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ABSTRACTS

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АБДУЛЛАЕВ, М. — ХАИТОВ, Р. (Сельскохозяйственный институт, Самарканд, СССР): **Влияние иммунного состояния животных на микрофлору кишечного тракта.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Опыты, проведенные на 60 подсвинках, показали, что животные выработавшие высокий поствакциальный антисибиреязвенный иммунитет статистически достоверно отличались от своих сверстников, с низким иммунитетом по микробиальному пейзажу кишечного тракта. Если у первых из 1 г фекалия на МПА выросли 38,0 ± 4,9 млн. колоний кишечных бактерий, то у животных альтернативной группы 23,0 ± 4,23. Рост грибов в аналогичных условиях у первых было в семь раз меньше, чем у вторых. Более прямую зависимость картины кишечной микрофлоры наблюдали у коров. Так, например, у коров положительно реагировавших на туберкулинизацию, общее количество выросших микробных колоний, в выше описанных условиях, было 38,08 ± ± 5,02 млн., а у здоровых животных — 56,64 ± 6,33. И в этом случае у иммунных животных грибы из фекалий выросли в три раза меньшем количестве. Ещё более яркую зависимость между иммунным состоянием животных и ростом кишечных бактерий из фекалия показали опыты, проведенные на каракульских ягнятах в постнатальном онтогенезе. Действительно, если у ягнят недельного возраста, у которых силен колостралный иммунитет кишечные палочки из одного грамма фекалия на МПА давали 448 ± 94,94 млн. колоний. В трехнедельном возрасте, когда колостральный иммунитет начинает ослабевать, а активный иммунитет ягнят ещё не становился — выросли 3129 ± 591,89 млн. колоний кишечной палочки и, самое главное, с наступлением иммунной зрелости, в 3-х месячном возрасте, рост колоний упал до 486 ± 157,79 млн. штук. Таким образом, все варианты иммунности оказывали воздействие на микробиальной пейзаж кишечного тракта.

АГИЙ, В. — ГРАБОВЕНСКИЙ, И. (Закарпатская государственная сельскохозяйственная опытная станция, В. Бакта, СССР): **Зависимость продуктивной отдачи нормализации калий-натриевого от сахаро-протеинового отношения в рационе бычков, откармливаемых на зеленых кормах.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Ранее нами (Агий и др., 1983) показано, что оптимальное отношение K : Na, в рационе откормочного молодняка крупного рогатого скота находится в пределах 3—5 : 1. Оно способствует улучшению углеводно-азотистого обмена и повышению среднесуточных приростов живой массы на 6,3—17 %, при снижении затрат кормов на единицу продукции и ее себестоимости.

В последних трех опытах установлено, что нормализация K : Na отношения в рационе откормочного молодняка крупного рогатого скота на фоне рационов состоящих из зеленых кормов и концентратов но при дефиците сахара (сахаро-протеиновое отношение 0,57—0,59 : 1) и нормальном уровне крахмала не сопровождается, повышением продуктивной отдачи таких рационов и улучшением течения обменных процессов.

С увеличением в рационе животных нормы поваренной соли количество натрия в цельной крови и ее плазме не возрастает, а отмечается только некоторое снижение концентрации калия. Уровень кальция, магния и серы не изменялся, а все остальные изучаемые нами показатели крови не выходили за пределы физиологических норм.

По убойному выходу, выходу туш, а также по химическому составу мяса между групповых достоверных различий не установлено с увеличением норм соли животным.

Только на фоне рационов сбалансированных по сахаропротеиновому отношению (сахар : переваримый протеин 1—1,5 : 1) наблюдается вследствие нормализации K : Na, отношения повышение среднесуточных приростов живой массы и усиление обменных процессов в сторону улучшения использования зеленых кормов на продукцию.

АЛЕКСАНДРОВ, С. — САНДЕВ, С. — СТОЯНОВ, А. — ЧАКЪРОВ, П. (Институт животноводства, Костинброд, Болгария): **Защищенный ДЛ-метионин в рационе ремонтных ярок.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Провели опыт с 6 группами ремонтных ярок (по 23 головы в каждой) северо-восточной болгарской тонкорунной породы. До начала опыта и уравнения групп ярок стригли. Опыт длился 358 дня. Одна группа служила контролем, II группа получала метионин незащищенный, III группа скармливали метионин, защищенный полимеризацией формальдегидом и мочевиной, IV группа — метионин, подвергнутый

грануляции и пропитке энтеросольвентыми смолами, V — метионин, защищенный полимеризацией формальдегидом, мочевиной и малеиновой ангидридом. Данные показывают, что добавка незащищенного метионина не влияет на уровень свободного метионина в сыворотке крови. Защитная обработка метионина, одноко, оказалось эффективной, так как его уровень в сыворотке крови повышался почти вдвое. На длину, тонину и крепкость волокна способ обработки и добавки метионина не влияют. Растяжимост шерсти возрастла на 20 % у ярок, получавших защищенный синтетическими смолами метионин. Делятся вывод, что уровень свободного метионина в крови является очень хорошим показателем эффекта защитной обработки аминокислот.

При скармливании хорошо сбалансированного рациона из кукурузного силоса, люцерного сено и смеси концентратов в весовом соотношении 1 : 0,25 : 0 3 при минимальным содержанием 1,40 кормовой единицы и 120 гр переваримого протеина добавка защищенного разными способами метионина не отразилась заметно на живом весе, выходе и качестве щерсти.

АЮПОВА, Р. С. (Институт физиологии Академии наук Казахской ССР, Алма-Ата, СССР): **Особенности строения и функции гипоталамуса, миндалины и гиппокампа и их значение в регуляции пищеварительных желез при различном состоянии (голод, насыщение) коз.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Для выявления регуляторных механизмов пищеварительных органов и пищевого поведения коз нами проводились исследования структурной и функциональной организации ядер гипоталамуса, миндалины и гиппокампа при различном состоянии животных. Опыты показали, что электростимуляция указанных структур у накормленных животных оказывает дифференцированное влияние на секреторно-ферментативную активность пищеварительных желез и моторную деятельность сложного желудка жвачных. При этом электрическая активность латерального и мамиллярного ядер гипоталамуса, латерального ядра миндалины и гиппокампа понижена, тогда как вентромедиального ядра гипоталамуса и базального ядра миндалины — повышена. В состоянии пищевой депривации в электрической активности латерального и мамиллярного ядер гипоталамуса, в латеральном ядре миндалины и гиппокампа доминирует высокочастотный ритм, а в вентромедиальном ядре гипоталамуса и базальном ядре миндалины преобладают низкочастотные ритмы. Секреторномоторная функция пищеварительных желез в этом состоянии усиливается и имеет волнообразный характер. Функциональная организация лимбико-гипоталамических структур мозга у коз связана с особенностями их сложного строения. Наибольший обьем и сложное строение имеют латеральное, вентромедиальное и мамиллярное ядра гипоталамуса, базальное и латеральное ядра миндалины. Отличительной чертой строения гиппокампа у коз является дорсо-вентральное расположение клеток.

Таким образом, в результате полученных данных установлена характерная для сельскохозяйственных животных функциональная и структурная взаимосвязь ядер гипоталамуса, миндалины и гиппокампа.

БАЗАНОВА, Н. У. — ТАШЕНОВ, К. Т. (Институт физиологии Академии наук Казахской ССР, Алма-Ата, СССР): **Пищеварение в рубце телят в условиях промышленного комплекса.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Опыты проводились на трех бычках алатауской породы с хроническими фистулами рубца. Животные были подобраны соответственно живой массе 45—50 кг и возраста 10—15 дней. Содержимое рубца брали до кормления, через три и пять часов после приема корма. До взятия первой пробы рубцового содержимого производился забор крови из яремной вены. На протяжении всего эксперимента подопытные животные находились в общем стаде, т. е. в аналогичных условиях кормления и содержания принятых а комплексе. Весь цикл выращивания и откорм телят делится на два периода: первый — 115 дней, второй — 211 день. Среднесуточный привес составил более 900 г. В конце второго периода животные достигли живой массы 450—480 кг.

Анализ содержимого рубца показал, что pH его в первый месяц жизни телят составил 5,9 ± 0,2, а затем с возрастом повышался до 6,5. Уровень летучих жирных кислот (ЛЖК) в рубце в первом периоде эксперимента находился в пределах 2,7—2,9 мэкв/ 100 мл. Наибольшего количества ЛЖК было достигнуто во втором периоде (9,2—9,8 мэкв/100 мл). Интенсивное сбраживание кормовой массы в рубце телят наблюдалось на седьмом месяце и совпадало с активным образованием ЛЖК.

Расщепление клетчатки в рубце во всех периодах опыта низкое. Изменение содержания общего и белкового азота идет параллельно на протяжении всего опытного периода. Из азотистых веществ определенный интерес представляет аммиак. Так, содержание аммиака в рубце и крови телят с возрастом повышается и наибольшей величины достигает в конце откорма, т. е. 13 месяцев.

БАЙМАТОВ, В. Н. (Башкирский сельскохозяйственный институт, Уфа, СССР): **Взаимосвязь патологических изменений в органах брюшной полости у животных при гепатозе.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Установлено, что большинство органов брюшной полости получают иннервацию от дорсального и вентрального вагуса, солнечного сплетения и диафрагмальных нервов. Кроме морфологической взаимосвязи они имеют и функциональную, как рефлекторно, так и через центральную нервную систему. При экспериментальном и спонтанном гепатозе у овец и кошек в нервных стволах и ветвях к печени, селезенке, почкам, желудку, тонкому кишечнику, надпочечникам, поджелудочной железе, а также в солнечном сплетении и спинальных ганглиях отмечаются дистрофические процессы. В мякотных нервных волокнах выявили наплывы нейроплазмы, которые видны в виде четкообразных утолщений чередующихся с утоньшением. Для безмякотных нервных волокон является характерным увеличение количества ядер леммоцитов. В солнечном сплетении и спинальных ганглиях клетки находятся в стадии некробиоза, в них имеется от 5 до 10 вакуолей. Ультраструктурные изменения в этих обьектах показали, что повсеместно идет демиелинизация мякотных нервных волокон. Миелин расщепляется на ламеллы, а затем раскручивается по спирали и образует целый ряд концентрических миелиновых колец. Осевой цилиндр сдавливается, вакуолизируется и распадается, а его место занимают кольца миелина. Интенсивная реактивная перестройка происходит в безмякотных нервных волокнах. В первую очередь в них увеличивается количество митохондрий, которые набужают, теряют кристы и распадаются. В леммоцитах гипертрофируется цитоплазма.

БАЙМАТОВ, В. Н. — ПОЛЯКОВ, В. Н. (Башкирский сельскохозяйственный институт Уфа, СССР): **Двигательная функция рубца и слепой кишки у овец в норме и при гепатозе.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Двигательную функцию рубца и слепой кишки у овец в норме, при экспериментальном и спонтанном гепатозе изучали на 12 животных с фистулами. Установлено, что при гепатозе снижается двигательная функция рубца и слепой кишки в среднем на 50 %. Вероятно это обьясняется наличием висцеральных связей с измененного органа на другие органы брюшной полости. Создаются благоприятные условия в желудочном-кишечном тракте для брожения и гниения кормовых масс, образуются и дополнительно всасываются в кровь токсические вещества, что усугубляет состояние организма. Количество основных сокращений рубца (за 5 минут) у ивец с гепатозами на 40—50 % ниже, а количество дополнительных на 10—15 % выше по сравнению с контролем. Также уменьшается сила и время этих сокращений. Число перистальтических сокращений слепой кишки уменьшается на 60 %, а ритмических — на 70 %, с уменьшением их силы и времени.

После внутримышечного введения темехина (в дозе 0,1 мг/кг живой массы животного в 1%-ном растворе) моторная функция рубца, у овец с гематозами, увеличивалась на 20—30 %. Тогда как у клинически здоровых животных она замедлялась на 5—6 %. Такзже отмечены изменения двигательной активности слепой кишки: у овец с гематозами число перистальтических и ритмических сокращений увеличивается на 10—16 %, а у контрольных животных замедляется на 60 %.

БЕСЕДА, И. — ВАЛЬКА, Й. — ДЮРИШОВА, Б. — БРУХАНИК, М. — ЧАСНОХОВА, М. — СТАНКО, П. (Институт физиологии сельскохозяйственных животных, Словацкая академия наук, Зволен, ЧССР): **Корреляционные связи мочевины сыворотки крови вместе с некоторыми показателями метаболического профиля коров, страдающих от метаболического алкалёза и ацидоза.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Корреляционные взаимосвязи между мочевиной сыворотки крови (М) с некоторыми параметрами метаболического профиля (МП) сопоставлялись в группах 50 дойных коров, страдающих от метаболического алкалёза (группа Ал) и 48 дойных

коров, страдающих от метаболического ацидоза (Ац). Результаты анализов были обработаны пьи помощи ЭВМ в виде гистограмм.

Корреляционные взаимосвязи М в месте с избранными параметрами МП изобрались в виде коррелограм. Были обнаружены большие дифференции между статистически значимыми корреляциями М и некоторыми показателями МП групп Ал и Ац. Например, в группе Ал корреляционные коэффициенты М-pH = 0,35, М-пCO_2 = = —0,29, М-ББ = 0,30, М-Гл = 0,44, М-Na = —0,34 . . . и т. д. В группе Ац корреляционные коэффициенты были М-pH = —0,09, М-пCO_2 = 0,06, М-ББ = —0,0004, М-Гл = —0,09, М-Na = 0,13 . . . и т. д.

Используемый метод даёт более глубокую картину о состоянии внутренней среды дойных коров. Он показывает тенденции, которые при общеупотребительном сопоставлении показателей профиля с рефферентными уровнями не возможно выявить.

Метод можно аналогически использовать для изучения разных других патологических состояний организма.

Все статистические калькуляции были сделаны при помощи ЭВМ Тесла — 270 и ЕЦ — 1026.

БИТЮКОВ, И. П. — БИТЮКОВ, Е. И. (Сельскохозяйственный институт имени профессора И. И. Иванова, Курск, СССР): **Особенности обмена углеводов у жвачных животных.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В период индивидуального развития обмен веществ у новорожденных телят, аналогичен моногастричным животным. Поэтому с первых суток жизни и до 1—1,5 месячного возраста у них отмечается наиболее высокое содержание глюкозы и других компонентов углеводного обмена. В два месяца концентрация этих соединений заметно снижается и затем стабилизируется на уровне, характерном для взрослых жвачных. Исследованиями установлено, что у новорожденных телят образуется значительно больше летучих жирных кислот, чем у взрослых животных, а с периода рубцового пищеварения концентрация их начинает уменьшатся. В первый месяц; жизни в крови телят содержится пировиноградной кислоты 3,6 ± 0,12 мг%, молочной кислоты, 14,6 ± 0,31 мг%, фруктозы 5,32 ± 0,04 мг%, гликогена 12,3 ± 0,51 мг%, а в дальнейшем их количество уменьшается. Обусловлено это тем, что в процессе пищеварения в рубце легкопереваримые углеводы подвергаются брожению с образованием органических кислот. Они всасываются в кровь, поступают в печень и используются для синтеза сахара, глюкогена, жира и других соединений. Причем из пропионовой и молочной кислоты в основном образуется глюкоза, концентрация которой у жвачных не высокая и составляет в среднем 48—56 мг%. При таком сравнительно небольшом количестве глюкозы энергетические процессы у них протекают на высоком уровне, как у моногастричных животных. Это обусловлено особенностями метаболизма углеводов у жвачных, у которых он тестно связан с энергетическим и липидным обменами.

ВРЫДНЫК, Ф. И. (Украинский научно-исследовательский институт физиологии и биохимии сельскохозяйственных животных, Львов, СССР): **Особенности пищеварения у крупного рогатого скота при скармливании сена, обработанного сжиженным аммиаком.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

На трех бычках с постоянными фистулами рубца и анастомозами 12-перстной кишки изучали ферментативные процессы в рубце, переваримость питательных веществ в желудоно-кишечном тракте и их усвоение при скармливании в составе рациона сена, обработанного в процессе заготовки сжиженным аммиаком. В контрольном периоде опыта те же животные получали в рационе сено без обработки.

Установлено, что в опытном периоде у животных в рубце увеличивается количество общего, белкового и аммиачного азота, нуклеиновых кислот, микроорганизмов, однако концентрация ЛЖК уменяшается. Изменяется тип ферментации в сторону увеличения уксуснокислого брожения. Увеличивается скорость эвакуации содержимого желудка в нижележащую часть пищеварительного тракта, вследствие чего снижается переваримость сухого вещества, азотистых и углеводных компонентов рациона в желудке и повышается их переваримость в кишечнике. Усвоение питательных веществ при этом увеличивается.

Данные о переваримости питательных веществ рациона, в состав которого входит сено, обработанное сжиженным аммиаком, хорошо коррелируют с таковыми же, по полученными в опытах *in vitro* и при инкубации сена в рубце *in situ*.

Можно считать, что изменения пищеварения у крупного рогатого скота при скармливании в составе рациона сена, обработанного аммиаком, обусловлены физико-химическими свойствами, приобретенными кормом во время его химической обработки.

ДВОРЖАК, Р. — ЯГОШ, П. — СКРЖИВАНЕК, М. — ЗЕНДУЛКА, И. (Ветеринарный институт, Брно, ЧССР): **Метаболический профиль и аминокислотный состав биомассы рубца и сычуга.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В течение эксперимента провели у четырех дойных коров, откормленных кукурузным силосом, люцерновым сенажом, кормовой свекловицой и концентратами, в месячных интервалах шесть отборов биомассы рубца и сычуга. Методом дифференциального центрифугирования подготовили для изучения аминокислотного спектра (17 АК) самостоятельную бактериальную фракцию жидкости рубца (BFBT). Получили следующих средных значений: pH жидкости рубца (BT) 6,59 ± 0,44, NH_3 BT 6,96 ± 4,76 ммол/л, общая концентрация летучих жирных кислот (TMK) BT 98,02 ± ± 17,73 ммол/л, pH жидкости сычуга (ST) 3,67 ± 1,28, NH_3 ST 4,63 ± 1,87 ммол/л, общая концентрация TMK ST 11,92 ± 3,37 ммол/л. Содержание общего сухого вещества биомассы BT 25,70 ± 7,84 г/л, содержание общего сухого вещества биомассы BFBT 1,73 ± 0,20 г/л BT, содержание общего сухого вещества биомассы ST 21,76 ± ± 4,62 г/л. Концентрация кислоты 2,6-диаминопимелинивий в BT 0,62 ± 0,23 ммол/л, в BFBT 0,06 ± 0,02 ммол/л BT, в ST 0,42 ± 0,13 ммол/л. Самую низкую концентрацию из изучаемых кислот определили в случае метионина: в BT 0,52 ± 0,21 ммол/л, в BFBT 0,07 ± 0,01 ммол/л BT, в ST 0,44 ± 0,18 ммол/л. Самая высокая в случае кислоты глутаминовой: в BT 7,91 ± 1,78 ммол,в BFBT 0,55 ± 0,11 ммол/л BT, в ST 4,56 ± ± 1,21 ммол/л.

ДЮРИШОВА, Б. — БЕСЕДА, И. — КРАЛИКОВА, Я. (Институт физиологии сельскохозяйственных животных, Словацкая академия наук, Зволен, Чехословакия): **Взаимодействие общих белков в сыворотке крови с избранными указателями внутренней среды дойных коров.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Была проведена оценка корреляционных отношений между общими белками (ОБ) в сыворотке крови и избранными указателями внутренней среды 18 дойных коров (опытная группа — О) с повышенными уровнями ОБ в сыворотке. Эта группа была сопоставлена с группой 12 дойных коров (контрольная группа — К), у которой уровень ОБ не превышал верхный физиологический предел.

В группе опытных дойных коров мы определили статистически значимые корреляции между общими белками сыворотки и:

1. избранными указателями сыворотки: ОБ-пCO_2 = —0,717; ОБ-АБ = —0,453; ОБ-АСТ = 0,414; ОБ-АЛТ = 0,415; ОБ-мочевина = 0,34; ОБ-альбумины = —0,869
2. избранными указателями молока: ОБ-Na = 0,437; ОБ-Ca = —0,527 и ОБ-общая кислотность молока = —0,529, причём в контрольной группе мы у тех же указателей определили следующие корреляции:

1. ОБ-пCO_2 = —0,11; ОБ-АБ = 0,083; ОБ-АСТ = —0,655; ОБ-АЛТ = 0,116; ОБ-мочевина ± 0,314; ОБ-альбумины = 0,152
2. ОБ-Na = 0,564; ОБ-Ca = —0,245; ОБ-общая кислотность = —0,628. Корреляционные отношения мы изобразили в виде коррелограми.

Легко объяснимо отношение между ОБ-АЛТ и ОБ-альбуминами. При сравнении обеих групп дойных коров были выявлены серьёзные расхождения в избранных показателях и общими белками. Для их объяснения необходимо глуюже изучить внутреннюю среду. Этой метод можно использовать при изученини разных патологических отношений.

ИЗБАСАРОВ, У. (Сельскохозяйственный институт, Самарканд, СССР): **Влияние макро- и микроэлементов на воспроизводительную функцию баранов.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Эксперименты проводились на 10 баранах каракульской породы в возрасте 4 лет, разделенных на 2 группы аналогов по 5 голов в каждой, 1 — контрольная, 2 —

опытная. Нами были проведены исследования кормов, шерсти баранов на содержание микроэлементов. При этом было выявлено дефицитное содержание меди, марганца, йода и цинка, в результате бараны страдали алиментарной импотенцией. Алиментарная импотенция снижается подкормкой кормолечебными гранулами, обогащенными микроэлементами и витаминами А, Д, Е. Состав кормолечебных гранул следующий: концентраты — 50 %, сено люцерны — 10 %, сено разнотравное — 20 %, томатно-фруктовые выжимки — 15 %, солома ячменная — 3,8 %, кожевенные стружки — 0,5 %, фосфат кормовой — 0,7 %, три витамина А, Д, Е — 1,0 г, кобальта хлористого — 0,5 г, калия иодистого — 1,0 г, марганца сернокислого — 20,0 г и меди сернокислой — 100,0 мг на 1 кг гранул. Питательность 1 кг кормолечебных гранул составляет 0,65 ± ± 0,05 кг кормоединиц. Животные 2 группы обретали заводскую упитанность, потребляя за 50 ± 5 дней до начала случки 50 ± 1 кг кормолечебных гранул на фоне пастбищного питания. Исследованиями установлено, что подкормка баранов перед случным периодом недостающими микроэлементами и витаминами улучшают спермопродукцию на 18—30 %, повышают оплодотворяемость овцематок на 10—15 %, сокращают перегул и яловость в маточном стаде.

