5 - 1 MICROBIOLOGY OF MEAT AND MEAT PRODUCTS

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In this report recent points of view with respect to the microbiology of meat and meat products will be reviewed. The commodities have been arranged, in principle, in order of increasing stability in the sense of resistance to microbial colonization.

The field is a very vast one. Consequently priorities had to be set. It was decided that emphasis be placed on attaining and monitoring of safety, quality and acceptability of meat and meat products.

The principal parts of the report are: carcass meat, minced ("ground") meat, frozen boneless meats, semi-preserved meat products and more fully heat processed meats packed in hermetically sealed containers.

5 - 2 Исследование зависимости между биохимическими, органолептическими и микробиологическими показателями полусухих сырокопченых колбас, изготовленных со стартовыми культурами

М.М.Михайлова, В.В.Крылова, В.Г.Васильев, О.В.Демина, Г.И.Солодовникова, И.Г.Анисимова. ВНИИ мясной промышленности. И.В.Лагода и Г.В.Косарева. ВНИИ молочной промышленности. К.Инце. ГИИМП. ВНР

Исследования проведены в производственных условиях на полусухих сырокопченых колбасах, изготовленных с бактериальными препаратами АЦИД-СК и ПБ-СК.
Так как стартовые культуры играют определенную роль в стабилизации процесса созревания колбас, то изучение механизма действия данных препаратов на качественные показатели процукта позволяет внести вклад в эффективность технологии их изготовления.
Из биохимических характеристик изучены показатели, характеризующие образование кислых и ароматообразующих радикалов.
При анализе результатов были использованы дисперсионный и корреляционный методы.
Исследована зависимость между количеством молочнокислых бактерий и показателями, характеризующими содержание кислых радикалов.
Данные математической обработки показали, что применение бактериальных препаратов стабилизирует качественные показатели полусухой сырокопченой колбасы. Эффективность изучаемых препаратов различна в зависимости от вида колбас.
Результаты исследований подтверждают более высокую интенсивность процесса гликолиза при использовании бактериальных препаратов.

5-3 МИКРОФЛОРА ОХЛАЖДЕННОГО МЯСА В ПРОЦЕССЕ ЕГО ХРАНЕНИЯ С ЧАСТИЧНЫМ ПОДМОРАЖИВАНИЕМ.

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Изучена микрофлора охлажденного мяса предварительно выдержанного при температуре -0+4 С до замораживания и хранения в частично подмороженном состоянии. Установлены сроки хранения.

5-4 МИКРОБИОЛОГИЧЕСКИЕ ПОКАЗАТЕЛИ СТРУКТУРИРОВАННЫХ БЕЛКОВЫХ ПРОДУКТОВ (СБП) НА БАЗЕ ПЛАЗМЫ КРОВИ

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Данные исследования являются самостоятельным фрагментом комплексного изучения проблемы создания и использования структурированных белковых заменителей мяса на базе плазмы крови убойных животных в технологии комбинированных мясных изделий. Объектами исследований служили четыре вида СБП: "плазменный", "соево-плазменный", "казеинатно-плазменный", "соево-казеинатно-плазменный". Экспериментально установлено, что общая микробная обсемененность СБП, приготовленных на базе плазмы крови крупного рогатого скота, определяется следующими составляющими: мезофильные микроорганизмы - 10^3 в 1г продукта, термофильные и психрофильные - 10^2. При этом наибольшее количество микроорганизмов $(0,69\pm0,04)\cdot10^5$ и $(0,82\pm0,5)\cdot10^5$ мезофилов в 1г отмечается в "казеинатно-плазменном" и "соево-казеинатно-плазменном" СБП соответственно.