ИЗБАСАРОВ, У. — ХАИТОВ, Р. (Сельскохозяйственный институт, Самарканд, СССР): **Резистентность организма баранов при полозой депрессии.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Опыты проводились летом и осенью на 20 баранах каракульской породы, разделённых на 2 группы аналогов по 10 голов в каждой. Возраст 4 года, живая масса 65 ± 3,0 кг. Показатели крови: летом: содержание гемоглобина — 10,3 ± 0,04 г%, концентрация эритроцитов — 7,3 ± 0,4 млн/мм³; лейкоцитов — 13,6 ± 0,7 тыс/мм³; сахара — 443 ± 15,0 мг%, СОЭ — 2,11 ± 0,02 мм/час, бактерицидная активность сыворотки крови — 90,0 ± 0,66 %, лизоцимная активность 36,0 ± 0,94 %, фагоцитарная активность нейтрофилов 92,0 ± 1,06 %; фагоцитарный индекс равен 6,5 ± 0,44. Спермы: объем эякулята — 0,82 ± 0,06 мл, активность спермиев — 7,0 ± 0,20 балла, концентрация — 2,56 ± 0,07 млд/мл, резистентность 17550 ± 105, переживаемость — 74,8 ± 1,36 час, живых спермиев — 78,5 ± 1,92 %. Показатели крови осенью: содержание гемоглобина — 12,5 ± 1,5 г%; концентрация эритроцитов — 8,0 ± 1,2 млн/мм³; лейкоцитов — 13,8 ± 0,5 тыс/мм³; сахар — 450 ± 20 г%; СОЭ 2,0 ± 0,01 % мм/час, бактериальная активность сыворотки крови — 92,5 ± 2,0 %; лизоцимная активность — 40,3 ± ± 2,5 %; фагоцитарная активность нейтрофилов — 92,5 ± 2,0 %; фагоцитарный индекс — 8,5 ± 0,5; спермы: объем эякулята — 1,20 ± 0,70 мл; активность спермиев — 8,0 ± ± 0,05; концентрация спермиев — 3,12 ± 0,50 млрд/мл; резистентность спермиев — 25051 ± 120, переживаемость — 74,8 ± 1,36 часов; живых спермиев — 78,5 ± 1,92 %. Из 2927 овцематок осемененных летом окотилось в срок 2029 (69,8 %), перегуляло 898 овец (30,2 %). Осеменено осенью — 1106 овец, окотилось — 948 (81,4 %), перегуляло 158 (18,6 %) овец.

КАРАЗИЯ, Р. — СЯДЯРЯВИЧЮС, А. — БАКУНАС, И. (Литовская ветеринария академия, Каунас, СССР): **Влияние чрезмерно интенсивного (неадекватного молочной продуктивности) кормления коров на микрофлору и микрофауну содержимого рубца.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Методом групп — периодов проведен опыт на коровах с разной молочной продуктивностью. Продуктивность коров первой группы ($n = 10$) составляло 3000—3500 кг, второй ($n = 10$) — свыше 6500 кг. В первом периоде эксперимента коровы обеих групп получали рационы концентратного типа, соответствующие их молочной продуктивности. Во втором периоде опыта животные второй группы получали такой же рацион, как и в первом периоде, а коровы первой группы кормились рационом высокопродуктивных коров.

В первом периоде опыта статистически достоверных различий микробиологических и биохимических показателей рубцового содержимого обеих групп коров не было. В рубцовом содержимом коров отмечено большое количество различных видов инфузорий. Не было существенных различий между группами и в показателях редукционной способности бактерий ($P > 0,1$), перевариваний целлюлозы ($P > 0,1$), брожения глюкозы ($P > 0,1$). Во втором периоде опыта у коров первой группы после 10-дневного кормления рационом высокопродуктивных коров значительно уменьшилось

редукционная способность бактерий ($P < 0\,001$), количество и подвижность инфузорий имела тенденцию к понижению ($P > 0{,}05$). Кроме того, pH уменьшилось до 6,49 ± 0,04 ($P < 0{,}001$), значительно ухудшилось брожение глюкозы ($P < 0{,}001$) и нарушилось соотношение ЛЖК. На 11 день второго периода опыта у трех коров первой группы появились первые клинические признаки дистонии преджелудков с неактивностью микрофлоры и микрофауны.

КАРЫНБАЕВ, Р. С. (Институт физиологии Академии Наук Казахской ССР, Алма-Ата, СССР). **Влияние различных концентраций аммиака в крови на характер обмена небелковых азотистых веществ в овец.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Исследования проводились на овцах с применением метода культуры изолированных органов. При перфузии печени, рубца и кишечника в портальную вену вводился водный раствор аммиака в различных концентрациях. В артериальной, венозной и портальной крови, а также в желчи, печеночной и кишечной лимфе определяли содержание мочевины, аммиака и глутамина. Результаты исследований показали, что повышение в крови концентрации аммиака в два раза, путем введения его водного раствора в портальную вену, приводило к резкому увеличению содержания как мочевины, так и глутамина в артериальной, венозной и портальной крови, чего не отмечалось в желчи и лимфе из печени и кишечника. Более высокая концентрация вводимого аммиака не вызывала такого увеличения количества небелковых азотистых веществ в артериальной, венозной и портальной крови, но приводила к резкому возрастанию их в печеночной и, особенно, в кишечной лимфе.

Таким образом, повышенное содержание аммиака в крови перфузируемых органов овец приводит к подавлению процесса образования мочевины в печени. Однако, руминогепатическая циркуляция азота, в наших опытах, осуществлялась в основном за счет мочевины, в меньшей степени аммиака и глутамина.

КИМ, Т. Д. — ИРГАЛИЕВА, Л. А. (Институт физиологии Академии Наук Казахской ССР, Алма-Ата, СССР): **Участие лимфатической системы органов пищеварения в азотистом обмене у овец.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В условиях экстракорпоральной перфузии изолированного комплексного препарата, включающего рубец, кишечник и печень с интактной межорганной связью, изучали лимфоток из печени и кишечника, венозное и артериальное давление, кровоток; определяли общий белок, фаракции белка, мочевину, аммиак, pH, pO_2, pCO_2 при введении в кровоток аммиака.

Показано, что введение аммиака в кровоток усиливает лимфоток как из печени, так и из кишечника, транспорт белков лимфой за единицу времени, несмотря на уменьшение концентрации их в лимфе (печеночной), что говорит об увеличении дренажной функции лимфатической системы. Высокое содержание мочевины и аммиака в лимфе оттекающей от органов свидетельствует об усилении детоксикационной роли ее. Эти данные указывают, что в единой функциональной системе изолированных пищеварительных органов сохраняется активная реакция лимфатической системы на введение аммиака в кровоток при минимальных физиологических и биохимических сдвигах в кровеносной системе.

Таким образом, участие лимфатической системы в азотистом обмене у овец в определенной степени реализуется на уровне саморегуляции.

КУМАР, Ю. (Эстонский научно-исследовательский институт животноводства и ветеринарии им. А. Мельдера, Тарту, Эстонской ССР): **Энзиматический анализ сыворотки крови и морфологическое исследование ткани печени при экспериментально вызванном гепатите.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

При помощи четыреххлористого углерода у 6 коров была вызвана острая (однократным введением в рубец CCl_4 в дозе 0,035 мл/кг) и у 5 коров подострая (шестикратным введением в рубец CCl_4 с интервалом 48 часов в дозе 0,005 мл/кг) форма гепатита. Выяснилось, что при острой форме гепатита наблюдается заметное повышение активностей глютамат-, сорбитол-, изоцитрат- и лактатдегидрогеназы (ГЛДГ, СДГ, ИЦДГ, ЛДГ), аспартат- и аланинаминотрансферазы (АСТ, АЛТ, γ-глутамилтрансферазы

(γ-ГТ) и щелочной фосфатазы (ЩФ). При этом особенно сильно повышалась активность ГЛДГ и АСТ. В период опыта у всех животных повышалось соотношение ГЛДГ/АСТ в среднем до 0,3. Для подострой формы гепатита характерно более умеренное повышение активностей сывороточных энзимов. Заметно повышенной оказалась активность ГЛДГ и СДГ, за ним следуют ИЦДГ и АСТ. Соотношение ГЛДГ/АСТ в сыворотке крови приближается к 1. Морфологические исследования показали, что при острой форме гепатита в паренхиме печени обнаруживаются мелкоочаговые некрозы и некробиозы со скоплением гистоцитов между дольками. При подострой форме гепатита наблюдали чрезвычайно многообразные дистрофические процессы в клетках от незначительного липофусцина до развития некроза отдельных клеток. Наблюдается мелкокапельное ожирение печеночных клеток, расположенных как в центре долек, так и в периферии. Наряду с этими изменениями местами наблюдается явление регенерации.

ЛАГОДЮК, П. З. — ЧАРКИН, В. А. — КЛОС, Ю. С. — ДРОНИК, Г. В. — ГНАТИВ, В. И. — КИСИЛЬ, И. О. — СОЛОНИНКО, И. И. (Украинский научно-исследовательский институт физиологии и биохимии сельскохозяйственных животных, Львов, СССР): **Обмен веществ в ткани молочной железы жвачных при естественной и индуцированной лактации.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В ткани вымени коров и полновозрастных телок на втором месяце лактации, искусственно вызванной прогестероном, эстрадиолом и резерпином, исследовали морфологические показатели, метаболиты белков и липидов.

У коров и телок индуцированная лактация по сравнению с естественной характеризовалась протеканием в молочной железе процессов пролиферации, формированием лобуло-альвеолярных структур, дифференциацией железистых клеток в более краткие сроки. Эти процессы, однако, более интенсивно протекали у телок, о чем свидетельствует более активное включение меченых предшественников в нуклеиновые кислоты.

Концентрация растворимых белков молочной железы (РБМЖ) у телок и коров с индуцированной лактацией была близкой, но на 47 % выше, чем у коров с естественной лактацией. Содержание фракции РБМЖ, аналогичных по подвижности β-глобулинам было одинаковым, а -альбуминам, α- и сумме β_2-, γ_1- и γ_2-глобулинов было соответственно на 27, 42 и 100 % больше по сравнению с естественной лактацией. Иммунохимическим анализом РБМЖ с имунными сыроватками к РБМЖ, белкам сыроватки молока и крови у исследуемых животных существенных отличий не было установлено.

С развязыванием лактации половыми гормонами у коров и телок снижалось содержание общих липидов и их фракций в три раза. При этом относительное содержание фосфолипиддов и холестерина снижалось, а триглишеридов — заметно повышалось. Эти изменения соответствовали картине, характерной для естественной лактации.

МЕЛЬНИЧУК, Д. А. (Украинская сельскохозяйственная академия, Киев, СССР): **Метаболические механизмы гомеостаза у животных при нарушении кислотно-щелочного равновесия в организме.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В настоящее время известно, что основными системами гомеостаза в организме человека и животных при нарушении кислотно-щелочного равновесия (КЩР) являются: распираторная (регулируемое дыхательным центром удаление из организма CO_2), экскреторная (удаление из организма H^+ и HCO_3^- через почки и пищеварительный тракт) и буферная (бикарбонатная, фосфатная, белковая, гемоглобиновая, минеральные вещества костной ткани и др.). Распираторную и экскреторную системы гомеостаза относят к физиологическим. Настоящий доклад посвящен сущности еще одной системы кислотно-щелочного гомеостаза, которую предлагается назвать метаболической. Она представляет собой совокупность таких метаболических симптомов как усиление или угнетение кетогенеза, аммониегенеза и утилизации аммония, гликолиза и глюконеогенеза, функционирования цикла трикарбоновых кислот и липогенеза в тканях, наблюдаемых в условиях, изменения КЩР в организме. Гемеостатический эффект перечисленных метаболических симптомов заключается в изменении интенсивности взаимопревращений сильных органических кислот и оснований в электролитонейтральные соединения или сильных электролитов в более слабые и наоборот, что направлено на нормализацию внутриклеточного pH.

НЕМЕЧЕК, Л. — ДВОРЖАК, Р. — ЯГОШ, П. — СНАШИЛ, М. — ЗЕНДУЛКА, И. (Хирургическая клиника, Ветеринарный институт, Брно, ЧССР): **Имплантация перманентных канюль рубца у крупного рогатого скота.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Перманентные канюли рубца имплантировали в течение 1980—1986 годов у 51 животного. Канюль изготовили индивидуально из флексона, большую часть из поливинилхлорида. Внутренний диаметр канюль колебался с 8 до 13 цм. Хирургическое вмешательство провели на стоящих животных после предыдущей седации применением ксилазина в дозе 0,25 мл на 100 кг веса. Для блокирования чувствительности брюшной стенки употребили проксимальной паравертебральной анестезии тринадцатого грудного и первого до третьего люмбального нервов. В полость рубца канюль вводили лапаротомией и руменотомией в *fossa paralumbalis sinistra* согласно обыкновенным хирургическим методикам. После введения канюли в отверстие рубца прилегания краев рубца и его соскальзывания достигали швом его стенки в верхней и нижней комиссуре тесно над внутренней манжетой канюли. Аналогично провели шов брюшины, мускулов и кожи. Настоящей фиксации канюли достигли навинтованием внешнего кольца. Кожные швы снимали через 10—12 суток, реконвалесценция животных после операции была 3 недели. В течение экспериментов проверили самый подходящий тип канюли для рубца и получили опыт с порядком операции имплантации канюль и послеоперационным уходом.

НИКИТИН, Б. Н. (Институт физиологии Академии наук Казахской ССР, Алма-Ата, СССР): **Влияние силосов с бактериальной закваской на пищеварение и продуктивность жвачных животных.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В хронических опытах на лактирующих коровах и молоднике крупного рогатого скота проведены сравнительные исследования процессов пищеварения в рубце и продуктивности (молочной и мясной) при скармливании кукурузных и сорговых силосов спонтанного брожения и с бактериальной пропионовокислой закваской. Показано, что силосы с закваской по сравнению с контрольными менее кислые pH-3,9—4,0, содержат больше общего и белкового азота, витаминов A, группы B, особенно B_{12} и пропионовой кислоты (до 0,35 %). При одинаковом уровне кормления на низкоконцентратной диете (силос составлял более 50 % рациона по питательности) пищеварительные процессы в рубце и продуктивность у контрольных и подопытных животных достоверно отличались. При относительно близких величинах pH рубца общее количество летучих жирных кислот (МЭКВ/л) и их соотношение, % в рубце были не одинаковыми (средние величины, контроль: общее количество — 110—115, уксусная — 68, пропионовая — 14, масляная — 18, опыт: общее количество — 120—125, уксусная — 66, пропионовая — 23, масляная — 11). Бродильная активность по Эйнгорну, разложение клетчатки и уровень белкового азота в рубце у подопытных животных были выше на 30—50 %. В крови метаболиты, характеризующие кислотно-щелочное равновесие, различались.

Молочная продуктивность и количество молока (по белку, жиру и лактозе) у подопытных коров достоверно выше, чем у контрольных. Молодняк крупного рогатого скота при поедании силоса с закваской увеличивал прирост живой массы в сутки на 200—250 г по сравнению с контролем.

НОВОСАД, Р. — СОКОЛА-ПАТКОВСКАЯ, Б. (Сельскохозяйственная Академия, Вроцлав, Польша): **Замечания о поведении элементарной серы у жвачных.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Обеспечение в рационе оптимального к-ва неорганической серы является условием правильного роста и продуктивности животных. Процесс включения неорганической серы в метаболический тракт не в полне ясен.

Овцы получали однократно с кормом элементарную серу в виде радиоизотопа сера-35 без носителя в дозе 1,11 МБк. Кровь исследовали спустя 30 минут и через каждый час в течении 12 ч. и дальше раз в день в течении 12 дней. Пробы мочи и кала брали ежедневно в течении 24 дней. Серу-35 обнаружено в 30 минут после введения. Радиоизотоп удерживался в крови в течении опыта. Кривая активности крови имеет скачкообразный характер, самую высокую активность обнаружили в 1, 2 и 3-й час опыта, в дальнейшим активность крови уменьшалась.

Кривые активности проб мочи и кала тоже проходили скачкообразно, пики чередовались с низким уровнем в течении 24 дней опыта. По мере истекания времени

активность проб уменьшалась. Кривая активности серы-35 в мочи содержит ряд пиков: 1 пик с 1 по 5 день, 2 пик с 7 по 8 день, 3 пик с 10 по 13 день опыта и дальше более низкие «двудневные» пики до конца опыта. Активность проб кала тоже характерна неравномерным содержанием серы. Самая высокая активность в первые 7 дней опыта, очередные пики с 9 по 12 день и на 15 и 17 день опыта. Интересно, что сера-35 введена в виде элементарной обнаружена в крови в первый час опыта. Можно полагать; что у жвачных переход в русло крови происходит не только из за активности микроорганизмов пищеварительного тракта как полагают некоторые авторы.

ПОЛЯКОВ, В. Н. (Башкирский сельскохозяйственный институт, Уфа, СССР): **Показатели суточной моторной функции рубца у овец в норме и при экспериментальной патологии щитовидной железы.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Моторная функция рубца играет важную роль в интенсивности пищеварительных процессов. Выяснены ее основные закономерности. Однако двигательная активность рубца в различные периоды суток при кормлении овец и натощак в норме и при разной функциональной активности щитовидной железы изучена недостаточно.

Была поставлена задача выяснить динамику моторики рубца в круглосуточных опытах на полифистульных овцах в норме, при ати реозе, гипо- и гипертиреозе. Регистрация сокращений рубца проводилась фистульным и бесфистульным баллонно-кимографическими методами. Атиреоз у овец получали путем тиреоидектомии, гипертиреоз-введением тиреоидина, тироксина или трийодтиронина, гипотиреоз-блокадой щитовидной железы 6-метилтиоурацилом (6-МТУ).

Анализ кимограмм, показал, что рубец сокращается постоянно с периодами усиления и ослабления. Усиления при кормлении и натощак особенно выражены в утренее (9.00—10.00 часов), дневное (14.00—15.00 часов) и вечернее (18.00—19.00 часов) время (в часы обычного кормления овец в лаборатории). Ослабление моторики наблюдалось в ночное время.

При гипертиреозе количество сокращений рубца и их амплитуда увеличивались причем в ночное время ослабление двигательной функции рубца было менее заметным.

При атиреозе и гипотиреозе (естественном и экспериментальном) количество сокращений рубца и их сила уменьшались, особенно заметное снижение интенсивности моторики отмечалось в ночное время.

ПУПИН, И. Г. — ГРИВУЛ, Т. Н. — ВЫШНИВСКИЙ, И. Я. (Украинский научно-исследовательский институт физиологии и биохимии сельскохозяйственных животных, Львов, СССР): **Интенсивность метаболизма нитрат-нитрата в рубцовой среде и влияние на микробиальный протеосинтез.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В инкубационных опытах установлена несоразмерность количества азота-15, накапливаемого в кислотонерастворимой фракции азотистых веществ (белковом азоте) микроорганизмов из меченых, нитрата, нитрита и мочевины, количеству мечаного аммиака, образуемому из указанных субстратов при одних и тех же условиях. Показано, что отрицательное влияние нитрита на организм жвачного животного проявляется уже на уровне рубцового метаболизма. Нитрит натрия, добавленный к содержимому рубца в дозе 0,5 до 15 мкмолей/мл, тормозил ассимиляцию аммонийного азота микроорганизмами рубцовой среды. Причем внесение нитрата в количестве от 0,5 до 15,0 мкмолей мл приводило к почти линейному уменьшению интенсивности ассимиляции, дальнейшее увеличение дозы нитрита усиливало угнетение ассимиляции аммония, но весьма менее выражено.

В отдельной серии опытов нитритный анион в количестве 7,5 мкмоль на 1 мл рубцовой среды подавлял дезаминирование глутаминовой и аспарагиновой кислот и достоверно угнетал вовлечение их меченого азота в микробиальный протеосинтез. Ингибирующее влияние нитрата проявлялось более существенно на интенсивность ассимиляции азота испытуемых аминокислот, чем на их дезаминирование.

РАЙД, Х. — КОКА, Э. — БАН, И. (Эстонский научно-исследовательский институт животноводства и ветеринарии им. А. Мельдера, Тарту, Эстонская ССР): **Контроль состояния вымени у коров путем измерения электропроводности молока.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Измеритель электропроводности молока предназначен для быстрого выявления скрытых маститов у коров в условиях фермы. Работа прибора основана на измере-

нии тока через датчик, который находится под переменным напряжением постоянной величины. Ток через датчик пропорционально зависит от величины электропроводности. Этот ток преобразуется в пропорциональное с ней напряжение, а напряжение затем преобразуется в цифровой код и отображается на цифровом табло. Датчик (объем 4 мл) состоит из 3 кольцевых электродов и снабжен теплоизолятором. Время непрерывной работы прибора без подзарядки аккумулятора составляет 8 часов. Диапазон измерения 0 . . . 20 мСм, разрешающая способность 0,1 мСм. Для диагностики скрытых маститов в начале доения после сдаивания первых 3 . . . 4 струек или в конце доения в датчик надаивают молоко отдельно из каждой доли. Фиксируют показание на табло в течение 2 . . . 3 секунд. Пороговым значением электропроводности нормального молока при температуре 36 . . . 38 °С считали 8,5 мСм. Электропроводность молока коррелирует с реакцией с 2%-ным мастидином ($r = 0,76$), с содержанием лактозы ($r = -0,72$) и содержанием соматических клеток ($r = 0,52$). При использовании прибора достигнуто высокое совпадение результатов (90 %) с другими методами диагностики, по сравнению с молочно-контрольной пластинкой сокращаются затраты труда и времени на исследование, не требуется специальных реактивов и средств.

РЕГАК, П. — КОШТЯ, К. — КОШТЬОВА, Д. — БОДЯ, К. (Институт физиологии сельскохозяйственных животных, Словацкая Академия Наук, Кошице, ЧССР): **Гипоталамическая гиперфагия у гусей в отношении к диете.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

У гусей рейнской и ландейской породы исследовалась гипоталамическая гиперфагия после билатеральных электролитических лезий гипоталамического вентромедиального ядра. Гуси кормились вволю кукурузной монодиетой и полной кормовой смесью. Индивидуальный прием корма оценивался у животных разводимых отдельно в клетках в течение 51 дней (с чего 15—18 дней — адаптационный период). Электролитические лезии проводились у животных в возрасте 25—26 недель стальным электродом, анодным постоянным током 2,0 мА в течение 30 сек. в нами определенных стереотаксических координатах. У гусей с лезиями вентромедиального ядра отметили гиперфагию при обеих использованных диетах. Гиперфагия у гусей кормленных полной кормовой смесью достигла статистически достоверно высшего уровня (на основе полного количества принятого корма во время от лезий), чем у гусей кормленных кукурузной монодиетой. Привес образовыванный подкожным, брюшным и кишечным жирами был у гусей кормленных полной кормовой смесью тоже достоверно высший, чем у гусей кормленных кукурузной монодиетой. Вес печени и процент жира в печени был статистически достоверно выше у гусей ландейской породы кормленных кукурузой, чем у гусей рейнской породы при использовании кукурузной монодиеты и полной кормовой смеси.

РУДЯК, Т. Н. (Сельскохозяйственный институт, Самарканд, СССР): **Гистофункциональные изменения в органах животных под влиянием эхинококковой жидкости.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Нами были проведены опыты по введению эхинококковой жидкости различной модификации животным и изучение влияния её на организм. После введения эхинококковой жидкости наблюдалось снижение гемоглобина на 1,8 г%, повышение количества лейкоцитов в 2 раза. В лейкоцитарной формуле отмечался рост количества эозинофилов в 3,6 раза. При исследовании общего белка и белковых фракций сыворотки крови наблюдалось снижение общего белка на 3,11 г% и альбуминов на 28,5 %. Возросло количество альфа-глобулинов на 6,4 % и особенно содержание гамма-глобулинов в 2,5 раза. Отношение альбуминов к глобулинам снизилось до 0,45 (против 1,47). При гистологическом исследовании были выявлены следующие изменения: в головном мозгу вокруг сосудов имелись круглоклеточные инфильтраты и периваскулярный отек. В печени по ходу междольковой соединительной ткани выявлены скопления лимфоидных элементов — гистеоцитов и эозинофилов. В корковом слое почек — очаги инфильтрации с атрофией клубочков и канальцев. В белой пульпе селезенки встречались гигантские клетки. При гистохимическом исследовании органов отмечалось снижение активности щелочной и кислой фосфатаз в печени. В почках активность щелочной фосфатазы угнеталась, активность кислой — увеличивалась в клубочках. Реакция сукцинатдегидрогеназы увеличивалась как в печени, так и в почках.

Таким образом, введение эхинококковой жидкости влечет к сенсибилизации организма и снижению резистентности.

САВОЙСКИЙ, А. Г. — ЛИТВИНОВА, Е. Ф. (Московская ветеринарная академия, Москва, СССР): **Динамика фракций белка после введения раствора глицина у высокопродуктивных коров, больных гепатозом.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Эксперименты проведены на 20 коровах швицкой породы в возрасте 5—6 лет с молочной продуктивностью 4,5—5,5 тыс. л, сформированных в две группы — опытную (больные гепатозом) и контрольную (клинически здоровые животные). Коровам вводили внутривенно 40%-ный раствор глицина в дозе 0,045 г на 1 кг живой массы с последующим взятием крови через 5, 15, 30 и 60 мин. Белковые фракции сыворотки крови исследовали методом диск-электрофореза в полиакриламидном геле. Установлено, что в опытной группе по сравнению с контрольной исходный уровень трансферрина, церулоплазмина и постальбумина ниже на 19,6 %, альбумина на 9,5 %, $\alpha 2 + \gamma 1$-глобулина на 36,9 %; $\beta 2$- и $\gamma 2$-глобулина выше на 19,0 %. У здоровых коров спустя 5 мин после нагрузки отмечали повышение уровня всех фракций белка, за исключением альбумина, затем снижение его и возвращение через час к исходному уровню. У коров опытной группы через 5 мин наблюдали понижение концентрации альбумина на 4,0 %, $\beta 2$-гробулина на 9.8 %, постальбумина на 16,6 %, $\gamma 2$-глобулина на 19,1 % при одновременном повышении уровня трансферина на 17,6 % к исходному. Через 15 мин количество $\gamma 2$- и $\alpha 2 + \gamma 1$-глобулина, постальбумина и альбумина нарастало. Через час уровень $\gamma 2$-глобулина и альбумина еще не достиг первоначальной величины. Концентрация $\alpha 2 + \gamma 1$-глобулина, церулоплазмина и трансферрина оставалась повышенной. Таким образом, изменение динамики фракций белка в сыворотке крови коров опытной группы после внутривенного введения аминокислоты глицина свидетельствует о нарушении белковосинтетической функции и компенсаторно-приспособительных механизмов гепатоцитов в условиях увеличенной функциональной нагрузки на дистрофически пораженную печень.

СКВАРУК, В. И. — БОРТНОВСКИЙ, П. Ф. — ВОЛТОРНИСТЫЙ, В. М. (Украинский научно-исследовательский институт физиологии и биохимии сельскохозяйственных животных. Львов, СССР): **Влияние способа выпойки молозива на организм и интенсивность роста телят.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Изучали иммуннобиологическую реактивность организма телят, концентрацию в их крови метаболитов белкового и энергетического обмена, поведенческие реакции, а также интенсивность роста при ручной нормированной выпойке молозива и нерегулируемом подсосном содержании в течении 1, 3 и 5 суток.

Установлено, что подсосное содержание телят в молозивный период физиологически более приемлимо для организма, чем ручная выпойка. В этих условиях телята самостоятельно сосут молозиво в наиболее оптимальные сроки после рождения (через 2—3 часа), потребляют его часто (6—8 раз в сутки) несколько в больших количествах, чем при ручной выпойке, но небольшими порциями, что способствует его эффективному перевариванию и усвоению питательных веществ.

Это обеспечивает более высокую резистентность организма за счет увеличения концентрации белков и иммунных глобулинов в крови телят не только в молозивный период, но и в старшем возрасте. Характерно, что более интенсивная пассивная иммунизация организма теленка иммуноглобулинами молозива в условиях подсоса способствует, правдоподобно, повышению функциональной активности лимфоидных органов. Содержание белка и иммунных глобулинов в тканях тимуса, селезенки и лимфоузлов телят 3-х недельного возраста была заметно выше, чем при ручной выпойке молозива. Приросты живой массы телят коррелировали с иммунным статусом организма.

СОЛОВЬЕВА, Т. Л. — МУСУЛЬБАС, М. С. — ТИХОМИРОВА, Н. С. (Научно-исследовательский институт животноводства лесостепи и полесья УССР, ВАСХНИЛ, Харьков, СССР). **Регуляция распределения энергии у коров.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Изучена активность липогенеза (ЛПГ) и липолиза (ЛП) при инкубации *in vitro* образцов подкожной жировой ткани (ПЖТ) и молочной железы (МЖ) коров в разные стадии лактации. Установлено, что через 1, 3 и 6 мес. после отела активность ЛПГ, выраженная в 1.10^{-3} мгС/1мг Р-ДНК, составила соответственно в ПЖТ 7.16 ± 1.8; 162.5 ± 54.4; 254.4 ± 90.3, а в МЖ — 101.6 ± 19.6; 82.5 ± 14.2; 26.0 ± 13.5. Скорость стимулированного адреналином ЛП в эти периоды составила в ПЖТ 1186.6 ± 148.4;

1402.7 ± 354.9; 1071.6 ± 197,0, а в МЖ — 753.3 ± 253.I; 468.7 ± 74.1; 421.7 ± 72.9. Таким образом, регуляция метаболизма у коров в начале лактации направлена на подавление использования питательных веществ в ПЖТ за счет угнетения ЛПГ, чему способствует обнаруженное нами ранее подавление активности инсулярного аппарата поджелудочной железы и рецепторной способности тканей к инсулину в этот период. Усиление ЛПГ в ПЖТ при максимальной активности ЛП через 3 мес. лактации обеспечивает снабжение МЖ синтезированными *de novo* жирными кислотами без отложения их в ПЖТ. На спаде лактации на фоне резко возросших активности поджелудочной железы и рецепции периферических тканей к инсулину наблюдается значительное увеличение ЛПГ и отложения в ПЖТ запасных энергетических соединений, израсходованных в начале лактации. Тот факт, что наиболее резко в течение лактации изменяется скорость ЛПГ, дает основание предположить, что этот процесс является основным звеном регуляции распределения энергетических соединений между использованием в теле и молокообразованием у коров.

СЯДЯРЯВИЧЮС А. — КАРАЗИЯ, Р. — БАКУНАС, И. (Литовская ветеринарная академия, Каунас, СССР): **Способы восстановления деятельности функции микрофлоры и микрофауны рубцового содержимого крупного рогатого скота.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Для восстановления жизнеспособности позитивной симбиотной микрофлоры и микрофауны преджелудков применяли ферментные препараты амилосубтилин Г3х и протосубтилин Г3х. Препараты оказывают лечебный эффект лишь при наличии живой микрофлоры и при введении его непосредственно в рубец. При пониженной активности микрофлоры и микрофауны преджелудков после введения терапевтических доз препарата на другой день значительно увеличивается число и подвижность инфузорий, улучшаются редукционные процессы бактерий и моторика преджелудков по сравнению с контролем ($P < 0{,}001$). Выздоровление коров и полное восстановление жизнедеятельности микроорганизмов происходит в среднем в течение трех суток. Слишком большие дозы препарата оказывают отрицательное влияние на метаболизм рубца. При более тяжелых заболеваниях преджелудков, когда число сокращений рубца снижается до 6 раз за 10 минут, pH содержимого рубца отклоняется в кислую или щелочную сторону, инфузории исчезают либо наблюдаются единичные и малоподвижные,, значительно понижается редукционная способность бактерий, указанный способ лечения не дает эффекта. В таким случаях необходимо тщательно удалить содержимое преджелудков путем промывания водой, затем ввести в рубец смесь ферментных препаратов и спустя 10 минут — 10—15 литров содержимого рубца здоровой коровы.

ТАРАКАНОВ, Б. В. — НИКОЛИЧЕВА, Т. А. (Всесоюзный научно-исследовательский институт физиологии, биохимии и питания сельскохозяйственных животных, Боровск, СССР): **Становление целлюлозолитической микрофлоры и метаболических функций в рубце телят.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Изучено становление микрофлоры и ее гидролитической функции в рубце телят в связи с возрастом и условиями кормления. Установлено, что снижение уровня молочного кормления при выращивании бычков до 5-месячного возраста с 400 кг молока и 600 кг заменителя до 230 и 250 кг соответственно ппи обеспечении высококачественными растительными кормами способствует более раннему становлению в преджелудках целлюлозолитической микрофлоры. У 3-месячных опытных бычков активность целлобиогидролазы и суммарная целлюлозолитическая активность, в сравнении с контролем, возрастали на 21,7 и 19 % соответственно. У 4—5-месячных животных активности этих ферментов значительно варьировали, но тем не менее коэффициент переваримости клетчатки у опытных бычков был выше и составил 59,8 против 55,5 % в контроле.

Изучение целлюлозолитической микрофлоры в рубце 7—11-месячных телок показало, что повышение уровня грубых кормов в рационе с 25—30 до 37—44 % по питательности увеличивало количество целлюлозоразрушающих бактерий, активность целлобиогидролазы и суммарную целлюлозоразрущающую активность в содержимом рубца на 3,4—37,5; 10—20,8 и 2.7—35 2 % соответственно. Коэффициент переваримости клетчатки при этом возрастал у 10-месячных телок до 64.8, против 53,7 % в контроле ($P < 0{,}05$). Следовательно, становление микрофлоры и ее гидролитической функции в рубце телят определяется механизмом субстратной индукции.

ХРЕНКОВА, М. — ЧЕРЕШНЯКОВА, З. — СОММЭР, А. — ФЛЬАК, П. (Научно-исследовательский институт животноводства, Нитра, ЧССР): **Энзиматическая деградируемость кормового боба обработанного формальдеидом.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В обширных экспериментах методом ин витро мы изучали доступность, или же деградируемость белков кормового боба обработанного формальдеидом. Дозы формальдеида были с 0,2 г до 2,0 г HCOH на 100 г сырого протеина.

Кроме наблюдания микробиальной деградируемости в действии микрофлоры рубца мы оценивали энзиматическую деградируемость пепсином, трипсином и панкреатином. Значительным обнаружением являлось ограничение растворимости и деградируемости в рубце под влиянием пепсина. Самое большое понижение растворимости мы отметили при апликации самых высоких доз формальдеида, причем содержание растворимого азота снизилось почти в трое больше в сравнении с нативным кормовым бобом. Напротив того мы узнали улучшение энзиматической переваримости сырого протеина азотсодержащих и сухого вещества при помощи пепсина, но главным образом при помощи трипсина и панкреатина. Самая низкая переваримость в сравнении с нативным бобом была регистрирована при переварении пепсином. Переваримость трипсином и панкреатином значительным образом понизилась только при дозах больше 1,6 г HCOH.

Самые оптимальные результаты при следованных показателях мы получили при дозах с 0,8 до 1,2 г HCOH на 100 г сырого протеина кормового боба.

ЦЮПКО, В. В. — БЕРУС, М. В. — КЛИМОВ, В. А. — ШЕВЧЕНКО, Г. С. (Научно-исследовательский институт животноводства лесостепи и полесья УССР, Харьков, СССР): **Доступность сырого протеина для переваривания в тонком кишечнике.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

На бычках с обводными канюлями в начале дуоденума определяли поступление сырого протеина (СП) из сложного желудка. Опыты проведены на 22 рационах, различавшихся по уровню кормления (0,51—0,89 MJ ME/кг^{0,75}), концентрации (7,8—11,7 MJ ME кг сухого вещества — СВ), концентрации СП (9,0—15,7 г/кг СВ), растворимости СП в буфере Мак Доугала (24,5—57,3 %) и содержания разрушаемого СП (INRA, 1978) г на 1 MJ ME. Доступность СП для переваривания в кишечнике выражали в % к принятому и в г СП на 1 MJ ME рациона. Доступность СП составляла от 70 до 140 % по отношению к принятому и 11,35 ± 0,30 г IMJ ME (9,5—13,9 г MJ). Процент поступления СП в кишечник снижается с увеличением его концентрации в СВ рациона (r = —0,74), при увеличении растворимости (r = —0,77) и количества разрушаемого СП на IM ME (r = —0,83). Выведены управления регрессии для расчета поступления СП в % к принятому (y_1) и в граммах на IMJ ME (y_2).

$$y_1 = 161{,}58 + 21{,}94 \,.\, X_2 - 11{,}03 \,.\, X_3 \; (r = 0{,}65;\ \text{OA-7,9})$$

$$y_2 = 14{,}1628 - 0{,}0747 \,.\, X_1 \; (r = 0{,}59;\ \text{OA-9,5 \%})$$

$$y_2 = 11{,}378 + 4{,}0158 \,.\, X_2 - 0{,}074038 \,.\, X_1 \; (r = 0{,}57;\ \text{OA-7,7})$$

где: X_1 — концентрация растворимого СП с СВ %
X_2 — уровень кормления MJ/кг^{0,75}
X_3 — разрушаемый СП, г MJ ME

ЧАЛАБАЕВ, А. (Сельскохозяйственный институт, Самарканд, СССР): **Перегревания организма и показатели естественной резистентности у животных.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Эксперименти проводились на 20 ягнятах каракульской породы с 1 июля по 31 августа 1984 года, разделенных на 2 группы по 10 голов в каждой, 1-контролная, 2-опытная. Проведены общие гемотологические исследование крови, определены лейкоцитарная формула, количество общего белка и их фракций, титр лизоцима крови, частоты пульса, дыхания и температуры тела животных. Исследованиями установлены, что ягнята опытной группы имели в 5 % случаев высокий титр, в 80 % нормальный и в 15 % случаев низкий титр лизоцима крови, а у ягнят контрольной группы соответственно: 15 %, 65 %, 20 % имели низкий титр ЛК-1. Температура тела ягнят, содержавшихся под теневым навесом в среднем 38,5 ± 38,8 °C, пульс 75—80 ударов

и дыхания 35—50 раз в минуту. У контрольных ягнят температура тела 39,1 ± 40,2 °C, пульс 90—110 ударов и дыхания 80—95 раз в 1 минуту. Ягнята сбивается в кучу, отказываются от корма, стоят неподвижно опустив голову, у некоторых рот раскрыт и свисает язык. Гемотологические показатели. Эритроциты у ягнят 2-группы в пределах 9,1 ± 0,6 млн мм^3, лейкоситы 10,2 ± 1,02 тыс./мм^3, гемоглобин 11,2 ± 0,8 г%, фагоцитарная активность нейтрофилов 45,2 ± 1,31 % и количество общего белка 6,7 ± 0,12 г%, а у ягнят первой группы эти показатели соответственно составили: 8,7 ± 0,7 млн мм^3, 9,3 ± 1,4 тыс. мм^3, 10,8 ± 0,6 г%, 39,21 ± 1,37 % и 6,3 ± 0,15 г%.

Таким образом, при перегреваниях организма снижается показатели естественной резистентности у животных.

ЧЕРЕШНЯКОВА, З. — ХРЕНКОВА, М. — СОММЭР, А. — ФЛЬАК, П. (Научно-исследовательский институт животноводства, Нитра, ЧССР): **Перемены растворимости азотистых веществ и содержания выделенных аминокислот из подсолнечных жмыхов методом ин витро в зависимости от дозы формалдеида.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Растворимость азотистых веществ подсольнечных жмыхов обработанных увеличающимися дозами HCOH (0,0—2,0 г HCOH на 100 г азотистых веществ) существенно понижалась. Из величины 1,998 г N на 100 г сухого вещества в нативном корме понизилась на 0,296 г N на 100 г сухого вещества при самой большой дозе формальдеида. Обработанные подсолнечные жмыхи мы в условиях ин витро после инкубации с рубцовой жидкостью впредь инкубировали с пищеварительными жмыхами в следующем порядке: пепсином, трипсином и панкреатином. В ферментативном медиуме мы наблюдали содержание аминокислот выделенных из обработанного корма. На основе достигнутых результатов можно отмечать низшую деградируемость обработанных подсолнечных жмыхов пищеварительными энзимами в отличие от влияния рубцовой жидкости.

ЯГОШ, П. — ШИМЕК, М. — ДВОРЖАК, Р. — ЗЕНДУЛКА, И. — СКРЖИВАНЕК, М. (Ветеринарный институт, Брно; Исследовательский институт питания животных, Погоржелице, ЧССР): **Метаболический профиль жидкости рубца и избранные показатели внутренней среды при буферизации кормовых рационов бикарбонатом, NaOH и бентонитом у откормочного рогатого скота.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Кормовый рацион состоял из кукурузного силоса с содержанием сухого вещества 29 %, смеси концентратов, добавки минеральных веществ, витаминов и указанных добавок в количестве 3 % из сухого вещества кормового рациона. a_1 — контрольная группа, a_2 — 3 % NaOH, a_3 — 3 % бентонита, a_4 — 3 % $NaHCO_3$. В жидкости рубца исследовали pH, общую кислотность (CA), аммиак, летучие жирные кислоты и количество инфузорий. В крови исследовали pH, pCO_2 и BE, макроэлементы Na, K, Ca, P, Mg и микроэлементы Cu и Zn. Исследованные показатели метаболического профиля и кислотно-щелочного состояния крови колебались в интервале эталонных данных и разницы между группами не ддостигли статистической значимости. Применение добавок не оказывало влияние на концентрацию макроэлементов в сыворотке крови. Что касается исследованных микроэлементов статистически значительную разницу определили между группой контрольной и группами экспериментальными в случае меди: a_1 — 11,37, a_2 — 13,44, a_3 — 14,28, a_4 — 13,89 $\mu mol \cdot l^{-1}$. Все три добавки имели положительное влияние на ретенцию меди.

ЯНОВИЧ, В. Г. — ВОВК, С. И. — ГОЙСАЛЮК, С. В. (Украинский научно-исследовательский институт физиологии и биохимии сельскохозяйственных животных, Львов, СССР): **Возрастные особенности синтеза и расщепления белков и липидов в мышечной ткани крупного рогатого скота.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

В пробах четырехглавой мышцы бедра, полученных методом биопсии от 3 бычков черно-пестрой породы в 45-, 90- и 180-дневном возрасте *in vitro* исследовали интенсивность синтеза белков из [U—^{14}C] аминокислот и активность кислой, нейтральной и щелочной протеаз, интенсивность синтеза липидов из [I—^{14}C] глюкозы и активность триацилглицеринлипазы и липопротеидлипазы, интенсивность окисления [I—^{14}C] лейцина, [I—^{14}C] аланина и [I—^{14}C] пальмитата.

Установлено, что интенсивность синтеза белков из смеси [U—^{14}C] аминокислот в мышечной ткани бычков с возрастом повышается, а интенсивность их расщепления и окисления [I—^{14}C] лейцина — снижается. При этом использование [U—^{14}C] аминокислот в синтезе миофибриллярных белков в мышечной ткани бычков в течение исследуемого периода повышается в несколько раз, тогда как в синтезе саркоплазматических белков оно существенно не изменяется.

Интенсивность синтеза липидов из [I—^{14}C]ацетата в мышечной ткани бычков с возрастом повышается в несколко раз, а из [I—^{14}C] глюкозы, наоборот, снижается. Интенсивность окисления [I—^{14}C] пальмитата в мышечной ткани бычков в течение исследуемого периода уменьшается более, чем в 1,5 раза. Экзогенный инсулин и тироксин не оказывают существенного влияния на синтез белков и ингибируют окисление [U—^{14}C] аминокислот в мышечной ткани иследуемых животных. Экзогенный инсулин стимулирует синтез триацилглицеринов, а адреналин — липолиз в мышечной ткани животных на всех стадиях развития примерно в одинаковой степени.

ANGELOV, A. — DIMOV, V. (Institute of Animal Science, Kostinbrod, Bulgaria): **Study on the protection of polyunsaturated fatty acids against biohydrogenation in the rumen of sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Different methods of protection of polyunsaturated fatty acids (PUFA) in forages against biohydrogenation in the rumen were tested. *In vivo* and *in vitro* experiments were carried out to check the efficiency of these procedures. It was found that the saturation of PUFA correlates with the rate of lipid hydrolisis. *In vitro* tests showed that different treatments of forages only with formaldehyde were not sufficient to prevent hydrolisis of PUFA esters and their saturation. Best results were obtained after treatment with casein and formaldehyde solution. Using dilute solution of sodium hydroxide instead of casein solution gave a satisfactory results.

Feeding ewes with protected PUFA increased significantly the level of 18 : 2 in the plasma lipids. This elevation was greatest in the fractions of cholesterol esters and phospholipids. The feeding pattern (frequency of feeding and physical form of the diet) also effects the biohydrogenation of PUFA in the rumen.

BANSKALIEVA, V. — DARDJONOV, T. — DIMOV, V. (Institute of Animal Science, Kostinbrod, Bulgaria): **Effect of energy intake on the fatty acid composition of adipose tissue triacylglycerols and plasma free fatty acids in lambs.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Lambs were fattened on diets with different energy levels and protein contents. Fatty acid composition of adipose tissue triacylglycerols (TG) and plasma free fatty acids (FFA) were analysed at liveweight, 14 (after weaning), 29 and 40 kg.

It was found that higher energy intake was related to a higher relative amount of oleic acid in TG and FFA and accompanied by a lower level of steric acid. These tendencies were best pronouced at liveweight at 29 kg and in the fraction of FFA.

The protein level in the diet did not influence the fatty acid patterns in the investigated lipid fractions.

The results were discussed in respect of the regulation of $\Delta 9$ desaturase in adipose tissue by the energy density of the diet and the influence of TG on FFA.