5.5 ИЗУЧЕНИЕ КАЧЕСТВЕННЫХ И КОЛИЧЕСТВЕННЫХ ИЗМЕНЕНИЙ МИКРОФЛОРЫ PSE- И DFD - МЯСА В ОТНОШЕНИИ К ЕГО ТЕХНОЛОГИЧЕСКОЙ ИСПОЛЬЗУЕМОСТИ

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НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ МЯСНОЙ ПРОМЫШЛЕННОСТИ, Брно, ЧССР

За качественными и количественными изменениями микрофлоры свинины PSE- и DFD-мяса наблюдали в течение хранения в измельченном и неизмельченном мясе /мышца longisimus dorsi /. Сопоставлением микрофлоры PSE-и DFD -мяса и нормального мяса установлены у DFD -мяса меньше всего благоприятные условия для роста лактобацилл. DFD-мясо меньше всего сохраняемо и даже добавки лактобацилл и стрептококков не имеют влияния на это состояние. Между PSE-мясом и нормальным мясом не были установлены более существенные разницы у наблюдаемых видов микроорганизмов. Учитывая биохимические разницы и свойства PSE -мяса потвердились предпосылки, что у этого мяса имеются более благоприятные условия для развития лактобацилл. Полученные сведения использовали в связи с определением технологической используемости свинины PSE-и DFD-мяса.

5.6 EINFLUSS VON STARTERKULTUREN AUF PATHOGENE MIKROORGANISMEN

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Da die Herstellung fermentierter Rohwürste auch in Ungarn immer mehr an Boden gewinnt, ist die Frage des Schicksals pathogener Mikroorganismen in diesen Produkten von direkter praktischen Bedeutung. Es ist umso mehr wahr, da es in der internationalen Fachliteratur oft kontradiktorische Ergebnisse vorhanden sind. In den Experimenten haben wir drei kommerziell erhaeltlichen Starterkulturen und einen Leuconostoc mesenteroides - Stamm getestet, ob sie das Wachstum pathogener Bakterien /Staphylococcus aureus und Salmonella give/ in einem Fleisch-Modellsystem hemmen. Die Einflussgrössen /Inkubationsdauer und Temperatur, Anfangskeimzahl von Starterkulturen, End-pH, hinzugefügte Kohlenhydratmenge/wurden so gewaehlt, dass sie den, in Ungarn angenommenen Werten entsprechen. Die Keimzahl der Pathogenen wurde auf ein höheres und niedrigeres Niveau eingestellt. Nach unseren Ergebnissen zeigte sich eine klare Tendenz in der Keimzahlentwicklung der pathogener Bakterien, die sich als abhaengig vom Pathogen aber unabhaengig von den angewandten Starterkulturen erwies. Es konnte eine bedeutend grössere Empfindlichkeit des Salmonella-Stammes, als die des St. aureus im saeuren Fleischmilieu festgestellt werden.

5 - 7 HOT DEBONING IN CUBA. MICROBIOLOGICAL ASPECTS.

Lic. Caridad Vallad...	Food Ind. Res. Inst., Hav/Cuba
Lic. Manuel Roca	Food Ind. Res. Inst., Hav/Cuba
Ing. Siomara Jares	Food Ind. Res. Inst., Hav/ Cuba

The major factor inhibiting adoption of hot deboning operation is the micro - biological status of meat. The increase of contamination during the operation is supported by handling of the meat when it is still hot and wet.
In this paper we evaluate the posibilities of introduction of a hot deboning technology in our country from the microbiological point of view.
The results indicate the importance of a strict hygienic control. If this can be assured hot deboned meat can be microbiologically as good as meat produc - ed by traditional methods.

5 - 8 Использование микробиальных культур при производстве копченостей из говядины

И.И.Тимощук, Т.М.Шапошникова, В.С.Денисенко и В.П.Крылова. Украинский научно-исследовательский институт мясной и молочной промышленности. Л.А.Бушкова и Г.К.Еремина. ВНИИ мясной промышленности.

Разработаны технология выработки бактериального концентрата "Ацидобакт" на основе трехвидовой многоштаммовой закваски, содержащей штаммы
и технология производства копченостей с использованием этого концентрата. Одновременно отработаны составы для посола мяса, представляющие собой многокомпонентные ароматизированные рассолы, которые вводят в мясное сырье методом шприцевания. Это позволяет получить в течение 2-3 суток соленый продукт не только из высших, но и из низших сортов мяса с приятным вкусом и ароматом, сочный, с нежной консистенцией, обеспечивает выход готового продукта 90-92% к массе несоленого сырья.

5 - 9 OBSERVATIONS ON BONE TAINT IN GAMMONS'

DR JOHN F DEMPSTER
DUNSINEA RESEARCH CENTRE, CASTLEKNOCK, DUBLIN 15, IRELAND.

Two gammons were examined for the causative organism/s of 'bone taint'; one before storage (A) and the other (B) after 23 months at -18°C. Total aerobic numbers in A were 3.75×10^7 g^{-1} (25°C) and 1.825×10^7 g^{-1} (37°C). Small numbers of faecal streptococci and clostridia were present. Microscopic examination indicated that the flora (25°) consisted of Gram-positive rods and Gram positive cocco-bacilli. Spores were absent. The pH of the lean was 6.25 and the gammon had the following chemical composition. 3.4% NaCl: 110 ppm NO_3: 44 ppm NO_2.

Total aerobic numbers in gammon B were 9.3×10^7 g^{-1} and 1.0×10^7 g^{-1} at 25° and 37° respectively. Significant numbers of streptococci and clostridia were present in the muscle homogenate; smaller numbers were found in the bone rinse and drip. Microscopic counts of the muscle homogenate and the drip were 1.31×10^9 g^{-1} and 3.18×10^8 ml^{-1} respectively. Gram positive short rods were found in the muscle (M. semimembranosus); Gram negative rods in the bone rinse and Gram positive rods in the drip. The pH ranged from 6.15 to 6.25 and the gammon was satisfactorily cured; salt 4.03 - 5.06%; 152 - 234 ppm: NO_3; 15 - 24 ppm NO_2.

The following genera were identified in gammon B; Clostridium, Vibrio, Hafnia, Enterobacter, Serratia and Pseudomonas.

5 - 10 ATP-BIOLUMINESCENCE : A RAPID METHOD FOR THE ESTIMATION OF THE MICROBIOLOGICAL CONTAMINATION OF MEAT AND MEAT PRODUCTS

H.Labots, M.Sc. and F.K.Stekelenburg
TNO Netherlands Centre for Meat Technology, Zeist, The Netherlands

Estimation of microbial ATP is a very rapid method for the determination of the microbial contents of food. In foods with low non-microbial ATP contents (for example milk and lemonades) the microbial ATP, which is a measure of the number of microbial cells present, can be estimated rapidly, using the bioluminescence technique. However, since somatic ATP is abundant in raw meats and meat products and even in cooked meat products, separation of microbial and somatic ATP is necessary.

For the experiments described, a procedure (Lumac) was used comprising selective extraction and inactivation of somatic ATP followed by extraction of microbial ATP and estimation of this ATP by means of a reaction with a luciferine-luciferase reagent.The light emitted in this reaction was measured with a luminometer.

Good correlations were obtained between the light emitted and standard plate counts for samples of raw meat ($r = 0,91$), minced meat ($r = 0,91$) and vacuum packed meat products ($r = 0,94$).

The results became available in about 60 minutes, independent of the number of micro-organisms present (10^4 to 10^9 per gram).

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The results became available in about 60 minutes, independent of the number of micro-organisms present (10^4 to 10^9 per gram).

5 - 11

APPLICATION OF BIOLUMINESCENCE AS A RAPID METHOD FOR ASSESSMENT OF THE MICROBIAL STATUS OF MEAT

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The objectives of this study were to evaluate the possibilities of applying bioluminescence as a rapid method for determination of the microbial status of meat and certain meat products.
By means of the luciferin-luciferase enzyme system it is possible under suitable conditions to measure the concentration of ATP. Through different extraction methods it is also possible to separate microbial ATP from ATP present in the sample itself, the so-called somatic ATP.
Samples used in this study were retailpacked whole and ground fresh meats, some of which were packed in modified atmosphere. A number of cured meat products such as raw pork sausage or pasteurized, cured meats including meat roulade, Bologna type sliced sausage, head cheese, and ham were also examined.
Provided results of ordinary bacteriological examinations for total numbers were obtained by incubating the agar plates at 17°C, correlation coefficients of 0.7-0.8 between these results and ATP determinations were found. These results are sufficiently acceptable for screening purposes.
In a public analyst surveillance programme it means that e.g. 4 out of every 5 samples can be accepted within one hour after the samples have been picked up at retail level. Further analyses may then be concentrated on suspect samples only, thus not only saving many resources, but also enabling personnel engaged in public surveillance programmes to intercept at a much shorter notice than if normal methods are used.