BARAN, M. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Use of monensin — roughage or concentrates?** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Chemical additives commonly classified as ionophores used in ruminant nutrition should improve the performance of animals by manipulating rumen function. The ionophore monensin is used as coccidiostat and in growing and fattening ruminants has a positive effect on feed conversion via transforming of rumen fermentation. In wide scale of feed rations for ruminants the question of monensin effect in roughage or concentrate diets is very important. Monensin may improve the efficiency of feed utilization by a change in rumen fermentation, resulting in reduced deamination, partial inhibition of methanogenesis and an increase in the production of propionic acid. In our experiments with adult wethers fed on all-, high-roughage and concentrate diets we determined the high and almost the same values of molar % of propionic acid in all 3 diets and good feed conversion in roughage diets. The effect of monensin was greater if it was given in high roughage diets. On the other hand we do not confirmed these results with growing lambs, where no positive effect of monensin was found in roughage diets. The possibilities of monensin use are in roughage rations with some non-traditional feeds. In experiment with fattening bulls we reached 12% increase of weight gains using monensin in rations, where the part of concentrates was replaced by dried poultry manure. We suggest also, that another factor, very important in better utilization of feed rations with monensin, is the quality of roughages.

BARAN, M. — KALACHNYUK, G. I. — JALČ, D. — SIROKA, P. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia; Ukrainian Research Institute of Animal Physiology and Biochemistry, Lvov, USSR): **Performance of lambs given monensin with roughage or concentrate diets.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The effect of monensin (Elanco Products Co., Indianapolis) on the performance, energy, dry matter and nutrients digestibility was investigated with 24 growing lambs divided into 4 groups. The animals were fed 113 days diets consisted of hay and concentrates (60 : 40 %, diets 1 and 2, 40 : 60 %, diets 3 and 4). Diets 1 and 2 were considered as roughage, diets 3 and 4 as concentrated. Monensin (40 mg . . kg^{-1} DM) was added to diet 2 and 4. Some results (mean of 6 animals) are given in the table (a : b $P < 0.05$):

Parameter / Group	1	2	3	4
Average total gain (kg)	7.95	10.56	13.01	13.58
Average daily gain (kg)	0.07	0.09	0.11	0.12
Feed conversion ratio	12.28	10.03	8.01	7.95
DM — digestibility (%)	65.27	65.38	68.02	67.29
Energy digestibility (%)	63.29	64.53	66.77	66.48
ADF digestibility (%)	50.05	48.37	36.10	36.07
NDF digestibility (%)	66.04	66.00	67.30	67.73
Cellulose digestibility (%)	58.92	58.16	48.23	48.65
N — digestibility (%)	71.22	72.45	73.13	73.71
N — balance	4.15	3.93	6.98[a]	4.89[b]

Absolutely live weight gains were higher in lambs fed on concentrate diets. No positive effect of monensin on lambs performance and nutrients digestibility was found in any rations roughage or concentrated.

BARAN, M. — KALACHNYUK, G. I. — SIROKA, P. — JALČ, D. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia; Ukrainian Research Institute of Animal Physiology and Biochemistry, Lvov, USSR): **Rumen fermentation in lambs given monensin with roughage or concentrate diets.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In experiment with 24 growing lambs divided into 4 groups, the effect of monensin (Elanco Products Co., Indianapolis) on rumen fermentation was investigated. The animals consumed for 113 days daily 1 kg of DM diet consisted of hay and concentrates in the ratio of 60 : 40 % (diets 1 and 2) and 40 : 60 % (diets 3 and 4). Monensin (40 mg . kg^{-1} DM) was added to diets 2 and 4. Some results of ruminal values are given in the table, statistical comporison was made between 1 : 2 and 3 : 4 groups (a : b $P < 0.05$, c : d $P < 0.01$, e : f $P < 0.001$):

Parameter / Group	1	2	3	4
Total VFA (mmol.l^{-1})	97,89	91.48	100.41[e]	77.63[f]
Acetate (mol%)	70.80[e]	66.90[f]	66.35[e]	63.62[d]
Propionate (mol%)	14.02[e]	16.55[d]	14.79[e]	19.45[b]
Butyrate (mol%)	12.64	13.71	16.15[a]	14.43[b]
Acetate: propionate	5.07[e]	4.05[f]	4.56[e]	3.31[d]
Energy efficiency of VFA production (%)	71.80[e]	73.12[f]	72.84[e]	74.44[d]

Monensin affected the rumen fermentation in usual way, decreased the molar % of acetate and increased the molar % of propionate, but significantly increased the energy efficiency of volatile fatty acids production in the rumen of lambs fed the roughage diets.

BELÁK, M. — KOČIŠOVÁ, J. — BARAN, M. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **The effect of monensin on some tissues of sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The ultrastructure of striated muscle, diaphragm and myocard in sheep was studied. The tissues investigated were processed for the needs of electron microscopy observation by the routine methods used in the electron microscopy. 1 and 1/2 year old sheep served as the experimental animals. 100 mg of monensin were added to their feed ration (meadow hay, barley, 3 g urea) during 9 weeks. The changes on the myofibrils and mitochondria having arisen out of the effect of monensin were manifested in the diaphragm muscle by disappearing of limits between I and A zones and in the myocard by damaging the interior mitochondrion membranes. In skeleton muscle edematous intermyofibrilar spaces were found.

BELL, F. R. — MATHIEU, C.-M. (University of Reading, Reading, England): **Assessment of possible neuroendocrine control of drinking in sheep following ingestion of dry food.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Five Clun Forest sheep fitted with rumen cannulae were examined at suitable intervals before and after feeding and *ad libitum* drinking, for changes in physiological and endocrine parameters. Rumen volume was assessed using radioactive ^{51}Cr EDTA as a marker and rumen fluid osmolality and sodium contents measured by osmometry and flame photometry. Coincidental plasma samples were measured by radioimmunoassay for arginine vasopressin, angiotensin II and aldosterone, as well as for packed cell volume, osmolality and sodium content. One or more of all these parameters have been suggested in previous reports as being implicated in the control of food and liquid intake in animals.

The sheep imbibed 85% of the 24 h intake of water in the 5 minutes following cessation of a two hour feeding session. During feeding a minor hypovolaemic hypernatraemia and hyperosmolality developed in the plasma, as rumen volume increased, with a rise in osmolality but no change in sodium content. In a second series of experiments in the same sheep a volume of fluid equal to that normally taken in the five minutes after feeding was introduced into the rumen. The animals were then offered water *ad libitum* again as in the first experiments. They consumed almost the same amount as before. The possible neuroendocrine control of ingestive processes in sheep will be discussed in relationship to the plasma endocrine levels and behaviour will be discussed.

BELL, F. R., DORIS, P.A. and WOOD, T. J. (1985). The coincidental effects of dehydration and rehydration on plasma and cerebrospinal fluid angiotensin II levels in unrestrained steers. Brain Research, 325, 143—150.

BREVES, G. — HOELLER, H. (School of Veterinary Medicine, Hannover, Fed. Rep. Germany): **Studies on phosphate absorption across the rumen wall of sheep *in vivo* and *in vitro*.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

It is generally assumed that the forestomach wall is no major site for net phosphate absorption in sheep. Recent experiments in ruminating calves, however, have shown that there may be substantial phosphate absorption from the omasum. In order to get a more detailed information about the importance of the rumen wall, *in vivo*-experiments were carried out using the technique of the washed rumen. Isotonic buffers were used and the phosphate concentration in the rumen was varied between 0 and 15 mmol/l. The experiments were done in P depleted and P repleted sheep. Under both experimental conditions net phosphate absorption increased linearly with phosphate concentration in the rumen indicating that phosphate absorption depended on the concentration gradient between the rumen fluid and the extracellular fluid.

In vitro-experiments were done to study the unidirectional fluxes of phosphate across rumen epithelia which were obtained immediately after slaughter. The experiments were done in Ussing chambers under short circuit conditions and fluxes were calculated after adding ^{32}P either to the mucosa or to the serosa side of the chamber. When the rumen epithelia were obtained from 1—3 years old sheep unidirectional fluxes were identical in both directions indicating that the transport mechanism for phosphate was passive diffusion.

ENEV, E. — PETKOV, A. — TODOROV, N. — DJANKOV, T. — OBLAKOV, N. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora, Bulgaria): **Digestive processes in sheep fed straw treated with NaOH and urea.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

A three period experiment was carried out with lambs fitted with fistulas on the rumen and the proximal duodenum. The animals received similar ration (maize silage, barley, wheat straw, dicalcium phosphate, urea and salt). During the second period the straw was treated with NaOH and during the third — with urea.

It was found that pH of rumen content reached 6.96 ± 0.02 to 7.17 ± 0.04 before feeding and 6.36 ± 0.04 to 6.74 ± 0.04 — 2.5 h after feeding for the three periods. The total quantity of VFA significantly increased 2.5 h after feeding and highest values reached during the III period. Concerning the molar proportion the differences were not significant. There was a tendency for increasing of C_2 and C_3 and decreasing of C_4 in II and III periods. The protein of the protozoal mass was from 37.91 to 41.32 % for I, 41.13 to 41.69 % for II and 37.22 to 38.23 % for III period. In comparison to the protozoa, the protein content in the bacterial mass was higher.

The testing of diaminopimelic acid (DAPA) showed highest content 7 h after feeding in II period (NaOH treated straw). The treating of straw with NaOH or urea didn't show any significant changes in the total protein, serum albumen, urea and glucose in blood.

FAIX, Š. — LENG, Ľ. — SZANYIOVÁ, M. — VÁRADY, J. — BOĎA, K. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Effect of intrarenal iodoacetate infusion on urea excretion in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The influence of iodoacetate (inhibitor of anaerobic glycolysis) on renal urea excretion has been studied by several investigators, however the conclusions are contraversial. In this clearance study we tested the effects of intrarenal iodoacetate infusion on urea excretion in seven sheep. During control period (60 min) saline was infused into the left renal artery at rate 0.375 ml . min $^{-1}$. After control period iodoacetate was infused (0.1 mmol . min^{-1} . kg^{-1} b. w., rate 0.375 ml . min^{-1}) during 180 min. At the end of experiment both kidneys were removed for determination of urea concentration in tissue. It was found, that after iodoacetate infusion the urine flow rate, absolute tubular reabsorption of urea and fractional urea excretion in left kidney did not change. Glomerular filtration rate ($P < 0.001$), urine urea concentration ($P < 0.01$) and amount of urea excreted ($P < 0.01$) significantly decreased, while fractional water excretion ($P < 0.01$) significantly increased. Urea concentration gradient was abolished in the both kidneys, but the fall in tissue urea concentrations was more pronounced in left kidney. Presented results are rather showing on deteriorated renal functions after iodoacetate infusion than on the direct effect of iodoacetate on urea transport in kidney of sheep.

FÉBEL, H. — JUHÁSZ, B. (Research Institute of Animal Nutrition, Herceghalom, Hungary): **Influence of the feed additives on certain physiological indices of lambs with special reference to the rumen digestion.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The present experiment investigated the effect of the feed additives Salinomycin, Flavomycin and Avoparcin on blood metabolites and ruminal metabolism in wethers weighing 20—26 kg. We used 12 wethers with ruminal fistula. Samples

of blood and rumen fluid were taken before feeding and 1.5; 2.5; 3.5; 5; 6.5 hours after feeding. Avoparcin increased the pH in the rumen, while Salinomycin and Flavomycin seem to have no effect. Salinomycin and Flavomycin didn't affect total VFA, but Avoparcin decreased VFA production. Salinomycin stimulated the fermentation to produce propionic acid while reduced acetic acid. Acetate : propionate ratios decreased with the addition of Salinomycin. Molar proportions of acetic and propionic acid were not changed by inclusion of Flavomycin and Avoparcin. Flavomycin decreased butyric acid but Salinomycin and Avoparcin showed no significant changes for this. No significant effect of these antibiotics was recorded for lactic acid in the rumen. Salinomycin reduced the concentration of blood lactic acid, but Flavomycin increased it. Salinomycin increased ammonia in the rumen before feeding while Flavomycin reduced it before and after feeding. Concentration of blood ammonia was reduced by Salinomycin. Before feeding urea in the rumen was increased by Salinomycin. Flavomycin caused in increase in blood urea after feeding compared with others. Both Salinomycin and Avoparcin had no effect on blood glucose but decreased in response to Flavomycin. No differences existed among antibiotics for total protein.

FEJEŠ, J. — VÁRADY, J. — BOĎA, K. — KALACHNYUK, G. I. — PUPIN, I. G. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia; Ukrainian Institute of Physiology and Biochemistry of Farm Animals, Lvov, USSR): **The effect of intraruminal and intracecal nitrogenous nutrition on the sheep metabolism.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

On mature sheep with the fistulas of the rumen and cecum the utilization of nitrogen in a diet after peroral and combined peroral + intracecal nitrogen intake was investigated. The animals were fed 2 times daily a diet consisting of 50 % barley straw, 20 % maize starch, 20 % cellulose flakes, 2 % urea, 4 % minerals + + vitamins. Feed ration was 20g kg live weight day. At combined nutrition 50 % urea of a diet was administered during feeding by the infusion into the cecum. The different way of nitrogen nutrition has been manifested in some indices of N-metabolism. The significantly higher values were found: in the urea concentration in blood before and 3 and 5 hours after feeding, in the ammonia concentration in the rumen 3 and 5 hours after feeding and in the amount of bacterial nitrogen per g of dry matter of the rumen contents before and 3 hours after feeding at combined way of nitrogen nutrition. Both a decreased retention of ^{15}N (by 50 %) and the larger amount of nitrogen excreted by urine indicate the worse nitrogen utilization at intracecal nitrogen nutrition in comparison with the intraruminal nutrition.

FLACHOWSKY, G. — MATTHEY, Maria — OCHRIMENKO, W. I. — SCHNEIDER, M. — HENNIG, A. (College of Animal Production and Veterinary Medicine of Karl-Marx-University Leipzig, Jena, GDR): **Isoacids in rumen liquid and effect of added isoacids on rumen dry matter disappearance of wheat straw.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Isoacids is the collective term for the branched-chain fatty acids isobutyric, isovaleric and 2-methylbutyric acid and the straight-chain valeric acid synthesized from branched-chain amino acids (e. g. valine, leucine, isoleucine) and other components. Isoacids seem to have a positive influence on microbial protein synthesis and cellulolytic activities of microbes. The influence of composition of diet and time after feeding on concentration of isoacids in rumen liquid and the effect of supplemented isoacids on rumen dry matter disappearance was studied. The concentration of isoacids in rumen liquid was influenced by protein content, protein source, typ of diet and time after feeding. An increase in protein content of diet effected an increase in concentration of isoacids in rumen liquid. During the day the rumen isoacid-concentration was more influenced by a roughage diet than by a diet rich in concentrate. The intraruminal infusion of an isoacid-mixture (2 × 1 g per sheep and day, consisting of 25 % isobutyric, isovaleric, 2-methylbutyric and valeric acid, each) to a straw-starch-urea diet (1000, 300, 50 g per animal and day) effected an insignificantly increase of rumen dry matter disappearance of NH_3--treated wheat straw (from 47 to 49 %; incubation time: 48 h). More research under consideration of various diets should be done.

FLACHOWSKY, G. — SCHLENZIG, M. — HEIDEMANN, B. — KIRSCHE, Brigitta — OCHRIMENKO, W. I. — HENNIG, A. (College of Animal Production and Veterinary Medicine of Karl-Marx-University Leipzig, Jena, GDR): **Effects of added β-carotene on fertility of dairy cows and heifers and carotene content of various fractions of ovar.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Three long-term group feeding trials with dairy cows and two individual feeding experiments with heifers were carried out. Cows (corn silage, sugar beet products, concentrate) and heifers (treated straw, concentrate) consumed diets poor in β-carotene (< 15 and < 1 mg kg DM). Diets were supplemented with different levels of vitamin A and or β-carotene (til 300 mg animal and day). Various parameters of fertility were investigated.

Fertility of cows and heifers was not significantly influenced by added β-carotene if the vitamin A requirements were met. 15 mg β-carotene per kg dry matter of diet without vitamin A-supplementation were sufficient for high performances and reproduction.

Added β-carotene to diets poor in β-carotene (< 1 mg kg DM) did not significantly increase the weight of *corpus luteum* (3.80—4.58 g), but it increased its carotene content. β-carotene was also found in small yellow-brown tissue fractions of ovar (0.19—0.43 g ovar). The carotene concentration of fractions (158, 150, 334 and 487 μg/g) was much higher than that of *corpus luteum* (2.3, 27, 50 and 81 μg g) if β-carotene was supplemented (0, 100, 200 and 300 mg animal and day).

FOCANT, M. — VANBELLE, M. (Université Catholique de Louvain, Louvain-la-Neuve, Belgium): **Steam-flaking decreases cereal's protein degradability in reticulo-rumen.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Industrial steam-flaking, we have studied, consists in steam-cooking the grain during approximatively 60 minutes followed by a hot-flaking at 95 °C between 2 cylinders with a crushing strength of 30—40 kg cm^2.

Starch gelatinization was estimated by its susceptibility to pancreatin hydrolysis. Soluble N in NaOH 0.02N was determined. Dry matter and protein *in vitro* degradability in sheep rumen fluid were determined after a 6 hours incubation.

14 barley samples (6 untreated, 8 steam-flaked) and 6 wheat samples (3 untreated, 3 steam-flaked) were analysed. Steam flaking of barley or wheat was accompanied by a gelatinization of about 53 % of the starch and by a large decrease of N solubility (6 versus 11 % soluble N × 6.25, % DM). These qualitative modifications involved little effects on dry matter degradability whereas after 6 hours, protein degradability was decreased from 27 to 9 % for barley and from 46 to 8 % for wheat.

This interesting alteration for ruminants could increase aminoacids intestinal flow by a larger ruminal by-pass of alimentary proteins (Durand et al., 1974).

DURAND M., BEN AMEUR M., VIROBEN G., 1974. Ann. Biol. Anim. Bioch. Biophys. **14 (1)**, 167—192.

We thanks INTERAGRI Co which provided us the cereal samples and I. R. S. I. A. which subsidiated the research.

FOCANT, M. — VANBELLE, M. (Université Catholique de Louvain, Louvain-la-Neuve, Belgium): **Metabolic inhibition of rumination activity: Volatile Fatty Acids versus osmolality effect?** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Three Texel ewes received 10 g barley and 42 g hay kg$^{0.75}$ each morning. They were intraruminally infused (3.5 ml/min) with NaCl 0.9 %, NaCl 2M or a 2M V. F. A. sodium salts mixture (0.7 acetate + 0.2 propionate + 0.1 butyrate) neutralized to pH 6.5, during a 3 hours period beginning at the food distribution. Each treatment was given 3 consecutive days according to a latin square design. The experimental periods were separated by a transition of 10 days.

3 hours post-feeding, rumen V. F. A. were doubled by V. F. A. infusions with regard to the NaCl's one (140 versus 70 mM total VFA l ruminal fluid). At the same time, jugular blood acetate reached 3 mM l instead of 0.5 mM l. The large increase in water intake (4.6 versus 2.5 l day) provocated by the perfusion of the 2 hyperosmotical solutions was probably the reflect of an osmotic disturbance. Rumen motility was not altered by treatments.

With respect to NaCl 0.9% V. F. A. injections were accompanied by a large increase of the lag time before rumination (492 versus 157 min). Consequently, rumination time was reduced during the first 12 hours after feeding.

Do the V. F. A. act directly? We thing osmolality alteration plays the major role in rumination inhibition since NaCl 2M perfusions also provoked larger lag time (355 min) before rumination!

FOCANT, M. — VANBELLE, M. (Université Catholique de Louvain, Louvain-la-Neuve, Belgium): **Intermeal relationships in sheep fed *ad libitum*: significance for feed intake control.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Six adult Texel sheep were fed *ad libitum* with pelleted dried sugar beet pulp. This industrial by-product is known to be nearly as energetic as barley. Their mean daily intake was 53.4 ± 5.2 g D.M. $kg^{0.75}$. Before the 5 p.m. daily distribution of beet pulp, 10 g hay $kg^{0.75}$ were also given to the animals to assume a normal rumen physiology. The hay was completely ingested within 20 minutes. Sugar beet pulp intake was homogeneously distributed throughout the whole day. Mastication was recorded during a period of 21 days. A mean of 127 meals was analysed per sheep. We observed no relation between premeal-interval and meal size. On the other hand, meal size was positively correlated with post-meal interval. From our knowledge, it is the first time, this well-know relation in rats was observed in a ruminant species.

It seems that, in *ad libitum* feeding, the conditions which determine meal's end are not well defined whereas new meal should be initiated after a proportional time to the previous energy intake.

This finding substanciates once more the existence of a metabolic control of the feeding behaviour of ruminants. For energetic nutriments, feed intake control in sheep would be similar to the rat's one! Nevertheless the exact mechanisms of satiety regulation remain unknown and are still the dealt of many researchs.

GIESECKE, D. — STANGASSINGER, M. (Institute of Animal Physiology, University of München, München, F. R. Germany): **Insulinfunction and lipid mobilization in lactating cows.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In Holstein-Friesian and German Simmental cows with 6000—7000 kg milk yield, the mobilization of adipose tissue fatty acids in relation to the functioning of the insulin system was investigated during early lactation. According to the results, cows at this stage of lactation are in quasi-diabetic state starting already at 3—4 weeks before calving. During that time plasma insulin levels and glucose tolerance are decreased while lipid mobilization, ketogenesis and plasma glucose are increased. After parturition insulin levels decrease to as low as 26% of initial values (in some cows to zero). There is a significant reciprocal relationship (r = = —0.882 to —0.558; $p < 0.01$) to milk yield in Friesian cows. FFA are correlated with milk yield ($r = 0.583$; $p < 0.05$) in both breeds. From the pattern of plasma fatty acids the ratio of C18 : 1 over C18 : 0 is significantly correlated with the FFA level ($r = 0.850$; $p < 0.001$). Insulin response to glucose load is decreased to 30% of prepartum values whereas half-life values of insulin remain at 30—40 min. Insulin receptor affinity of erythrocytes decreases with plasma insulin levels before parturition and increases again 6 weeks after parturition. The results support a quasi-diabetic condition due to metabolic stress and breed. Possible nutritional measures will be discussed.