5 - 12

INTERACTION LACTOBACILLUS SP. - BROCHOTHRIX THERMOSPHACTA

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The study of the interaction of *Lactobacillus-Brochothrix* has been realised at 25°C, at uniform pH (6,0), with constant presence of glucose. In anaerobic condition pure culture, of *Brochothrix* reached 10^9/ml in 48 H. and in mixed culture, the enumeration was 10^6/ml at 24 H. and after decreased. In semi-aerobiosis, in pure and mixed culture, the maximum was 10^8/ml at 24 H.. At 7 days, the population has decreased to 10^7/ml in pure culture and to 10^3/ml in mixed culture. For *Lactobacillus*, differences also occured : in semi-aerobiosis and in anaerobiosis, the presence of *Brochothrix* produced an increase of its enumeration ; moreover in semi-aerobiosis, the population remained uniform during 6 days whereas in pure culture it decreased (10 fold) just after the end of the logarithm phase. There was consequently interaction between the two bacteria.

In semi-aerobiosis, adding catalase (30 U/ml) to mixed culture enlarged the decrease of *Brochothrix* and suppressed the steady-state of *Lactobacillus*. In pure culture, catalase gave, for *Brochothrix*, the same phenomenon that with *Lactobacillus* and for *Lactobacillus* emphazised the decrease after the log-phase. The interaction between the two bacteria would be in connection with hydrogen peroxide.

The formation of H_2O_2 depends of superoxide dismutase (SOD). Both bacteria contained a MnSOD, true enzyme for *Brochothrix*, but for *Lactobacillus*, the amount of the enzyme was in relation to the added Mn in broth. When Mn (10mg/l) was put in pure culture, it had no effect on the growth of *Brochothrix*, but promote this of *Lactobacillus* like *Brochothrix* made. In mixed culture, Mn suppressed the decrease of *Brochothrix*.

To explain these phenomena, the following hypothesis was made : *Lactobacillus* and *Brochothrix* used H_2O_2 for their metabolism (growth and steady-state). In mixed culture without added Mn *Lactobacillus* picked up H_2O_2 formed and released by *Brochothrix* in the broth.

5 - 13

MICROBIOLOGY OF PORK SKIN DURING SLAUGHTERING

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The purpose of this study was mainly to appreciate the evolution of microorganisms on pig carcases during the different stages of slaughtering. Samples were collected in 7 processing plants with differences in capacity and line-speed ; 27 series of samples concerned 4 definites sites of slaughtering lines :

- Before scalding
- After scalding
- After shaving and singeing
- After eviscerating.

At each stage, 10 carcases were examined by excising a skin sample (5 to 10 g.) near the bleeding sore.
The results concerned the total count, *E. coli*, Pseudomonas, *S. aureus* and *Salmonella* . It is possible to define a general scheme on the evolution of the contamination at different stages ; nevertheless there are differences between plants and also between days of samplings. The initial level of microorganisms and the hygiene in the plant, seem to play a major role in the final contamination of the product.

5 - 14

SURVIVAL OF CAMPYLOBACTER JEJUNI IN SELECTED GASEOUS ENVIRONMENTS

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Campylobacter jejuni is known as a significant enteropathogenic bacterium for humans. Several food-borne outbreaks have implicated foods of animal origin as vehicles in the transmission of the pathogen to humans. The organism is a commensal for a wide range of livestock animals, and subsequently, has a high prevalence on meats purchased by the consumer. This study was instituted to determine whether the practice of vacuum-packaging would influence the survival of the organism in meat products. Vacuum-packaged and oxygen-permeable, polyvinyl chloride film-wrapped broiler chickens were compared to determine the survival of the bacterium. No significant ($P<0.01$) difference in the survival of C. jejuni was observed, irrespective of the packaging system assessed by either surface rinse or drip sampling. Significantly ($P<0.01$) greater numbers of the organism were recovered by surface rinse sampling in both packaging systems when compared with the numbers obtained from purge sampling. The influence of modified atmospheres on the survival of innoculated C. jejuni in ground beef, held for two weeks at 4°C, was also assessed. The atmospheres which were compared included (a) 100% nitrogen, (b) vacuum (-50.8 cms. mercury), (c) 80% carbon dioxide and 20% nitrogen and (d) 5% oxygen, 10% carbon dioxide and 85% nitrogen. Significantly ($P<0.01$) greater survival of C. jejuni was demonstrated in the 100% nitrogen atmosphere when compared with the other systems. These results indicate that the organism survives at variable rates in different atmospheres, but the differences were small and are unlikely to impact on the public health.