GYULAI, F. (Institute of Animal Physiology, Košice, Czechoslovakia): **Effects of metronidazole and monensin on the rumen ciliate *Entodinium simplex*.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The ionophore monensin has been widely used as a ruminant feed additive but its mode of action on rumen protozoa is not well understood. The antiprotozoal agent metronidazole inhibits H_2 production in trichomonads and drug reduction generates toxic derivatives responsible for killing the anaerobic protozoa. This

study was undertaken to compare the effects of metronidazole and monensin in cultures of *Entodinium simplex* grown *in vitro* for more than 3 years. The effects of both compounds on protozoal survival were investigated by incubation for 24 hr. The antiprotozoal action of the ionophore was observed in the range 1—100 $\mu g \cdot ml^{-1}$. Monensin was found to be toxic but some motile protozoa survived the concentration 100 $\mu g \cdot ml^{-1}$. However, the surviving protozoa were swelled. Metronidazole was found to be more toxic than monensin because 10 $\mu g \cdot ml^{-1}$ of metronidazole killed all protozoa in the culture. This investigation shows different toxic effects of metronidazole and monensin on the rumen ciliate *E. simplex*.

HARTMANN, H. — KRAUTZIG, I. (Humboldt-University, Berlin, GDR): **Milk fat utilization in healthy and diarrhoeic calves.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

We estimated some pathophysiological aspects of digestion and absorption of milk fat in healthy and diarrhoeic calves. We found in healthy calves with age 4 to 5 weeks a maximum intestinal absorption rat of milk fat from about 11 Gramm per day and per kg livingmass. The increase of fat content in the milk-feeding from 2 to 8 % can induce diarrhoea in healthy calves. In relation of the intensity of diarrhoea the intestinal utilization of milk fat is diminished. Calves, which suffered moderate (faeces loss increased about tenfold), show a reduced utilization of fat from physiological 96 % to 84 %. Calves, which suffered strong (faeces loss increased about twentyfold), show a diminished utilization of fat under 70 %. In result of this maldigestion and or malabsorption in diarrhoeic calves the fat content in faeces can increased to fivefold (steatorrhoe).

The reasons of diarrhoea in young calves is not always clear. In some cases a disturbed intestinal fat utilization can provoke diarrhoea in calves.

HAVASSY, I. — JAVORSKÝ, P. — RYBOŠOVÁ, E. — KRÁLOVÁ, M. — HORSKÝ, K. — KOŠŤA, K. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia; Institute of Experimental Botany, Czechoslovak Academy of Sciences, Praha, Czechoslovakia): **Adherent bacteria and utilization of blood urea nitrogen-15 in the rumen of sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In experiments with 6 sheep it was found that 30 min. after the *i. v.* injection of ^{15}N urea N-substances of the rumen fluid bacteria, bacteria adherent to the rumen wall and ruminal food particles are synthetized from the blood urea-N. ^{15}N enrichment gradually increased 30, 180 and 360 min. after the administration of labelled urea and in the bacteria adherent to the rumen wall it was lower 360 min. after the injection (0.367—0.426 ^{15}N at % excess) than in the bacteria of the rumen fluid (0.802—0.858 ^{15}N at % excess) and in the bacteria adherent to the food particles (0.811—0.943 ^{15}N at % excess) where it was approximately the same. Relative ^{15}N abundance in fraction 1. (protozoa, food particles and epithelial cells with adherent bacteria) and fraction 2. (rumen fluid bacteria) isolated by differential centrifugation of rumen fluid increased 30, 180, 360 min. after the *i. v.* injection of ^{15}N urea. In fraction 3. (supernatant after isolation of rumen fluid bacteria) the ^{15}N abundance decreased. It is concluded that *i. v.* administered urea-^{15}N is relatively quickly utilized for N-compounds synthesis of the rumen bacteria. At the same time, it is utilized more intensively by the rumen fluid bacteria and bacteria adherent to the food particles than by the bacteria adherent to the rumen wall.

HENICS, Z. — GOMBOS, S. — TOSSENBERGER, J. (Institute of Animal Physiology and Nutrition of Agricultural College, Kaposvár, Hungary): **Changes of rumen fermentation patterns on effect of different quantities of wheat straw upgraded by edible mushroom** *Pleurotus ostreatus*. Veter. Med. (Praha), *32*, 1987 (Suppl.).

Rumen trial was completed by two of canulated animals. The daily diet during of four periods of trial consisted of 2 kg of maize, 1 kg of supplement (protein, minerals, and vitamins), chopped green maize plant or barley silage *ad libitum* and 0, 3, 4, 5 and 6 kg of wheat straw upgraded by *P. ostreatus* instead of 3, 2, 1

and 0 kg of grass hay. Each of trial periods was introduced by ten days prefeeding period followed by six days of trial-period. On the first, third and sixth day of trial periods before (0) and after the morning feeding in 3, 5 and 9 hours rumen fluid samples (about 1000 cm^3) were taken by hand from ventral sac of rumen of both animals. NH_3 content, pH-value and volatile fatty acids were measured. Degradation of samples of upgraded wheat straw, grass hay, barley silage and maize were *in situ* measured by for a certain degree modified nylon-bag technique (Mehrez and Orskov, 1977). Cellulolytic activity of rumen fluid was also measured by measuring of degradation of cottonwool-samples.

According to the results wheat straw upgraded by *P. ostreatus* influences the rumen fermentation and the degradation of feed components and nutrients. Products of lignin degradation having got free from wheat straw on effect of *P. ostreatus* ectoenzymes limit the proliferation and or enzyme-activity of rumen microorganisms.

HORSKÝ, K. — HAVASSY, I. — KOŠŤA, K. — RYBOŠOVÁ, H. — JAVORSKÝ, P. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Blood plasma amino acids synthesis from intravenously administered ^{15}N-urea in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In experiment with sheep fed a diet containing 6.2 g N/day after *i. v.* administration of ^{15}N urea (single dose 15.3 mg ^{15}N/kg b. w.) the synthesis of blood plasma amino acids from blood urea-N was investigated. The amino acids were separated by the preparative ion exchange chromatography from acid protein (TCA p. p.) hydrolysates. The ^{15}N abundance 0.054 at % ^{15}N found 3 hrs after *i. v.* ^{15}N-urea injection in plasma protein-N decreased after 24 hrs to 0.042 at % ^{15}N and after 48—72 hrs it decreased again up to 0.064 or 0.070 at % ^{15}N, respectively. 3 hours after *i. v.* administration of labelled urea ^{15}N was incorporated only in tracer amounts into amino acids: cystine, histidine, methionine, isoleucine, tyrosine and phenylalanine. The enrichment of other amino acids ranged from 0.01 to 0.045 ^{15}N at % excess. In course of time 24, 48 and 72 hrs ^{15}N was incorporated with a considerable variability (0.006—0.047 at % ^{15}N) into all 17 isolated amino acids. During 3 to 72 hrs most of non-essential amino acids were labelled higher than essential ones. The lowest enrichment was recorded in methionine, cystine and phenylalanine. The results indicate that in ruminants blood plasma nitrogen is utilized for a synthesis of essential and non-essential amino acids of blood plasma proteins. For the adequate synthesis of these amino acids the synthesis of amino acids by means of ruminal bacteria is an indispensable intermediary phase.

IVAN, M. (Animal Research Centre, Agriculture Canada, Ottawa, Ontario, Canada): **Gastric and intestinal absorption and secretion of zinc-65 in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The absorption and secretion of ^{65}Zn in the stomach and intestinal tract regions was studied in sets of two and three sheep which were exchanging digesta via re-entrant cannulae in the proximal duodenum, with the aid of automatic digesta samplers. One sheep from each of the three three-sheep sets was dosed intraruminally with the radioisotope. One sheep from each of the three two-sheep sets received an intravenous dose. All sheep were fed hay and pelleted concentrate every three hours. The diet contained 83 μg Zn/g dry matter. Each experiment lasted for ten days. Secretion of ^{65}Zn into the stomach and intestinal regions in the intravenously dosed sheep of the two-sheep sets was calculated on the basis of total recovery over 10 d in the digesta and faeces. It was found that for every one molecule of zinc secreted into the stomach region 2.1 molecules were secreted into the intestinal tract region. This ratio was almost constant for all three replicates and was used for estimation of true ^{65}Zn absorption in the three-sheep set. Measurements of ^{65}Zn in blood plasma from intraruminally dosed sheep of the three-sheep set showed that there was no apparent absorption from the stomach region. Measurements from sheep receiving radioactive digesta intraduodenally showed that mean apparent absorption of ^{65}Zn was 7.0 % and mean true absorption was 10.3 %. Mean apparent reabsorption of endogenous ^{65}Zn was measured in the third sheep and was 12.9 %. There was a large variation in endogenous recycling

of ^{65}Zn into the stomach region. These experiments showed no active absorption of zinc from the stomach region and a ratio of 1 : 2 for endogenous secretion of zinc into the stomach and the intestinal tract regions.

JALČ, D. — ZELEŇÁK, I. — SIROKA, P. — KMEŤ, V. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Fermentation of lignocellulosic materials by Rusitec.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

By means of the rumen simulation technique (Rusitec) 15 days fermentation of the lignocellulosic materials (LCM) was realized in 3 stages — without and with the supplementation of 500 and 1000 i. u. of cellulase DK 85. The LCM were fermented in 4 vessels: in the 1st vessel — 14 g hay (H), 2 g barley meal (BM); in the 2nd one — 14 g H, in the 3rd one — 9 g H, 2 g BM, 5 g treated barley straw (TBS); in the 4th one — 11 g H and 5 g TBS. The supplementation of cellulase and barley meal to substrates did not effect the digestibility of the dry matter of hay (53 %) and TBS (54 %) as well as the other indices of the rumen fermentation. A trend of higher values of the production of effluent (E), gas (G), total and individual volatile fatty acids (VFA), glucose utilization (Gl), hydrogen production (H) appeared at the fermentation of substrates together with barley meal.

	Wessel No.	pH	E ml/day	G l/day	VFA	Gl	H
					mmol/day		
Without cellulase	1	6.96	846.6	2.7	58.87	36.14	113.81
	2	7.01	818.3	2.6	51.96	28.34	101.98
	3	6.95	903.3	2.5	57.77	31.85	122.65
	4	6.94	885.0	2.3	54.93	30.17	107.39
500 i. u. cellulase	1	7.01	780.0	2.9	62.07	33.69	117.19
	2	7.09	750.0	2.8	61.34	34.10	96.19
	3	6.95	805.0	2.8	64.96	34.80	118.63
	4	7.00	770.0	2.5	53.95	29.07	101.66
1000 i. u. cellulase	1	6.89	842.5	2.9	59.15	32.42	113.64
	2	7.03	800.0	2.4	49.09	26.86	122.22
	3	6.96	852.5	2.9	64.52	34.86	120.92
	4	6.92	885.0	2.7	63.06	36.96	130.64

JAVORSKÝ, P. — KMEŤ, V. — NEMCOVÁ, R. — LENÁRT, J. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice; Institute of Experimental Veterinary Medicine, Košice, Czechoslovakia): **Conjugative plasmids in rumen lactobacilli.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The occurrence as well as the conjugative transfer of the resistance plasmids in amylolytic rumen strains of *Lactobacillus plantarum* has been followed. We have used the isolate of *Lactobacillus lactis* RN1 of our own as a recipient strain in the simple conjugative test. The transfer of the resistance plasmids varied between 1×10^{-5} to 10×10^{-7}. Together with the resistance for tetracycline determinant, in five strains of *L. plantarum* the co-transfer of the amylase activity has been observed. We have proved the presence of the plasmids approximately 9.12 kbp 6.6 kbp 5.55 kbp 1.9 kbp in length, in strain of *L. plantarum* 41 5. The plasmids were isolated by the modified alcalic method according to Kado and Liu. The results indicate for the application of plasmids *L. plantarum* after their better characterization as vectors of gene manipulations in rumen bacteria.

KALACHNYUK, G. I. — SAVKA, O. G. — BARAN, M. — KMEŤ, V. — KOPEČNÝ, J. — ŠIMŮNEK, J. (Ukrainian Research Institute of Animal Physiology and Biochemistry, Lvov, USSR; Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia; Institute of Animal Physiology and Genetics, Czechoslovak Academy of Science, Praha, Czechoslovakia): **Metabolism of bull-calves at long-term feeding of non-traditional feeds.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The effects of joint feeding (replacing a part of grain) of dry poultry manure (50—1800 g), kaniga (30—800 g) and natural clinoptylolytes (30—200 g) in increasing quantities (g head day) on metabolic processes in the body were studied in the long-term experiments (14—16 months) on bull-calves (initial weight 40—50 kg, final weight — 430—500 kg). It was stated that partial replacement (5—35 per cent) of grain in the ration by above-mentioned non-traditional feeds (NTF) had no significant effect on protein levels dynamics in the fractions of rumen contents, non-protein nitrogen, uric acid, total sugars, pH, E_h, lactate, total VFA, their molar correlation and other indices of the rumen fermentation intensity. No significant changes in protein, carbohydrates and mineral metabolism in blood were stated. Neither were found any deviations from the normal state in liver, muscle and other tissues. Some peculiarities of metabolism, however, were found, such as: $N\text{-}NH_3$ level and cellulosolytic activity in rumen increased by 30 per cent, amilases activity, acetate-propionate index, VFA energetic output ($E^0/_0$) tending to decrease, while urea concentration in blood slightly rose. Mean daily weight gains of bulls variated in the range of 600—1300 g. During the whole period of experiment 300—350 kg of grain per head was spared at the expense of NTF.

KÁLDY, A. — SVIATKO, P. — CHANDOGOVÁ, E. — HIŠČÁKOVÁ, M. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Trace element saturation state of dairy cows in relation to their reproduction indicators.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In two farms K. and R. within the periodic trial the basal diets of dairy cows were supplemented with minerals including trace elements (TE) in form of TE premix MIKROMAG. The control of the supplementation was made by the analysis of supplemented pelleted feeds, cow feces and comparing the TE content with limiting values published in the literature as well as by determination of TE saturation state of cows according to their content in hair and blood serum. The cow organism saturation state with investigated TE was adjusted relatively difficult after MIKROMAG had been omitted, similarly as in consequence of secondary deficiencies. Omitting TE supplement for short time has influenced the TE saturation state of cows for a long time at year milk production 3000—4000 l/cow. In presented paper there are introduced the separate element correlations (Cu, Mn, Zn, Co, Fe and P) in the indicator tissues (serum, hair, feces) to the values of the separate reproduction indicators ($^0/_0$ success of 1. insemination; $^0/_0$ success of all insemination; time of interval and servis period; $^0/_0$ mortality of calves). The TE supplementation of the basal diets in farms K. and R. contributed to: 1. the attainment of planned production within the district; 2. the improvement of cow reproduction indicators — by shortening the servis period (farm K. significantly $\alpha = 0.05$) and the time of interval; — by significant increase of $^0/_0$ success after 1. insemination of cows (K.); — by significant increase of natality and decrease of mortality in calves.

KÁLDY, A. — SVIATKO, P. — CHANDOGOVÁ, E. — HIŠČÁKOVÁ, M. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Contribution to dairy cow nickel saturation state in our conditions.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

On farm N. B. with cows and calves health we paid attention also to nickel. This was supported by occurrence of "hyena-form" pose described by Adam (1981). From the aetiological factor, farm is situated on limestone substructure. To confirm diagnosis we made: 1. analysis of liver, kidney and ovary from 40 cows to Co, Cu, Mn, Zn and Ni content; 2. comparison of Ni basal diet content of cows

with another farm without occurrence; 3. comparative feeding trial with Ni supplement to experimental cow diet and to compare Ni tissue content and clinic status of both groups. According to nickel content of the liver and kidney to compare with literature data we can't speak about Ni deficiency in winter. The hair and feces Ni content in cows with hyena-form syndrome were 2.37 and 31.86 mg Ni . kg DM^{-1}, in healthy cows 1.43 and 47.53 mg, respectively. In the beginning of feeding trial we supplemented Ni to the basal diet of the experimental group from 12.96 to 25.0 mg Ni . kg DM^{-1}. The Ni hair content difference between group (3rd sample collection) at cows ante partum (AP) is not and at cows post partum (PP) is significant. At PP cows Ni feces content difference, besides one case, is significant. However, Cu supply according to feces content is sufficient, Cu hair content indicated from partial to full deficiency. Occurrence of hyena-form syndrome in both groups during experiment was unchanged. In both we met with Cu deficiency of the different degree. According to results of Orság (1985) and Káldy (1980) we allowed to state that it is a prodromal phase of hoof illness.

KMEŤ, V. — LENÁRT, J. — NEMCOVÁ, R. — STACHOVÁ, M. — LAUKOVÁ, A. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice; Institute of Experimental Veterinary Medicine, Košice, Czechoslovakia): **The effect of *Streptococcus bovis* inoculation on the adherent ruminal microflora.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In a modelled experiment with lambs in the period of milk nutrition the effect of peroral inoculation of lyophilized strain of *Streptococcus bovis* A024 85 in amount 5×10^8 of germs daily on the development of ruminal microflora was investigated. The effect of inoculation on the adherent ruminal microflora activity was determined by the comparison of the total numbers of amylolytic bacteria with amylase activity upon the ruminal wall epithelium of experimental and control animals. After 4 weeks of a preparation application a significant increase of the total numbers of germs ($7.3 \times 10^5 . cm^{-2}$ in experimental and $1 \times 10^4 . cm^{-2}$ in control group) as well as alpha-amylase activity (8.5 nkat . cm^{-2} in experimental and 4.4 nkat . cm^{-2} in control group) has been recorded. The cellulase, protease and urease activities of ruminal microflora were not influenced. On the epithelium of rumen wall of the experimental lambs the adherent microcolonies of a colonizated strain have been proved by scaning electron microscopy. The results obtained indicate the use of colonizate preparations for the manipulation with the development of ruminal microflora of young ruminants.

KOČIŠOVÁ, J. — GYULAI, F. — BELÁK, M. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Study of ultrastructure and surface of rumen protozoa by TEM and SEM.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The ultrastructure and the surface of rumen protozoa *Entodinium simplex* and *Ophryoscolex caudatus* was studied. The protozoal surface had a typical porous structure with numerous bends and cilia (*O. caudatus*) and a longitudinal striated structure (*E. simplex*) with adherent symbiotic cocci and rods.

The ultrastructure of the studied protozoa included a rich ciliature and organels typical for these protozoa. Cilia were observed on the surface which consists of four layers: surface, homogenous, microtubular and microfilament layers. The cytoplasm consists of the endoplasm and the ectoplasm. A special attention was given to chromatic structures with a rich enzymatic contents — the hydrogenosomes. Skeletal plates were observed in *O. caudatus*.

KOLB, E. — MÜLLER, I. — DÜSEDAU, K. (Karl-Marx-University, Leipzig, GDR): **The influence of the infusion of butyrate, isobutyrate and isovalerate on the concentration of insulin, glucose, free fatty acids and total-amino-acid-N in the plasma of suckling lambs of various age.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In 4 groups of lambs with an age of 8—15, of 16—22, of 23—29 and 30—45 days the influence of the intravenous infusion of butyrate, of isobutyrate and of iso-

valerate (1.25 mmol kg) on the concentration of insulin, glucose, free fatty acids and total-amino-acids-N in plasma was analyzed. In all groups of lambs there was a significant rise in the concentration of insulin for about 1500 to 3000 pmol l, the biggest increase was found after isovalerate. The influence of age in these groups on the effect was small. Compared to adult sheep the effect on insulin concentration in lambs was smaller. After the infusion of the VFA there was a short and small increase in the concentration of glucose and FFS, thereafter a decrease. The concentration of total-amino-acids-N in the plasma was dimished. The biggest decrease was found after the infusion of isovalerate in the lambs with an age of 8—15 days. The analyses show, that the VFA are already physiologic stimulators of insulin secretion in suckling lambs.

KOPPEL, J. — RYNÍKOVÁ, A. — NOSKOVIČ, P. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Influence of growth hormone administration on growth in infant animals.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The objectives of this study was to determine the effects of bovine growth hormone (bGH — AFP lot No 7500C, generous gift from IMC, USA) on body growth and content of RNA, DNA and proteins in liver, brain and heart muscle in suckling rat pups and lambs. Suckling rats reared in litters of 8 (L8) or 4 (L4) pups were daily injected from 3rd to 28th day of life with 1 μg of bGH g body weight. In experimental pups (L4) during days 15—29 we observed significantly increased weight gain and tail growth ($p < 0.05$). Experimental pups (L8) had significantly ($p < 0.05$) increased DNA concentration in heart and decreased RNA DNA ratio in brain tissue. Suckling lambs (fed with milk replacer from 4th day of life) were daily injected from 10th to 38th day of life with 80 μg of bGH kg body weight. Experimental sucklings did not significantly ($p > 0.05$) differ from control ones in body weight and milk diet consumption, neither in plasma levels of glucose, triglycerides, lipids, urea, insulin, nor in content of nucleic acids and proteins in brain, liver, heart muscle and m. semitendinosus. On the other hand, experimental lambs had significantly ($p < 0.05$) increased body weight gains during 4th week of experiment (32nd—38th day of life). It can be concluded, that bGH increased the body weight gains of infants only in later suckling period. It is probable, that GH plays no decisive role in growth regulation in early postnatal period of life.

KOŠŤOVÁ, D. — KOŠŤA, K. — REHÁK, P. — BOĎA, K. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Electrophysiological characteristics of the ventromedial hypothalamic nucleus and lateral hypothalamic area in normally fed and 24 hour food deprived conscious sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

We registrated telemetrically the spontaneous electrical activity of the hypothalamic ventromedial nucleus (VMH) and the laeral hypothalamic area (LH) in conscious adult sheepmale, with implanted electrodes, — in a state of normal feeding or after 24 hour food deprivation. The frequency of electrical activity, the amplitude of electrical activity and the frequency by Fourier analysis were evaluated. The frequency of electrical activity was found to be approximatelly the same in the VMH and LH with mean values 11.5 ± 0.5 Hz in feed sheep. The amplitude of electrical activity in the VMH was higher compared with the LH, with mean absolute values 31.4 ± 1.2 μV in the VMH and 27.2 ± 1.2 μV in the LH. The Fourier analysis showed that from the total amount of harmonic frequences — the first one i. e. the basic frequency represented 48—56 %, the rest of them was higher harmonic frequences. In sheep after 24 hour food deprivation the frequency of electrical activity decreased in both regions under study and the absolute values of the amplitude of electrical activity increased in the VMH and also in the LH compared with fed animals. Along with these changes we found by Fourier analysis that from the total amount of harmonic frequences the basic frequency decreased by 6 % as a consequence of greater amount of distorting frequences.

KOWALCZYK, J. — JACZEWSKA, A. — WITKOWSKA, E. — OTWINOWSKA, A. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **Digestion of nutrients of ammoniated straw.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Three groups of five wethers of 46 kg body live weight were fed for 1 month with untreated or ammonia treated barley straw supplemented with mineral and vitamine mixture. Group I received untreated straw *ad libitum* (about 550 g per day); II — ammoniated straw (about 550 g per day); III — ammoniated straw *ad libitum* (about 850 g per day). Apparent digestibility of organic matter, N-free extractives, crude fibre, cellulose, NDF, ADF was lowest for the group I; the greatest for group II and for group III somewhat lower than for the group II. Higher voluntary intake of ammoniated straw than untreated straw has been confirmed. Interesting is that digestibility of N-free extractives (usually assumed to be readily hydrolysable carbohydrate) were significantly lower than digestibility of crude fibre. This apparent paradox makes important evidence for discussion on the usitability of hitherto used analytical methods for estimation of nutritive value of feeds.

KOWALCZYK, J. — OTWINOWSKA, H. — WITKOWSKA, E. — JACZEWSKA, A. — CHOMYSZYN, M. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **An attempt to rapeseed oilmeal protein protection with blood from rumen degradation.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Albumin is relatively slowly degraded in the rumen. The effectiveness of usage of blood albumin for protection of the protein of different feeds from rumen degradation was examined. Primary tests *in vitro* indicated that the protein of high protein feeds with fresh blood (1 : 1) dried and heated for 2 h at 120 °C was significantly slower decomposed in rumen liquor. Two groups of six wethers of 36 kg body live weight were fed with ration: 710 g dried sugar beet pulp, 150 g meadow hay, 32 g rye, 20 g mineral mixture and 88 g of treated rapeseed oilmeal per 1 kg: group I received the mixture of separately heated rapeseed oilmeal and blood, group II — rapeseed oilmeal mixed with fresh blood, dried and heated. Daily intake was 1200 g. Diets contained, %: dry matter — 91.4; crude protein — 12.4; crude fibre — 18.2; N-free extractives — 53.5. Apparent digestibility coefficients of nutrients for group I and II were: dry matter — 74.4 ± 87 and 76.0 ± 1.16, crude protein — 64.6 ± 3.83 and 66.3 ± 4.01, crude fibre — 66.0 ± 7.32 and 70.9 ± 3.04, N-free extractives — 86.8 ± 0.50 and 87.2 ± 0.74, respectively. Average daily body live weight gain was 183 ± 20 and 165 ± 43 and feed efficiency 6.59 and 7.52 kg. The results of the experiment indicate that nutritive value of experimental ration (II) was even slightly lower than control one (I).

KOWALCZYK, J. — ŽEBROWSKA, T. — JACZEWSKA, A. — WITKOWSKA, E. — OTWINOWSKA, A. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **Secretion and absorption of urea into the isolated loop of the small intestine of sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Three sheep 45 kg live weight with isolated loops 180 cm long of small intestine were given diets consisting of dried whole plant of maize (7 % CP, A), and supplemented with rapeseed oilmeal (B) or urea barley preparation (C) to 15 % CP. The isolated loops were perfused with Krebs-Ringer buffer of pH 8 for 5 h during 3 days at the rate of 270 ml h. The amount of urea-N secreted into the loop was: 1.9 ± 0.7; 7.6 ± 2.4 and 14.2 ± 3.1 mg h in sheep given A, B, C diets, respectively. Ammonia-N was not found in the perfusate. The intestinal loops of sheep given diet C were perfused additionally with Krebs-Ringer solution containing urea (55.3 mg N/h) or ammonium chloride (40.7 mg N/h). The net absorption of urea-N was 12.3 % and ammonia-N — 49 %. The modification of pH of Krebs-Ringer solution in a range 4 to 8 did not affect of the amount of urea absorbed or secreted. Incubation of Krebs-Ringer solution or perfusate with urea addition for 4 h at 38 °C did not change the urea amount in the liquid which indicates on the lack of ureolytic activity in the perfusate.

KROUPOVÁ, V. — TESAŘÍK, L. — TRÁVNÍČEK, J. (University of Agriculture, České Budějovice; State Veterinary Institute, České Budějovice, Czechoslovakia): **Changes in physiological need of sodium in milk cows receiving high doses of potassium.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Owing to the increasing excess of K in feeding rations for cows, it is necessary to modify the intake of Na as well. In the course of a two year period we evaluated the intake of Na and K in 32 feeding rations for a group of high-pregnant (1) cows and cows after calving (2). We found out that in 97 % cases the intake of Na exceded the need as stated in CSN and the intake of K exceded the recommended daily dose — 70 g for pregnant and 77 g for lactating cows with yield of 20 kg. In spite of the excessive intake of Na, its mean level in urine amounted to relatively low values in both groups, and a considerable part of mean values dropped under the physiological level.

Group of cows	1		2	
	$\bar{x}$	$s_{\bar{x}}$	$\bar{x}$	$s_{\bar{x}}$
K excess in feeding ration %	470	174	357	96
Na excess in feeding ration %	167	35	175	44
Na concentration in urine mmol l^{-1}	26	13	37	17
K concentration in urine mmol l^{-1}	348	77	303	70
Value frequency of Na under 20 mmol l^{-1}	34.6 %		16.6 %	

On the basis of the occurrence of frequent decreased values of Na in urine, we recommended to increase the daily dose of Na per one cow (yield 10 kg) up to 45 g when the intake of K is higher than 200 g per head and day.

KUCHÁR, S. — MOZEŠ, Š. — KOPPEL, J. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Regulation of food intake in infants.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The food intake control and some aspects of development of regulatory mechanisms in infant rats and suckling lambs were studied. In several experiments on the young rats there was investigated: the onset of inhibitory effect of glucose, glycerol and aminoacids administration on food intake; the involvement of ventromedial and lateral hypothalamus in hypophagic effects of glycerol, glucose and aminoacids; effect of glucoprivation (induced by insulin or 2-Deoxy-D-glucose) on the food intake. It was concluded that the inhibitory component of chemospecific control of the food intake in infant rats develops progressively from the 13th to the 23rd day of life in association with the functional maturation of the CNS (hypothalamic) structures. The stimulatory component of chemospecific control develops later because the glucoprivation is ineffective to stimulate the hyperphagy of rat pups until the age of 24—28 days. On the suckling lambs there was investigated: the influence of the fat content of diet on total milk intake; the influence of the perorally administered glucose, lactose and galactose; the influence of the intravenously and intracarotideally administered glucose on milk intake. The results suggest decisive role of the energostatic control of milk intake and also the existence of certain glucostatic control in suckling lambs.

KURSA, J. — KROUPOVÁ, V. — KLEIN, Z. (University of Agriculture, České Budějovice, Czechoslovakia): **The significance of ketone bodies and albumin in blood for the check of metabolic consequence of high milk production.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Health disturbances in high yielding cows are most often due to lowered function of liver. It is therefore necessary to estimate more parameters of the function of liver, blood values of albumin and ketone bodies among them. It has been shown that in the case of routine examination of albumin it is possible to use Bio-La--Test. The table shows mean values of both parameters in cows up to three months after calving with daily milk yield of 23—35 kg. The intake of energy was not lower than 90 % of their need, and the occurrence of ketonuria was rare. Blood analyses were carried out at the beginning and at the end of the summer period.

	n	$\bar{x}$	s_x
Ketone bodies mmol.l^{-1}	385	1.53	0.67
Albumin g.l^{-1}	341	26.7	3.3
Occurence of blood values of		%	
ketone bodies 0.5—2 mmol.l^{-1}		80.0	
2.0—3 mmol.l^{-1}		12.8	
> 3.0 mmol.l^{-1}		6.2	
Albumin < 25 g.l^{-1}		31.9	

KU SUAN ZAN — RUSSEV, V. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora, Bulgaria): **Enzyme activity and acidity of abomasal and duodenal chyme of calves.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Experiments were carried out with 6 male calves with fistulae on the abomasum and duodenum, divided into two groups — experimental and control. The calves from the experimental group received a milk replacer and those from the control one were given whole milk during the milk period. All the calves during the transitional period received starter mixture for calves.

It was found that the chymosin activity in the abomasal chyme and duodenum during the milk period was highest and towards the transitional period it significantly decreased. The clotting of milk under the action of abomasal chyme began after 101.92—165.00 s and finished after 226.67—260.00 s. The time for clotting of the milk under the action of duodenal chyme was longer, like that of the milk replacer. Peptic activity was higher before feeding. At the beginning of the transitional period its activity decreased and after that increased. The activity of lipase in the abomasal and duodenal chyme of the control calves during the milk period was higher in comparison with the experimental one. During the transitional period its level increased but not significant. The total acidity of the control group was higher than that of the experimental group.

LEBEDA, M. — URBÁNKOVÁ, Z. (Biochemical Laboratory of Uniform Agricultural Cooperative, Bánov, Czechoslovakia): **Main metabolic indicators of urine in dairy cows.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Indicators suitable for evaluation of the adequacy of energy-yielding nutrients are the acid-base status, the ketone-bodies concentration and the urea concentration in the urine. The urea concentration has to be related with the ammonia concentration as an indicator of protein shortage or of a damage of the liver function. In 1984 we have shown that the ammonia concentration in the urine was increasing in the last 2.5 months of pregnancy in cows and that it was a symptom of an inadequacy of the ration and or of a metabolic change in this group of cows. The further investigation was made in 2423 dairy cows of four groups: I — 1st phase of lactation, II — 2nd phase of lactation, III — 8th month of pregnancy, IV — 9th—9.5th month of pregnancy. It confirmed that the urine ammonia increased

significantly till in 8th month of pregnancy and it demonstrated a new fact that the increase went on significantly in the 9th and 9.5th month of pregnancy. The increased concentration of NH_3 seams to be more dependent on functional state of the pregnant organisme than on the type of feeding seeing that the summer and winter values of NH_3 are not significantly different in the groups III and IV. But in groups I and II the summer values are significantly higher than the winter values. This explanation is based also on the fact of higher values of plasma urea and lower values of total plasma protein and beta-carotinemia in pregnant cows. The accuracy of NH_3 measurement is higher using 415 nm than 480 nm wave-lenght by photocolorimetry.

LENG, L. — FAIX, Š. — SZANYOVÁ, M. — BOĎA, K. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Micropuncture study of the urea transport in nephrons of iodoacetate treated kidney of sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The present study was designed to evaluate the effects of intrarenal infusion of iodoacetate, an inhibitor of anaerobic glycolysis, on segmental urea transport along the nephron. Free-flow samples of renal tubular fluid from eight saline infused sheep (C — control) and from seven iodoacetate infused sheep (I) were compared. There were no changes in tubular fluid to plasma urea ratio in late proximal (LP) tubules (C vs. I, 1.31 ± 0.06 vs. 1.46 ± 0.05, NS) and in early distal (ED) tubules (2.18 ± 0.32 vs. 2.01 ± 0.23, NS) while in I sheep the late distal (LD) TF/P_{urea} was even decreased (3.90 ± 0.47 vs. 1.99 ± 0.34, $P < 0.05$). No differences were found in fractional delivery of urea (%) to LP (75.5 ± 2.3 vs. 81.6 ± 3.2, NS), ED (81.9 ± 8.7 vs. 74.9 ± 10.4, NS) and LD (48.4 ± 8.8 vs. 31.3 ± 4.0, NS) tubules. Tubular fluid to plasma inulin ration (TF/P_{In}) and single nephron filtration rate (SNGFR, $nl \cdot min^{-1}$) were different only when measured in LD tubules. They were both lowered in the kidneys of iodoacetate infused sheep (TF/P_{In} 8.5 ± 0.47 vs. 6.3 ± 0.48, $P < 0.05$; SNGFR 56.6 ± 4.1 vs. 36.4 ± 5.7, $P < 0.05$). Our results do not support the concept of active urea transport in the kidney that would be dependent on energy derived from anaerobic metabolism.

LUBBERDING, H. J. — GERHARDUS, M. J. T. — GIJZEN, H. J. (University of Nijmegen, Nijmegen, The Netherlands): **Cellulase activities in an artificial rumen system, fed with cellulose.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

A novel two-stage anaerobic process for the fermentation of cellulosic residues has been developed (H. J. Gijzen et al., Appl. Microbiol. Biotechnol. 1987, in press). The first phase is derived from a unique natural microbial ecosystem that is known to exhibit extremely high cellulase activities, i. e. the forestomach of ruminants. In this phase microorganisms of rumen origin, comprising bacteria and ciliates, perform an acidification process. The organic acids produced by the rumen microorganisms are subsequently converted into biogas in the second phase.

If pure cellulose is fed to this system (15 g of filter paper $\cdot l^{-1} \cdot day^{-1}$) breakdown is complete and the ciliates *Eudiplodinium maggii* and *Diplodinium denticulatum* become dominant. By means of fractionation the contribution of ciliates and bacteria in cellulose breakdown is established: 70 % of the cellulase activity is correlated with the bacterial fraction, 30 % with the ciliate fraction. After ultrasonic treatment (5 × 30 s) and centrifugation (10 min 50,000 × g) about 40 % of the cellulase is present in the supernatant; the rest is in the pellet fraction, bound to cellulose and cell debris. There is hardly any increase of soluble cellulase by expanding the sonication time, unless the pellet is resuspended in fresh medium. Detergents, whether in combination with sonication or not, do not increase the amount of solubilised cellulase. Cellulases of ciliates and bacteria behave in the same way. Routinely CMC-cellulose is the substrate for cellulase activity. If filter paper is used, the activity is about ten times lower. Considering the factors mentioned above, the cellulase in the system fed with filter paper converts 12—17 g of cellulose $l^{-1} \cdot day^{-1}$, which is approximately the same as the daily amount of filter paper fed to the system.

MAROUNEK, M. — BARTOŠ, S. — KALACHNYUK, G. I. (Institute of Animal Physiology and Genetics, Praha, Czechoslovakia; Ukrainian Research Institute of Physiology and Biochemistry of Farm Animals, Lvov, USSR): **The metabolism of inulin and starch by rumen microbes.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The aim of our study was to describe the main features of the metabolism of inulin and starch by rumen microbes. We followed the production of VFA in mixed cultures and the production of metabolites, growth yields and growth rates in pure cultures of ruminal bacteria.

MATSUKA, G. Kh. — TUKALO, M. A. — VASIĽEVA, I. G. — KALACHNYUK, L. G. — KRIKLIVIY, I. A. — OVCHARENKO, G. V. (Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences, Kiev, USSR): **The structure of isoaccepting leucine tRNAs from lactating cow mammary gland and adaptation to biosynthesis of milk proteins.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

As determined earlier spectrum of leucine isoaccepting tRNAs is changing simultaneously with the change of the functional state of cow mammary gland. During involution of gland at low level of protein biosynthesis five isoaccepting leucine tRNAs are found. However, during lactation when the gland produces specific milk proteins six leucine tRNAs are found, and two of them — $tRNA_3^{Leu}$ and $tRNA_4^{Leu}$ are absolutely new. Four to six isoaccepting $tRNAs^{Leu}$ from lactating gland were isolated and their nucleotide sequences and the codon recognition properties were investigated. One of most functionaly impotent differ between this tRNAs is a anticodon structure. Leucine $tRNA_{1,2}$ have anticodon CAG and $tRNA_{3,4}$ have anticodon IAG. Such changes in the anticodon strongly influence on the codon recognition. The $tRNA_{1,2}^{Leu}$ most strongly recognize CUG codon, this codon having the highest frequency among leucine codons in eucaryots. $tRNA_{3,4}^{Leu}$ recognize better the CUU codon which is rather rare, but in α_s-casein it has the same frequency as in the case of CUG codon. On the other hand, the value of Michaelis's constants of leucyl-tRNA synthetase for $tRNA_{1,2}^{Leu}$ and $tRNA_{3,4}^{Leu}$ are close. Thus appearing in lactating gland $tRNA_{3,4}^{Leu}$ which can read the CUU codon of casein mRNA, is the structureal display of adaptation to synthesis of milk proteins.

MICHAŁOWSKI, T. — BOCHENEK, J. — LANDA, I. — MUSZYŃSKI, P. (Zoological Institute, University of Warsaw, Warsaw, Poland): **The growth of *Entodinium caudatum* in the medium containing non-protein-nitrogen (NPN).** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The ciliates *Entodinium caudatum* were cultured in the Coleman's "caudatum type" salt solution using mainly urea but also ammonium sulphate or carbonate as nitrogen sources. The urea dose varied from 0.08 to 8.0 μM/ml/day. The energy source was a mixture of cellulose, starch and pectins (0.75 mg/ml/day). The ciliates were fed every day. Every fourth day the ciliate and bacteria number was estimated.

The ciliates died when medium contained only NPN and a mixture of carbohydrates and also when sterilized rumen fluid was added to the medium. When hay (0.75 mg/ml/day) was added the ciliates maintained at a density from 2.6 to 6.5 $\times$ 10^3 per ml. No differences in bacteria number were found here. The urea addition (0.75 μM/ml/day) to the medium containing Leguminosae plant proteins increased generally the population density ($P < 0.05$).

In the cultures receiving urea doses from 1.5 to 8.0 μM/ml/day the ciliate number never exceeded 10 $\times$ 10^3/ml. A positive correlation between the ciliate and bacteria number and a negative correlation between ciliate number and urea concentration was found here ($P < 0.01$).

Wheat gluten addition caused a maintenance of *E. caudatum* at a density ranging from 10.7 to 32.0 $\times$ 10^3/ml. In the last two experiments no correlation between ciliate number and ammonia concentration was found.

MOZEŠ, Š. — KUCHÁR, S. — NOSKOVIČ, P. — RYNÍKOVÁ, A. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Metabolic activity of ventromedial and lateral hypothalamus and food intake.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The metabolic activity of nucleus ventromedialis (VMH) and lateral hypothalamic area (LHA), expressed as total RNA content in individual neurons were related to feeding status in adult male Wistar rats. During diurnal period the RNA content of LHA neurons at 6^{00}—12^{00} significantly decreased and at 18^{00}—24^{00} increased. After 12 and 24 h fasting the RNA content of LHA neurons decreased and in VMH increased (24 h fasting) in comparison with *ad libitum* fed animals. The short-term, 1 h food intake after 12 and 24 h fasting oppositionaly changed the metabolic activity of these hypothalamic neurons. The RNA content of LHA neurons increased and in VMH (24 h fasted) decreased. The relative satiation, after administration of glucose and glycerol to 12 h food deprived animals or increased food intake after injection of insulin, significantly increased the RNA content in individual neurons of LHA. The results demonstrated the close relationship between metabolic activity of VMH and LHA and the feeding status of rats. The oppositional changes of the RNA content of VMH and LHA neurons are in conformity with the different role of these hypothalamic centers in food intake control.

MUSZYŃSKI, P. — MICHAŁOWSKI, T. (Zoological Institute, University of Warsaw, Warsaw, Poland): **The effect of protein solubility on growth of rumen ciliates *in vitro*.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The rumen ciliates (either *Entodinium caudatum* or *E. caudatum* mixed with *E. exiguum*) were cultured for 40 days receiving 0.75 mg/ml/day of mixture consisting of 50 % powdered hay, 40 % barley flour and 10 % protein studied. The number of ciliates and bacteria was estimated every fourth day.

The ciliate number decreased almost linearily ($P < 0.05$) with increasing protein solubility when different proteins were given. When cultures were offered casein preparates of different solubility the number of ciliates increased to a maximum (from 27.6 to 32.8 $\times$ 10^5 at 40 % solubility and from 17.5 to 28.4 $\times$ 10^5/ml at 80 % solubility for *E. caudatum* and *E. exiguum* respectively) and then decreased ($P < 0.05$).

The rate of digestion of different proteins was not related to their solubility. The rate of casein digestion by *E. caudatum* decreased from 34.6 to 8.9 nM N/10^5 cells, and by bacteria increased from 14.9 to 35.9 nM N/10^6 cells with increasing protein solubility ($P < 0.01$). The trypsic treatment of casein showed no relation between protein solubility and digestion rate.

The number of bacteria in ciliate cultures was almost the same irrespectively of casein solubility while when bacteria were cultured alone (however receiving the food reduced by the amount being ingested by ciliates) their number increased from 9.1 to 14.2 $\times$ 10^7 ml with increasing casein solubility.

NEFYODOV, V. P. — KUDRYAVTSEV, V. A. — KAZAKOV, V. N. — RUPENKO, A. P. — MILLER, S. V. — ALEKSEEV, P. V. (Institute of Biophysics USSR Academy of Sciences, Siberian Branch, Krasnoyarsk, USSR): **Isolated perfusing complex of organs — the experimental system for digestion processes investigation.** Veter. Med. (Praha), *32*, 1987 (Suppl).

The perfusion model of gastro-pancreato-duadenal complex (GPDC) of isolated organs was proposed. The apparatus "Homeostat-3" constructed in the Institute of Biophysics and the method of controlled normothermic perfusion of isolated organs developed in the same place were applied. Hypothermal and pharmacological defence of tissues from hypoxic damages was used in the isolating operation of organs for perfusion. The technology of organs perfusion of GPDC includes the programme of control of temperature, hemodynamics and some physical and chemical medium parameters. It allows to exercise the process of extracorporal blood circulation in homeostatic conditions in 6—12 h. In the course of GPDC perfusion we studied: the dynamics of extra- and incretory secretion as well as the number

of physico-chemical parameters of medium and organs tissues providing the control of functional activity and the adequacy of the system under study. To disturb the stationary equilibrium state of GPDC system some factors were applied modelling the pathology of organism — hypoxia, intaxication; the effect of separate regulatory peptides introduced exogeneously was also studied. As a result the many-factors parametric characteristics of separate chains in metabolism of digestion organs were obtained.

ORPIN, C. G. — JORDAN, D. J. — MANN, S. P. — HAZLEWOOD, G. P. (Agricultural and Food Research Council, Institute of Animal Physiology and Genetics Research, Babraham, Cambridge, U. K.; University of Tromsø, Tromsø, Norway): **Plasmid-coded functions in the rumen bacteria** *Selenomonas ruminantium*. Veter. Med. (Praha), *32*, 1987 (Suppl.).

Strains of *Selenomonas ruminantium* were isolated from rumen fluid of sheep, cattle and goats using trehalose, lactate or sucrose as sole carbon source. Preparations of DNA from these isolates was subjected to agarose gel electrophoresis; 4 to 10 plasmid bands were detected in each isolate, with molecular weights of 1.8 to > 100 kbp when compared with linear DNA marker fragments. Most strains isolated on sucrose contained fewer (4—6) plasmid bands, and were unable to grow on either trehalose or lactate. All isolates made on trehalose contained a common plasmid of > 45 kbp. Strain Tre 3 isolated on trehalose was grown for 20 sequential 10 ml-batch cultures using glucose as sole carbon source. Plasmid DNA preparations from this strain after growth on glucose revealed the loss of the 45 kbp plasmid. All lactate-utilizing strains carried a common plasmid of > 40 kbp, which was also lost on extended subculture on glucose. Isolation of the > 45 kbp from the Tre 3 (tre^+, $lact^+$) using buoyant density centrifugation in a calcium chloride gradient, followed by transformation of strain Suc 11 (tre^-lact^-) resulted in transformation to tre^+, $lact^+$. Agarose gel electrophoresis of DNA preparations of the transformant revealed the presence of the > 45 kbp plasmid. This plasmid therefore codes for both trehalose and lactate utilization and can transform tre^-lact^- strains.