5 - 15

RAPID COUNTING OF PSEUDOMONAS FRAGI IN MEATS WITH AN ELISA METHOD

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The proteins of the outer membranes of Pseudomonas fragi have been extracted and separeted by electrophoresis. The profiles of the OM are very similar whatever the O serotype and the major proteins of this structure are common antigens. Using the antibodies against these proteins (in an ELISA test) makes possible the detection of 10^4 Pseudomonas per gram of meats in 4 h 30.

5 - 16

CAMPYLOBACTER CHEZ LA DINDE A L'ABATTOIR

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Campylobacter a été recherché dans les abats, dans la viande et sur la peau de dindes le long de la chaine d'abattage.
Plusieurs espèces ont été identifiées :
C. jejuni, C. coli, C.f. fetus, et des souches résistantes à l'acide nalidixique.
La recherche systématique de marqueurs épidémiologiques permet de discuter de l'origine de la contamination par Campylobacter.

5 - 17 ПРОУЧВАНЕ ВЛИЯНИЕТО НА НАЧИНИТЕ НА ЗАМРАЗЯВАНЕ (ЕДНОФАЗНО ИЛИ ДВУФАЗНО) ВЪРХУ МИКРОФЛОРАТА В ЗАМРАЗЕНОТО МЕСО

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Опитите са проведени върху 48 броя говежди четвъртинки, разделени на три групи: месото от едната група е замразявано непосредствено след добиването му в свежо състояние (еднофазно замразяване); от другата група - след бързо охлаждане при -4°C за 24h ; от третата група - след бавно охлаждане при 0°C за 72h (двуфазно замразяване). Замразяването при всички групи е извършено интензивно при -35°C за 24h. Вземани са материали за бактериологично изследване от повърхността на месото (*m. long. dorsi*) и са определяни микробното число и броят на санитарно-показателните бактерии на 1cm^2 площ.

Установено е, че количеството на микроорганизмите по повърхността на замразеното месо зависи от начините на замразяване. Най-съществени промени претърпява микрофлората при еднофазно замразеното месо, а най-несъществени при двуфазно замразеното месо с предварително бавно охлаждане при 0°C за 72h. Средно положение заема микрофлората при двуфазно замразеното месо с предварително бързо охлаждане при -4°C за 24h. При първия случай микрофлората се редуцира 53 пъти (98%), при втория - 8,6 пъти (88,4%), при третия - 14 пъти (93%) спрямо микрофлората в свежото месо.

Мезофилните бактерии при еднофазно замразеното месо се редуцират 99%, при двуфазното - 96,5% след бързо охлаждане и 94% след бавно охлаждане, а психрофилните при същите условия съответно 91,7 и 50%. Вследствие на това хигиенната характеристика на микрофлората се променя, тъй като доминиращи стават психрофилните бактерии.

Освен микробното число се променя и броят на санитарно-показателните бактерии в зависимост от начините на замразяване, като следва същата закономерност.

5 - 18 TEST FOR TOXICITY OF MICROCOCCI AND STAPHYLOCOCCI USED AS STARTER CULTURES

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One of the most important requirements when using starter cultures in meat industry is that they should present no toxicological problems and public health risk. Toxicity of the micrococci and staphylocccci, isolated from fermented raw-dried meat products und used as starter cultures, was tested with respect to the formation of plasmocoagulase, DNA-se and thermonuclease. No one of the tested strains was positiv in forming these enzymes.

Micrococci and staphylococci was studied for antagonistic activity towards some test-microorganisms. The results obtained showed, that under the condition of the experiments, all the strains possessed antagonistic activity of different intensity towards the test-microorganisms. It can be concluded that the strains investigated were not only harmless but they were very useful in suppresing the harmful microflora.

5 - 19 ВИДОВОЙ СОСТАВ МИКРООРГАНИЗМОВ СЕМЬИ MICROCOCCACEAE , ВЫДЕЛЕННЫХ ПРИ ПОЛУЧЕНИИ ТЕЛЯТИНЫ И СВИНИНЫ

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При изучении гигиены получения телятины и свинины у нас, выделены 1041 штамма семьи Micrococcaceae : с семи объектов зял для убоя животных до и во время убоя; с поверхности трупов после окончания технологической обработки, как и с глубины мяса, внутренних органов и лимфатических узлов.

Определен видовой состав и биотипы изучаемых штаммов рода Staphylococcus и Micrococcus .

S.aureus выделен только у 1,68% с поверхности трупов свиней, 4,17% с изучаемых паренхиматозных органов и 4,17% с крюка для повешивания трупов во время работы.

5 - 20 ПРОУЧВАНЕ ВЪЗМОЖНОСТИТЕ ЗА ИЗОЛИРАНЕ НА САЛМОНЕЛНИ БАКТЕРИИ ОТ МЛЯНО МЕСО ЧРЕЗ УСКОРЕН КУЛТУРЕЛЕН МЕТОД

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С цел изследването на прясното мляно месо за салмонелни бактерии да завърши до 24-ия час след производството му и да отговаря на реалните нужди на практиката е изпитан сравнително със метода на БДС 6835-74 предложения от нас ускорен културелен метод.

Проследена е кинетиката на размножаването на монокултури салмонели и смесени култури от салмонели и ентеробактерии в тетратионатов бульон (Difco) и F - селенитов бульон по Leison при 37 и 43°С, както и в контаминирани със салмонели производствени партиди мляно месо.

Въз основа на тези предварителни проучвания е уточнен метод за доказване на салмонели, който се състои в следното : обогатяването на пробата мляно месо се извършва за 6 - 8 h в предварително темперирян F -селенитов бульон по Leifson, който се култивира на 43°С, като препосевките от него се извършват върху петриеви панички с брилянтгрюн-фенолрот агар по Kauffmann и агар на Gasner . Този метод дава възможност за доказване на салмонели в рамките на 24 h при наличие над 100 клетки в грам продукт и по чувствителност се покрива със стандартния.

5 - 21 DEPENDENCE BETWEEN THE TEMPERATURE AND THE DURATION OF ENRICHMENT AT ISOLATION OF YERSINIA ENTEROCOLITICA IN MEAT

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LABORATORY INVESTIGATIONS OF SAMPLES OF RAW VEAL MEAT ARE CARRIED OUT FOR THE DETECTION OF YERSINIA, WITH A VIEW TO DETERMINE THE PERCENTAGE OF ISOLATED YERSINIA ACCORDING TO THE TEMPERATURE AND DURATION OF ENRICHMENT IN PBS.THE TEMPERATURES USED AT THE PROCESS OF ENRICHMENT ARE 22 C FOR TWO DAYS AND 4 C FOR 21 DAYS.UNDER THESE CONDITIONS ARE DETECTED 57 % AND 78% POSITIVE SAMPLES RESPECTIVELY IN COMPARISON WITH THE TOTAL AMOUNT POSITIVE FOR YERSINIA VEAL SAMPLES.IT IS NECESSARY FOR THE ROUTINE LABORATORY INVESTIGATION OF VEAL MEAT PARALLEL ENRICHMENT AT 22 AND 4 C FOR 2 AND 21 DAYS RESPECTIVELY.

5 - 22 THE PRESENCE OF STREPTOCOCCUS AVIUM ON THE SURFACE OF THE SLAUGHTERED POULTRY

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Studies have been performed on the spread of Streptococcus avium on the surface of the slaughtered poultry /broilers/ in 2 poltry slaugher-houses. 216 strains of streptococci were isolated from 120 broilers after the slaughtering processing was completed. The streptococci were typified for the species according to the requirements of Bergey' S Manual of Bacteriology /1974/.