PETKOV, A. — VITANOV, S. — ENEV, E. — BOCHUKOV, A. — OBLAKOV, N. — DIMITROV, D. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora, Bulgaria): **Age differences in the ultrastructure development of forestomach in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

An electronic-microscope study was carried out on the forestomach wall of lambs and sheep from a milk specialized breed. The following age groups were studied: newborn — not suckled yet and suckled, 1, 2 and 3 weeks, 1, 2, 3, 4, 5, 6, 9 and 12 months of age. The experimental material was treated by prefixing with 5 % glutaraldehide, postfixing with 2 % osmium tetroxide including in durcupan, cutting on ultramicrotom "Reichert", contrasting with $C_6H_6O_7Pb$ and $C_4H_6O_6U$ and observed on electronic microscope "Opton-10CR". There were found some periods in the postnatal development of the wall. Ultrastructure pecularities were observed in the cell and tissue differentiation. They were mostly expressed in the epithelium layer of the mucose in the postnatal period and the first 25—30 days. It was found a transformation of the endoplasmic reticulum and gradual keratoses. The separate epithel layers of cells were differentiated. It was found a gradual complication of the intracell contacts. Together with the epithel cells was found variating quantity of branched cells. It was made an attempt for systemization of the processes of wall development for the different compartments of the forestomach. On the basis of the found ultrastructure pecularities were discussed the changes in the functional differences of the separate layers in connection with the age. The question for the changes in the preserving and resorbtion function of the mucose was discussed.

POULSEN, J. ST. DIRCH — ÖZKAN, K. — HEKMATI, P. (Royal Veterinary and Agricultural University, Copenhagen, Denmark; Veterinary Faculty, University of Tehran, Tehran, Iran): **The naso-ruminal sampler. An examination of a new instrument for continuous collection of ruminal fluid during long experimental periods.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Sampling of ruminal fluid from non-fistulated cows has for many years been performed by the use of Sørensen & Scamby's ruminal sampling method. The obtained samples were, however, often mixed with more or less amounts of saliva and thereby not representative of ruminal fluid. With a newly constructed instrument it should be possible to obtain samples which more likely are representatives of ruminal fluid. The instrument is designed to stay for longer periods (hours, day) in the animals whereby continuous sampling can be obtained. The instrument consists of a suction head and a long tube. By means of a long stiff cannula (cathether) introduced through the mouth can the suction head be placed in the ventral ruminal sac and the end of the tube will thereafter be passed from the mouth through the pharynx and ventral meatus nasi and out of the nostrils where the tube will be fixed to the halter. The in-situ position of the tube will be from the nostrils, the ventral meatus nasi, pharynx, eosophagus to the ventral sac of the rumen.

Examinations has so far nof shown any clinically observed disadvantages and the animal can eat and ruminate normally during sampling.

Details of sampling technic and a comparative clinical-chemical study of ruminal fluid sampled via the tube and via Sørensen & Scamby method and by direct sampling from the rumen in a fistulated cow will be given.

ROSSOW, N. — ILGNER, B. — SCHÖNHERR, R. (Humboldt-University, Berlin; Division Veterinary Service, Gransee, GDR): **Experimental studies in lambs into the effect of different feed rations on the digestive processes in rumen and caecum on the basis of selected parameters.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

After the implantation of caecal fistulae 10 male lambs were fed successively 3 rations distinctly different in energy and protein content. Ration A: High energy concentration and crude fibre deficiency; Ration B: Low energy concentration, high protein : energy quotient; Ration N: Energy and protein supply as needed. Samples of blood, urine, rumen fluid and caecal content were taken 2 h prior to and 4 and 10 h after feeding. At these dates the concentrations of volatile fatty acids in mmol l amounted to: Ration A: Rumen (79; 81; 74), caecum (123; 114; 99). Ration B: Rumen (39; 40; 39), caecum (85; 79; 74). Ration N: Rumen (71; 71; 58), caecum (121; 103; 95). Apart from the higher absolute concentrations of the single fatty acids in the caecum, in all rations the acetate-propionate proportion in the caecum is wider than that one in the rumen. The ration B restricted in energy resulted in increased plasma urea concentration and increased ammonia concentration in the rumen at 4 h after feeding and in the caecum at all dates. Neither the urine data of ammonia nor those ones of urea proved to be of any diagnostic value to explain the mentioned differences in the concentrations. Some other parameters showed both feed-dependent and diurnal-dependent differences. On the base of the studied parameters it was concluded that the microorganisms of rumen and caecum reacted to the feed rations principally in the same way.

RUSSEV, V. — PETKOV, A. — ENEV, E. — SIVKOVA, K. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora, Bulgaria): **Influence of some ionophore antibiotics on the digestion processes in lambs.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In continuance of 90 days, two experiments were carried out: scientific-productional with 100 lambs and experimental with 25 fistulated lambs 3 months of age. The animals were divided into 5 groups — 1 control and 4 experimental and were managed under similar conditions. The experimental groups received a supplement of Lasalocid-Na (Lazotec-Hoffman la Roche) by 20 ppm (II group), 40 ppm (III group), 50 ppm (IV group) and 600 ppm (V group) t fodder. It was found that the gain was higher for the lambs from III group with 1.2 %, IV — 9.04 % and V — 15.25 %. The fodder expense for 1 kg of gain was lower for II group by 1.18 %, III — 10.4 %, IV — 7.86 % and V — 13.06 %.

It was found an increasing of the propionic acid and a decreasing of the acetic, butyric and valerianic acids. The ammonia concentration in the rumen content of the experimental lambs was lower.

RYBOŠOVÁ, E. — JAVORSKÝ, P. — HAVASSY, I. — HORSKÝ, K. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Urease activity of adherent rumen bacteria.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In experiments with six sheep fed on a low-N diet (3,7g N/day) and six sheep fed on a higher-N diet (21g N/day) 3 hrs after morning feeding the following urease (E.C. 3.5.1.5) activities (given in $n.kat.mg^{-1}$ bact. dry matter) were found: In bacteria adherent to the rumen wall epithelium 13.25 ± 2.10; 3.81 ± 1.37; in rumen fluid bacteria 8.96 ± 1.53; 3.76 ± 1.02; in bacteria adherent to the ruminal food particles 5.69 ± 2.13; 1.92 ± 0.90. The urease activity in bacteria adherent to the rumen wall and in bacteria of rumen fluid in animals given low-N ration was significantly higher than in animals on higher-N ration. The results shows that the urease activity of the rumen fluid bacteria and adherent bacteria to the rumen epithelium and to food particles is different and decreases as nitrogen intake increased. From the relative high urease activity in bacteria adherent to the rumen epithelium determined at low nitrogen intake it can be supposed that they play an important role in the hydrolysis of blood urea during its passage through the rumen wall and its reutilization in the rumeno-entero-hepatal nitrogen cycle in ruminants.

SAVKA, O. G. — KALACHNYUK, G. I. — MAROUNEK, M. — BARTOŠ, S. — VÁRADY, J. — ZELEŇÁK, I. (Ukrainian Research Institute of Animal Physiology and Biochemistry, Lvov, USSR; Institute of Animal Physiology and Genetics, Praha; Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Fermentation and ammonia formation processes in the rumen at feeding of carbamide and poultry manure.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Carbamide included into combined feeds was fed to bull-calves in amount of 60—120 g/head/day. Dry poultry manure with litter (DPM) together with concentrate mixtures was fed in amount of 700—1500 g head/day. It was stated that carbamide influence on rumen metabolism was in agreement with reported data. Inclusion of DPM had some slight stimulating effect on the ammonia formation processes and cellulose fermentation in the rumen but slightly decreased amilases activity during the first 2 h after feeding. Joint feeding of carbamide and DPM had favourable effect on significant increase of $N\text{-}NH_3$ concentration (by 200—300 per cent, i. e. in 2—3 times as compared with control animals) that was approximately the same as at separate feeding of carbamide. However, the above-mentioned increase remained within the ranges of physiological norm and was not greater than 250 mg/l. The total state of carbohydrates fermentation and metabolism of nitrous and other substances in the rumen was also close to that stated while feeding carbamide. Significant reduction (by 20—40 per cent) of ammonia formation level in the rumen was established when molasses was included into the ration. Addition of 90—150 g of zeolite into the ration reduced $N\text{-}NH_3$ concentration by 10—18 per cent. 20—35 days-long adaptation to the ration with carbamide and DPM lowered the level of ammonia by 5—11 per cent. In general it was reduced by 35—69 per cent.

SCHIEMANN, R. — JENTSCH, W. — HOFFMANN, L. (Academy of Agricultural Sciences of the GDR, Research Centre for Animal Production, Dummersdorf-Rostock, GDR): **Comparative investigations of digestibility of various diets in cattle and sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In order to assess the accuracy of the energetic feed value and the energy requirement on the basis of digestibility determinations in sheep under standardized conditions and to transfer it to various categories of cattle the digestibility in the adult sheep was measured on a nutritional level of about 1.2 parallel to total metabolism measurements on cattle. In addition, some parameters of rumen physiology were determined. From a total of 283 comparisons between cattle and sheep 90 were carried out on young female cattle, 98 on fattening bulls, 50 on cows and 45 on adult oxen. The tested diets showed a high variation in the nutrient composition (crude fibre 10—40 %, crude protein 10—25 %). Digestibilities of energy and crude nutrients, metabolizable energy and in the rumen fluid the concentrations

of volatile fatty acids, total acid, ammonia, urea as well as the pH-values were measured.

As influencing factors on the magnitude of the measured parameters the live weight of cattle, the crude fibre and crude protein content of the diets and the nutritional level were analyzed. There was an accordance in the digestibility of energy and N-free crude nutrients between adult sheep and adult cattle (oxen, non-gestating, non-lactating cows) when measured on the same nutritional level. The digestibility of crude protein was 5 digestibility units lower in cattle than in sheep. Increasing the nutritional level in cattle by 1 unit led to digestibility depressions of energy by 3 digestibility units. 2 3 of this reduction was compensated on the stage of metabolizable energy by diminished energy excretion as methane and urine. Growing cattle in the early development showed by 6 units lower digestibility values than sheep: advancing development this difference diminished. Low crude fibre diets were better digested by sheep; with crude fibre contents above 25 % the digestibility was equal in cattle and sheep or a bit higer in cattle. There was no directed influence of the diets on the magnitude of digestibility when comparing cattle and sheep.

SIVKOVA, K. — MIRENSKI, N. — ENEV, E. — OBLAKOV, N. — TOSSEV, A. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora, Bulgaria): **Testing the influence of nutritive antibiotics included in the content of urea-mineral-mixtures on the weight gain and some processes in the rumen of calves and some blood parameters.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

An experiment was carried out with 4 groups of calves for fattening. The calves from all groups received rations of the same content and structure. To the basal ration of the calves from II group was added urea-mineral-mixture (UMM) containing monensin, to III group — UMM containing salinomycin and to IV group — UMM containing lasalocid.

Periodically and at the end of the experimental period was recorded the gain and was collected rumen content for analyses of the total quantity and molar proportion of VFA, pH and ammonia concentrations. In the blood were analysed the contents of sugar, total protein and albumen.

It was found an increasing of the weight gain for the calves from the experimental groups and higher values in the molar percentage of the propionic acid and decreasing of the molar percentage of the acetic acid.

The rest of the examined parameters didn't show any significant differences between the control and the experimental groups.

SLANINA, Ľ. — KODET, J. — PAULÍK, Š. — LEHOCKÝ, J. (University of Veterinary Medicine, Košice; Starch-factory, Havlíčkův Brod; Central Veterinary Hospital, Košice, Czechoslovakia): **Maltodextrins in the nutrition and diethetics of calves.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The intensive calf breeding requires the sufficient intake of energy and nitrogen. While nitrogen is well supplied during the milk nutrition, the energy intake, mainly during the first 3—4 weeks of life is insufficient because of the still undeveloped enzymatic system in the digestive tract. In order to ensure the sufficient supply of energy, but also of the dietetic needs, mainly during the changing stage of the new milk mix and during the metabolic disturbances in calves, we used in the experiment enzymatically digested potatoe starch. The starch digestion was provided by the alpha amylase in the Starch-factory, Havlíčkův Brod at various saccharifying level (DE); 5—7 % as the lowest value and through the intersteps up to 27 % as the highest value. Osmolality of the solution during the corresponding energy supply by maltodextrins was observed to be at the level of the native milk and even lower, while the glucose itself increased the osmolality over 1200 m Osm kg. Higher doses rates resulted in the decreased dry matter values in the feces and in a tendency to diarrhea. A favourable glycemic curve was considered to be a sign of utilization; this curve was flatter as compared to the curves obtained in the experiments with a glucose. The degree of starch saccharifying and its doses or its diurnal distribution are considered to be the significant factors in the application of maltodextrin in calves.

SMUTNÝ, J. — STRAPÁČ, I. — IVANKO, Š. — GYULAI, F. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **The influence of plant proteinase inhibitors on the digestion in the rumen. Isolation of trypsin inhibitors from *Vicia sativa* and their effect on the rumen ciliate protozoa.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

By means of trypsin immobilized on CNBr Sepharose 4B the mixture of at least three inhibitors was isolated from the water-soluble protein fraction of *Vicia sativa* seeds. The effect of those inhibitors on the rumen protozoa *Entodinium simplex* cultivated *in vitro* was tested.

In the control test were protozoa in the cultivation medium fed the wholemeal wheat flour. Tests were carried out with two different concentrations of meal from *Vicia sativa* seeds combined with wholemeal wheat flour.

No trypsin-like proteolytic activity, measured on the specific substrate, has been found in the cultivation medium of protozoa fed the meal from *Vicia sativa* seeds. The total proteolytic activity, measured on the azocasein as a substrate at pH 7.6 was tested. In the cultivation medium of both tests and controls the extracellular and also intracellular proteolytic activity separately were determined.

In comparison with the control no negative effect on the growth of protozoa *in vitro* has been found. It suggests that the proteinase inhibitors content of *Vicia sativa* seeds situated in feed mixtures probably will not negatively influence the growth of protozoa in the rumen of ruminants *in vivo*.

STANGASSINGER, M. — GIESECKE, D. (University of Munich, Munich, Fed. Rep. Germany): **Insulin function in fed and fasted animals.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The pattern of nutrition as well as digestive processes suggest insulin to be a less important regulator of glucosehomeostasis in ruminants than in other species. Therefore, an investigation was undertaken to study the sensitivity of the pancreatic insulin response to glucose (intravenous glucose tolerance test) as well as the tissue sensitivity to insulin (euglycemic glucose clamp test; insulin radioreceptor assay with erythrocytes) together with glucose kinetics in fed and fasted goats. The results obtained can be summarized as follows:

In fasting animals low basal insulin levels and a markedly impaired (—60 %) insulin release after glucose are associated with insulin resistence of the target tissues. The latter is supported by the results of a compartmental analysis of the glucose tracer kinetics which indicate a 40 % reduction in (insulin dependent) metabolic glucose loss but no changes in (insulin independent) glucose distribution processes.

In conclusion, the results obtained indicate an important regulatory influence of insulin on glucosehomeostasis in ruminants.

ŚWIETLIKOWSKA, U. — OŚKIEWICZ, K. B. — MOSDORF, M. — MILEWSKA, B. (Warsaw Agricultural University, Warsaw; Institute of Husbandry and Animal Production, Agricultural and Pedagogical Higher School, Siedlce, Poland): **The degree of minerals requirement supply for dairy cows in different feeding systems.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

All rations (more than 800) used in feeding of 40 dairy cows in 10 farms during the period of two years (1983—1984) were investigated. In used feeds, the quantities of following minerals were determined: Ca, P, K, Na, Mg, Fe, Cu, Mn. The contents of these minerals in the rations and the degree of requirement supply were analysed according to the feeding systems, feeding periods — winter and summer —, the mielk yield and the period of pregnancy. Basing on the used rations, 18 feeding systems could be created, 5 in winter feeding period and 13 in summer. The requirements of minerals were taken from Animal Feeding Norms (1981) and (for potassium) from NRC (1978). Generally, the degree of the mineral requirement supply differed according to the milk yield and feeding systems. It was mostly influenced by the structure of rations, kind and amounts of used feeds. The rations based on forages or with addition of grains, usually occured unsufficient in P, Na, Mg, Cu, Zn and too rich in K and Fe. The supply of cows Ca needs

was unsufficient in winter feeding based on farm produced feeds with small amounts of hay. An additions of industrial concentrates, supplemented with minerals, to the rations composed of farm produced feeds, better supplied P, Na, Mg and Ca-in rations unsufficient in it, but increased the surplus of Fe, Mn and Ca-in rations based on green forages; the deficiency of Cu was still not covered.

SZANYIOVÁ, M. — LENG, Ľ. — BOĎA, K. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Urea excretion in water depleted sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Clearance techniques were used to study the renal functions in conscious Merino sheep on reduced water intake (0.5 % of b. w. within 3 days). After 3 days of water depletion diuresis ($P < 0.01$), glomerular filtration rate (GFR, $P < 0.001$), plasma urea concentration (P_{urea}, $P < 0.001$) and amount of urea excreted ($P < 0.001$) were significantly decreased in comparison with the control (free water intake). Fractional excretion of urea and tubular reabsorption of urea were not changed after 3 days of reduced water intake. Statistically significant increases of osmolality of both plasma ($P < 0.001$) and urine ($P < 0.001$) were recorded while the clearance of osmotically active substances was decreased ($P < 0.02$) and the clearance of free water did not change. Water depletion did not affect the plasma concentration of sodium (Na), amount of Na excreted by urine, tubular reabsorption of Na and fractional excretion of potassium (K). Water depletion increased the fractional excretion of Na ($P < 0.01$), plasma concentration of K ($P < 0.02$) but decreased the amount of K excreted ($P < 0.05$). The results show that renal urea excretion in sheep during the short term water depletion is regulated by the change of the filtered amount of urea in glomeruli as a consequence of a decrease of both GFR and P_{urea}.

SZELÉNYI, M. — JUHÁSZ, B. — JÉCSAI, J. (Research Institute of Animal Nutrition Herceghalom, Hungary): **Effects of different feed additives on the N-metabolism in lambs.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The effect of different feed additives (Nitrovin, Avoparcin, Salinomycin, Flavomycin) and Kovin-50 (urea product) was investigated in N-metabolism experiment by castrated male lambs (20—26 kg) and in farm experiment by male and female lambs (20—35 kg) for establishment of protein metabolism and daily gain and food utilization.

The result of N-metabolism and fattening experiments showed that Kovin-50 was able to replace the extracted sunflower meal in the food of growing lambs completely.

The most important results were given by Salinomycin. It improved the N--retention with 19 percent and the productive protein utilization with 15 percent. The feed additives usually caused 8—15 percent decreasing in the urea concentration of blood samples. Wich all goes to show the better utilization of food protein. The digestibility coefficients of the food usually were improved by all feed additives with 6—16 percent in our experiment. But the feed additives have not effect to the total protein content and to total amino acid N concentration of blood.

ŠIMŮNEK, J. — MAROUNEK, M. — BARTOŠ, S. (Institute of Animal Physiology and Genetics, Czechoslovak Academy of Sciences, Praha, Czechoslovakia): **The action of monensin on fermentation of various polysaccharides by the ruminal microflora** *in vitro*. Veter. Med. (Praha), *32*, 1987 (Suppl.).

We followed the effect of monensin supplementation on the fermentation of cellulose, hemicellulose, xylan, pectin, inulin and starch in *in vitro* experiments. The mixed population of rumen microorganisms was used. We also studied the influence of monensin on the accumulation of lactic acid in the incubation fluid during fermentation of sucrose and starch. In all experiments we compared the effect of our inland monensin (SPOFA) with monensin made by ELANCO.

TOMÁŠ, J. — KOPPEL, J. — KUCHÁR, S. (Veterinary University, Košice; Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **The effect of glucose and propionate on the amino acid metabolism of suckling and ruminating lambs.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The changes in plasma free amino acids in both suckling and ruminating lambs after peroral administration of equimolar amounts (5.56mmol kg b. w.) of glucose and propionate, respectively. The control group was given an identical volume of 0.9 % NaCl. Plasma free amino acid levels were determined by column chromatography on the automatic amino acid analyzer HD-1200. With regard to the results obtained in this study it can be stated that peroral administration of glucose or propionate induces changes in the plasma amino acid spectrum of lambs that are partly age-dependent. Out of the essential amino acids the most pronounced changes were found in isoleucine, leucine and valine concentrations i. e. amino acids with branched side chains and lysine. These changes cannot be directly correlated to plasma insulin and glucose concentrations which indicates at the active participation of other hormones probably glucagon or growth hormone. The results obtained prove the complex nature of the regulatory mechanisms that affect the plasma free amino acid metabolism ruminants.

TOSSEV, A. — KOZELOV, L. — ENEV, E. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora; Institute of Animal Breeding, Kostinbrod, Bulgaria): **Influence of the size of lucerne hay on some processes in the rumen of calves.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Experiments were carried out with calves fed with lucerne hay of different size — 58 mm I exp., 25 mm — II exp. and 6 mm — III exp. Samples from the rumen content were collected at 0, 2, 4 and 6 h after feeding and were recorded the total quantity and the molar percentage of VFA and the ammonia concentration.

The received results show that at the 2nd h after feeding for the III exp. (6 mm) the total quantity of VFA was maximal. The feeding of the calves with lucerne hay of the smallest size lead to increasing of the molar percentage of propionic and butyric acids and decreasing that of the acetic acid in the rumen content. The ammonia concentration 2h after feeding increased and maximal values were reached for the III and II experiments. The data for the nitrogen balance showed that its utilization was poorer for the smaller size of the lucerne hay.

VÁRADY, J. — FEJEŠ, J. — BOĎA, K. — TASHENOV, K. T. — KALACHNYUK, G. I. — PUPIN, I. G. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia; Institute of Physiology, Kazakh Academy of Sciences, Alma-Ata, USSR; Institute of Physiology and Biochemistry of Farm Animals, Lvov, USSR): **Nitrogen metabolism at synthetic, semi-synthetic and classical diets in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

In experiments with wethers the indices of nitrogen metabolism after synthetic diets with different nitrogenous sources, semisynthetic and classical ones were observed. In the animals on both synthetic and classical diets the levels of total and protein nitrogen, NH_3, total VFA, copper, manganese, dry matter content of the rumen fluid, and the basic parameters of the bile and pancreatic juice were found to be the same. The different values were detected in the production of rumen gas, the pH and the residual nitrogen. The results of the experiments with different nitrogenous sources showed that a ruminant was able to cover its nitrogenous requirement to the same extent from urea, plant proteins, proteins of animal origin and aminoacids. The lowest values of clearance, pool and urea turnover were found at the synthetic diet compared with the semisynthetic and classical ones. Secretion of endogenous urea into the digestive tract was without differences at both methods of the nitrogen nutrition. An increased excretion of N-compounds by kidneys was found at the intracecal nitrogen nutrition what indicates that the passage of the increased amount of N-compounds by chymus into large intestines leads to the endogenous nitrogen loss and to the endogenous energy consumption.

VENCL, B. (Research Institute for Animal Production, Praha, Czechoslovakia): **Degradability of the feeds protein in the rumen and its solubility.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Owing to shortcomings of digestible crude protein as assesment of feeds protein value for ruminants new systems are accepted. The validity of new protein systems depends upon estimation of feed protein degradability and yield of microbial protein. Method *in sacco* was found suitable for large scale determination as compared to laborious *in vivo* method.

Protein degradation of sets of feeds (roughage $n = 48$, concentrates $n = 31$) was determined by the incubation of feed samples in the rumen of a dairy cows for 4, 8, 16, 24, 48, 72 hrs. The degradation of protein was expressed by the curve $y = a + b(1 - e^{-ct})$ according to Ørskow (1982) and corrected to outflow rate. Protein degradation was higher for preserved feeds-silage and protein rich haylage than for hay and green forage. Higher protein degradation was also determined in case of grain — barley, oat, rye (more than 80 %) as compared to maize (55 %). The same was true for soybean meal (60—68 %), cottonseed meal (72 %), fish meal (45 %) and feathers meal (20 %) on the one hand and peanut meal (90 %) on the other hand. The dependance of degradability values on *a* parameter of the function was high owing to significant relationship between percentage of soluble protein and mentioned *a* parameter ($r = 0.896$). The dependance of protein degradability values on *b* parameter depends on degradability of insoluble protein. The relationship between percentage of buffer soluble protein and *in sacco* degradability values was significant in set of silages and haylages.

VITANOV, S. — PETKOV, A. — ENEV, E. — DIMITROV, D. — OBLAKOV, N. — BOCHUKOV, A. (Higher Institute of Zootechnics and Veterinary Medicine, Stara Zagora, Bulgaria): **A study on the ultrastructure development of the intestinal tract in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

An electronic-microscope study was carried out on the wall from different parts of the small and big intestine in lambs and sheep from the milk specialized breed. The animals were divided into the following age groups: newborn — not suckled yet and suckled, 1, 2, 3 weeks, 1, 2, 3, 4, 5, 6, 9 and 12 months of age. Just after the slaughter of the animals the material for studing was treated by prefixing with 5% glutaraldehide, postfixing with 2% osmium tetraoxide, including in durcupan, cutting on ultramicrotom "Reichert", contrasting with $C_6H_6O_7Pb$ and $C_4H_6O_6U$ and observed on electronic microscope "Optone-10R". Significant changes in the ultrastructure were found at the moment of first suckling, connected with the resorbtion and secretion function of the enterocytes. The process of the gradual differentiation of the separate cell kinds was observed. There were found changes concerning the manner of feeding, leading to variations in the functional condition of the intestinal glands. There were found regularities in the condition of the separate cell organoides in the enterocytes and the preservation elements. The question for the connection between the structure and the function of the wall layers was discussed. Proposals were made for the critical periods in the development of the intestinal tract. There was found a difference in the intensivity of the development of the separate parts from the intestine.

VOIGT, J. — PIATKOWSKI, B. (Academy of Agricultural Sciences of the GDR, Research Centre for Animal Production, Dummersdorf-Rostock, GDR): **Concept for evaluation of nitrogen substances in ration for milk cows.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The protein value of feeds for ruminants is determined essentialy by the amount of protein or amino acids present at the duodenum. The calculation of the duodenal protein by sum of microbial protein (MP) and undegraded feed protein (UDP) is a logical way, if the two variables (synthesized MP per unit intake of energy, UDP) of feedstuffs are independently.

In the present experiments we used the nylon bag technique and found for forage and concentrate a significant positive correlation between DM fermentation and crude protein (CP) degradation in the rumen. The regression coefficient b_1

(CP degradation as regressor) was found to average 0.87. Therefore a negative relationship exist between the amount of MP and UDP.

For prediction of the protein supply to the small intestinum we investigated the relation between CP passage at duodenum (CP_D) and the diet composition. The experiments included 76 rations (8 to 25 % CP and DM) and were carried out on 27 cows fitted with rumen and duodenal cannulas. The best approach could be achieved by relating CP_D (without NH_3-N and endogenous N portion) to DM intake and CP intake: CP_D (g/d) = 119.2 DM (kg/d) + 0.26 CP (g/d) — 175 (n = 153, $SR^0/_0$ = 14.7). For a 550 kg cow the requirement of the CP_D could be calculated with the following equation: CP_D (g/d) = 230 + 91 FCM (kg).

WALKO, T. — ZELEŇÁK, I. — SIROKA, P. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice, Czechoslovakia): **Cellulosic dust in sheep diet.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The cellulosic dust arising as a waste in the works Slovcepa, Gemerská Hôrka, represents essentially a pure cellulose. Its *in vitro* digestibility is about 80 %, dry matter content 92 %, fat 0.7 %, ash 1.7 %, NDF 98.9 %, ADF 91.1 %, cellulose 94.4 %, hemicellulose 7.8 %. The cellulosic dust has been tested on rams (live weight 45 kg), when the control diet containing 78 % of meadow hay was compared to the experimental ones containing 22 % of cellulosic dust as a replacement of meadow hay and 4 % of beet molasses, or sulphite extract serving as a connective. The diets containing the cellulosic dust showed the statistically significant lower digestibility of N-compounds (the cellulosic dust doesn't contain any nitrogen), but statistically significant higher digestibility of cellulose and ADF. At comparison of beet molasses as a connective with sulphite extract, there are better results in beet molasses (nutrient digestibility, nitrogen balance, rumen digestion indices). The experiments showed that waste cellulosic dust equally replaced meadow hay (apart of nitrogen which is needed to add) and in more indices it surpassed hay, what suggests the utilization of this waste material in ruminant nutrition.

WIELOGÓRSKI, A. — ŻEBROWSKA, T. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **Nitrogen metabolism in sheep given glucose orally or into the duodenum.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The influence was investigated of glucose (G) given orally (M) or infused (I) into the duodenum of sheep weighing 50 kg fed on rations containing 16 (LN) or 25 (HN) g N on the nitrogen excretion in urine and faeces and on the level of urea in blood plasma. Glucose, 100 or 200 g, was given with feed in two equal portions at 8.00 and 15.00 or was continuously infused into the duodenum. Urine and faeces were collected daily during 10 days, blood from the jugular vein was taken on the 2nd and 8th day of collection. Glucose given 100 or 200 g G/d orally did not influence N excretion in urine in sheep fed on LN or HN diets but increased the amount of N excreted in faeces. The infusion of 100 or 200 g G/d into the duodenum of sheep fed on LN and HN diets decreased N excretion in urine by about 20 % while the amount of N excreted in faeces was unchanged. The amount of N retained (g/d) was: 1.92 (G 100 M), 4.11 (G 100 I), 2.29 (G 200 M) and 4.58 (G 200 I) on LN diet, and 2.20 (G 100 M), 5.59 (G 100 I), 1.72 (G 200 M) and 5.79 (G 200 I) on the HN diet; the differences between M and I being significant ($P \leq 0.01$). The level of urea in blood plasma (mg/100 g) was: 20.7 (G 100 M), 15.2 (G 100 I), 19.3 (G 200 M) and 14.1 (G 200 I) on LN diet, and 30.6 (G 100 M), 24.6 (G 100 I), 27.5 (G 200 M) and 21.8 (G 200 I) on the HN diet; the differences between M and I weresignificant ($P \leq 0.01$). It is concluded that infusion of 100 g G into the duodenum improved nitrogen utilization in sheep fed on LN and HN diets; further increase of glucose had no effect.

YOUNG, B. A. — WHITMORE, W. T. (University of Alberta, Edmonton, Canada): **Thermally induced metabolic acclimation in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The effects of thermal acclimation on whole animal and muscle energy metabolism was studied in adult sheep. The sheep were closely-clipped and acclimated in controlled temperature chambers to either 35C, 20C, or 3C constant ambient temperatures and were fed the same amount of a pelleted diet at all three ambient temperatures. After at least four weeks of thermal acclimation and exposure to continuous light, the resting and cold-induced summit rates of energy metabolism were measured by indirect respiratory calorimetry. The rate of oxygen uptake was also measured in small samples of external intercostal muscle excised from the thermally acclimated sheep. These samples were incubated in the presence and absence of ouabain. Rates of resting and summit metabolism and oxygen uptake by muscle *in vitro* were inversely related to the temperature to which the sheep were acclimated. These results indicate that there is thermally induced metabolic acclimation in adult sheep which is reflected in the whole animal and in muscle tissue. These thermally induced metabolic changes could be important in determining the dietary energy requirements of ruminants.

ZAŁUCKI, G. — ZAWADZKI, W. (Faculty of Veterinary Medicine, Agricultural Academy, Wrocław, Poland): **The influence of livex on rumen fermentation** *in vitro*. Veter. Med. (Praha), *32*, 1987 (Suppl.).

The mechanism of action of livex in sheep were studied. The experiments have been carried out with four sheep at the age 1 year, which were fed in 3 groups (hay — 100 %, hay — 70 % + concentrates — 20 % + beet pulp — 10 % and hay — 70 % + concentrates — 30 %), water and a mineral mixture *ad libitum*. Rumen content have been analyzed four times per day: before feeding and after 1, 2 and 4 hours after first feeding. The samples have been analyzed after addition of livex to ruminal content in a different amounts in proportion (proportionally) to doses of livex which were used to diets in feeding of ruminants. The following parameters were observed: pH, $N\text{-}NH_3$, total VFA, lactic acid, amount of protozoa, total production of gases and of methane in rumen liquid *in vitro*. Total gases production was measured by incubating of rumen liquid in an individual glass artificial rumen. Methane production was measured as the volume difference found after incubation with out and with N NaOH. Each test was performed with duplicate flasks. The samples of ruminal gases were analyzed also. Presence of methane, carbon dioxide, nitrogen, oxygen, carbon monoxide and other gases has been found. The relationships between gases were studied also.

ZAWADZKI, W. (Faculty of Veterinary Medicine, Agricultural Academy, Wrocław, Poland): **Modification of rumen fermentation by livex supplementation in feeding of small ruminants.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Fermentation of food by the microbial community of the rumen is essential for the maintenance and growth of ruminants. The relation between the formation of volatile fatty acids and CH_4 has stimulated the investigation of methods to decrease CH_4 production and simultaneously to increase the production of volatile fatty acids. The production of CH_4 and its loss represents about 10 to 18 percent of the energy intake of ruminants. Inhibitors of methanogenesis have caused the desired fermentation shifts in experiments both *in vitro* and *in vivo*. Some substances such as: monensin, avatec, cygro, sacox and others were studied also. The aim of present experiments was to determine the effect of livex — product from blood (Polish Patent) on the rumen fermentation. The sheep and calves were given livex as supplement to diet from may to july. The animals were fed hay, concentrates and beet pulp. Water was always available. Rumen content have been analyzed seven times per day: before feeding and after 1, 2, 3, 4, 5, 6 hours after the first feeding. This procedure has been carried during experimental procedure. The samples of rumen content were analyzed for pH, $N\text{-}NH_3$, lactic acid and gases produced during incubation in the vessels of Wartburg's apparatus and special

type of artificial glass rumen at 39 °C for 12 hours. Samples of rumen gases were collected in glass vessels and analyzed at the apparatus described by Krzysztolik et al. and were verified on gas chromatograph.

ZAWADZKI, W. (Faculty of Veterinary Medicine, Agricultural Academy, Wrocław, Poland): **Investigations of behenic acid as a new inhibitor of methanogenesis *in vivo* and *in vitro*.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The physiological functions of rumen are known. It is, therefore, of interest to examine the effect on rumen microflora and rumen conditions of substances known to modify rumen fermentation processes. Of special interest are substances which reduce energy losses and/or increase weight gain. Behenic acid is such a compound.

The experiments were performed on small ruminants (5 sheep and 8 goats) at the age 2 years, weight 40.0 kg. The animals were selected very carefully. Goats and sheep were fed in six groups: I — hay (100 %), II — hay (70 %) + concentrates (20 %) + beet pulp (10 %), III — hay (70 %) + concentrates (30 %), IV — hay (70 %) + bruised maize (30 %), V — hay (50 %) + concentrates (50 %), VI — hay (50 %) + bruised maize (50 %). The purpose of the studies was to determine the influence of behenic acid ($CH_3H_{2\,20}$ COOH) on methanogenesis and the level of volatile fatty acids in samples of the rumen content. Rumen content taken after 2 hours after the end of feeding by the use of rumen probe and a vacuum pump was incubated in the vessels of Wartburg's apparatus and special type of fermentation vessels at 39 °C for 12 hours. Rumen samples for VFA analysis were treated with 0.5 ml formic acid per 10 ml and stored at —20 °C until analysed. The quantitation of VFA in a 5000 Xg supernatant of the samples was performed on a Pye Unicam GCD gaschromatograph with a Cromosorb 101 (150 × 0.4 cm) column at a temperature of 180 °C and with nitrogen (40 ml/min) as a carrier gas.

ZAWADZKI, W. (Faculty of Veterinary Medicine, Agricultural Academy, Wrocław, Poland): **Effects of monensin and lasalocid on methane and VFA formation in sheep and goats.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The influence of monensin and lasalocid on the total production of gas and especially of methane in rumen liquid of small ruminants *in vitro* has been examined. The animals were kept in the same barn, on the same regime as used during the experimental period, from at least two weeks before the experiment started. The animals were fed hay, a concentrate mix for cows, water and a mineral mixture *ad libitum*. The concentrate mixture had vitamins added. Total gas production was measured by incubating 2 ml of rumen liquid in a Wartburg apparatus. Methane production was defined as the volume difference found after incubation without and with N NaOH in the central vial. Each test was performed with duplicate flasks, the incubation time was 30 min. The effects of monensin and lasalocid (both: 0.5 and 1.0 mg/kg bw/day) in the present experiments indicates that the doses of the two ionophores used have been adequate. The changes in total gas and methane production in rumen liquid from animals treated with monensin seemed to match better with the variations in the polyamine concentration. This might indicate a possible connection between the gas producing microbial species and those responsible for a part of the polyamine. On the other hand lasalocid, which reduced the gas production, although less than monensin, did not change the concentration of polyamines.

Monensin sodium was kindly supplied by Elanco, Eli Lilly and Co., D-2770 Kastrup, Denmark. Lasalocid (Avatec) was kindly supplied by Hoffmann—La Roche and Co., Basle, Switzerland.

ZAWADZKI, W. — ZAWADZKI, Z. (Faculty of Veterinary Medicine, Agricultural Academy, Wrocław, Poland and Institute of Engineering of Environment Protection, Wrocław, Poland): **About the proteolytic bacteria from bovine rumen.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

An important characteristics of ruminants is the occurrence of the microbial fermentation prior to the gastric and duodenal activity in which the bodies of the

microorganisms are digested. Among bacteria of the rumen very important group are proteolytic bacteria.

The studies were performed on cows aging 3 years fed ground corn and alphalpha hay according to the feeding standards. The samples of the rumen content were taken four times daily by rumen cannulae. Thirty days time of sampling was divided into three 10 days periods with two weeks interruptions between the 1st and the 2nd, and the 2nd and the 3rd interval. The experiments were performed in anaerobic conditions. There was determined a percent of proteolytic bacteria in the rumen microflora, and the isolated proteolytic bacteria were identified also.

ZELEŇÁK, I. — BOĎA, K. — JALČ, D. — BUČKO, J. — KRIVÁŇOVÁ, M. — SIROKA, P. (Institute of Animal Physiology, Slovak Academy of Sciences, Košice; College of Forestry and Wood Processing, Zvolen, Czechoslovakia): **Improvement of nutrition values of lignocellulosic materials by defibration method.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Defibration method consisting in short-term action of water steam, increased temperature and pressure significantly increased the dry matter digestibility of barley and wheat straw, corn-stalk, bagasse and beech sawdust. The digestibility of neutral detergent fibre, acid detergent fibre and cellulose was increased too. Beech sawdust needed to be impregnated with 1% H_2SO_4 before defibration thereby reaching the digestibility of dry matter up to 60%. In the Rusitec all tested materials produced more total volatile fatty acids, acetic, propionic and butyric acids after the defibration treatment. The defibrated beech sawdust has been used in the feeding experiment with lambs as a replacement of meadow hay. Feed ration contained 10 and 20% of beech sawdust. During 4 months of the experimental period no significant differences between the control and experimental groups were recorded in the food intake, weight gain and food consumption per 1 kg weight gain. The digestibility coefficients of the diet with 20% sawdust were, apart from the hemicellulose, in all other nutrients observed higher than that in the control. With the exception of the organic matter and energy, they were statistically significant. The digestibility of the hemicellulose was lower than that in the control. In the diet with 10% sawdust only the digestibility of N-compounds and fat was higher. The beech sawdust digestibility could be increased up to the level of middle quality hay.

ZIOŁECKA, A. — OSIŃSKA, Z. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **Development of some internal organs of calves in relation to protein intake.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

The calculations were based on data for 83 bull-calves, slaughtered at 120 days old, from 7 experiments on nitrogen and energy balance in growing calves. From 11 to 42 days of age the calves were given a constant amount of milk substitute and, to appetite but with recorded intake, feed mixtures of similar energy value, about 3.9 to 4 Mcal gross energy/kg, but different protein content, 12 to 22%. After withdrawing milk the calves continued on the same feed mixtures to 120 days of age. After starving for 24h the calves were slaughtered and their morphological body composition was estimated. The empty intestinal tract and internal organs were weighed with accuracy up to 5 g. Average daily gains was 722 g. The weight of different parts of the intestinal tract was: reticulorumen + omasum 2.80; abomasum 0.53; intestines 3.66; liver 1.99 and kidneys 0.46 kg. On the different parts of the gastrointestinal tract, there was a highly significant correlation, $r = 0.574$, only between the weight of the reticulorumen + omasum and protein intake. Weight of empty intestines rose with increasing intake of feed, $r = 0.543$, but not of protein, $r = 0.194$. The highest correlation between protein intake and weight of the internal organs was found for kidneys, $r = 0.783$ and liver, $r = 0.736$. Analysis of variance revealed significant differences in the weight of forestomachs and liver and kidneys between calves fed on 13 to 14% protein in the diet and those given more protein.

ŻEBROWSKA, T. — KOWALCZYK, J. (Institute of Animal Physiolgy and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **The use of intestinal loops for the study of secretion and absorption in sheep.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

One year old rams of 45 kg liveweight were equipped with double re-entrant cannulas made of Teflon and had an internal diameter of 10 mm, located in the lower duodenum or upper ileum. This allowed an isolated loop of duodenum or ileum to be formed when required through which solutions could be perfused. They were given diets consisting of whole maize meal with about 7 % CP, alone or supplemented with rapeseed oilmeal or urea treated barley to 15 % CP in DM. The rams were fed 1 kg diet per day in 2 equal meals at 8.00 and 15.00 h. The perfusion was started after feeding the animals with experimental diets for at least 2 weeks. During the perfusion studies the cannula connections were rearranged to allow digesta to bypass the intestinal loop. Krebs-Ringer bicarbonate buffer was perfused by means of a peristaltic pump at a rate of 4.5 ml min through the duodenum and 2.8 ml/min through the loop of ileum. During perfusions the cannula at the end of the loops were fitted with 1.5 m length of PCV tubing into which the perfusate flowed. The loop was initially washed out for 60 min to ensure that it was free of digesta residues. The perfusion stater after the morning meal and lasted for 5 h; every 1 h the perfusate collected in a bottle surrunded by ice, was weighed and sampled. At the end of the perfusion the cannulas were reconnected so that the normal flow of digesta through the loop was restored. The samples were pooled and frozen for subsequent analysis. Total N, protein N, urea and amino acids were estimated.

ŻEBROWSKA, T. — PAJAK, J. — ŻEBROWSKA, H. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **Apparent digestibility of nitrogen and individual amino acids in the small intestine of lambs given diets with different protein levels.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Six male lambs of 40 kg initial liveweight were fitted with simple cannulas in the duodenum and terminal ileum. Animals were given diets containing 100 (L), 130 (M) and 160 (H) g crude protein and 19 MJ gross energy per kg DM. The diets were composed of meadow hay (20 %), barley (22.6—40.6 %), rapeseed oilmeal (0—20 %), dried sugar beet pulp (10—50 %), mineral mixture (2 %) and chromic oxide as a marker (0.4 %). After 14 days of feeding on each diet the duodenal and ileal digesta were collected at two hourly intervals for 48 h. The daily amount of nitrogen in the duodenum digesta exceeded the intake by 13 (H), 20 (M) and 31 per cent (L). Concentration of ammonia nitrogen in the duodenum digesta was 9.1; 5.3 and 5.0 mg% in animals fed on diets H, M and L, respectively. Digestibility of nitrogen in the small intestine was in order as above 68.4; 67.4 and 65.3. Essential amino acids/total AA in feed and in the duodenal digesta were 36.0 and 35.7; 38.7 and 45.9; 45.2 and 47.1 in groups H, M, L and digestibility of amino acids in the small intestine was 72.0; 70.0; 68.9 in groups H, M and L, respectively. Digestibility of Thr, His, Trp were lower than other essential amino acids. The average amount of Thr and Ile absorbed was 28, Lys 11 and Met 36 per cent smaller after feeding diet L than diet H.

ŻEBROWSKA, T. — ŻEBROWSKA, H. — ZIOŁECKA, A. — PAJAK, J. — DAKOWSKI, P. (Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabłonna, Poland): **The use of rye grain in fattening lambs.** Veter. Med. (Praha), *32*, 1987 (Suppl.).

Two experiments were conducted with male Polish Merino lambs. In the first, lambs 6 months old, weighing initially about 42 kg, in 2 groups of 10 were fed individually for 4 weeks on a diet with 56 % rye grain, whole or ground. Whole grain was more readily eaten than the ground one (97 against 90.5 % of the allowance). No statistically significant differences were found between groups in the digestibility of nutrients, daily gain (186 and 148 g), and feed intake per kg gain: DM 7.2 and 8.1 kg, crude protein (CP) 936 and 1114 g, metabolizable energy (ME) 73.4 and 82.8 MJ.

In the second experiment lambs 2.5 months old weighing initially about 17 kg, in 2 groups of 10, were fed individually for 100 days on a diet with 25 % hay; the proportion of whole grain was: rye 57 % (group R) or barley 62 % (group B). No significant differences were found between groups in daily gain, 178 and 190 g, and intake per kg gain of DM, 4.9 in either group, CP 700 and 676 g and ME, 54 and 53.3 MJ in groups R and B, respectively, nor in the proportion of lean, separable fat and bone in the carcass and chemical composition of the "net body weight". The digestibility of crude fibre was in group R greater than in group B, 54.5 against 48.0 % ($P \leq 0.05$); the digestibility of other nutrients was similar. The health of the lambs was not disturbed throughout the experiment.