It has been established that in both slaughter-houses S.avium /32.4%/, S.faecium /21.3%/, S. faecalis var. liquefaciens /19.9%/, S. durans /15.3%/ and S. faccalis var. zymogenes /11.1%/ were isolated from the surface of the poultry.

The biochemical properties of the isolated culture S. avium are similar to enterococci. We recommend that besides the detection of the faecal streptococci / enterococci / the microbiological testing and hygienic estimation of the slaughtered poultry should include S. avium.

5 - 23 ПРОУЧВАНИЯ ВЪРХУ РАЗПРОСТРАНЕНИЕТО НА Y. ENTEROCOLITICA В ЖИВОТНИ, ПРЕДНАЗНАЧЕНИ ЗА КЛАНЕ.

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През периода 1983-1985 год. в един месокомбинат са изследвани проби от клинично здрави прасета и телета,произхождащи от различни ферми,за наличие на Yersinia enterocolitica (Y.enterocolitica). Изследваните материали включват цекално съдържание,ректални тампони и фекални проби.За изолиране на йерсиниите са използувани три метода - директно посяване на пробите върху твърди диференциращи среди,студово набогатяване и двустъпално набогатяване.Приложено е третиране на култивизираните набогатителни среди със слаб разтвор на КОН.

При прасетата Y.enterocolitica е установена средно при 3.2% от фекалните проби,2.9% от ректалните тампони и 5.7% от пробите цекално съдържание.Наличието на Y. enterocolitica в прасета,произхождащи от различни ферми,варира от 0 до 28.4%.Отбелязана е сезонност в изолирането на Y.enterocolitica най-голяма през есенно-зимно-пролетните месеци (ноември-април) и най-малка през лятото (юли-август).Някои от изолираните щамове се отнасят към патогенните за човека серотипове 0:3 и 0:9.

При телетата Y.enterocolitica е установена при 0.6% от пробите цекално съдържание.От ректалните тампони и фекалните проби този микроорганизъм не е изолиран. Установена е същата сезонна зависимост при изолиране на Y.enterocolitica, както при прасетата.Не са изолирани патогенните за хората серотипове 0:3 и 0:9.Дискутира се епидемиологичното значение на прасетата и телетата,както и методите за изолиране на Y.enterocolitica.

5 - 24 ПРОУЧВАНИЯ ВЪРХУ НАЛИЧИЕТО НА YERSINIA ENTEROCOLITICA В МЕСО

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През периода 1983-1985 год. са изследвани проби месо и органи от редовно заклани прасета и телета,за наличие на Yersinia enterocolitica (Y.enterocolitica). Изследваните материали включват смивове от определени части на трупа,от бъбреци,сърца,чер дроб,езици (включително и тонзили),както и мезентериални лимфни възли.

При прасетата Y.enterocolitica е установена в 14,6% от изследваните проби месо в 1,9% вътрешни органи и при 36,8% от смивовете на езици и тонзили.Патогенните за човека серотипове Y.enterocolitica 0:3 и 0:9 са изолирани от езици,тонзили и една проба мезентериални лимфни възли.В смивовете от другите органи тези серотипове не са установени.

При закланите телета Y.enterocolitica е изолирана само от проби месо.В смивовете от бъбреци,сърца,чер дроб,езици и в мезентериалните лимфни възли не е установено наличие на този микроорганизъм.

Дискутират се методите за изолиране на Y.enterocolitica и епидемиологичното значение на месото като източник на йерсиниоза по хората.

5 - 25 БИОХИМИЧНИ СВОЙСТВА НА ЩАМОВЕ YERSINIA ENTEROCOLITICA, ИЗОЛИРАНИ ОТ ЖИВОТНИ И МЕСО

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Проучени са биохимичните свойства на щамове Yersinia enterocolitica (Y.enterocolitica), изолирани от чревно съдържание,фекални проби,месо,вътрешни органи и езици на прасета и телета.Установено е,че значителна част от щамовете показват отклонения от биохимичната характеристика на вида Y.enterocoliticaТези отклонения се изразяват главно в различните отнасяния на щамовете към l-рамноза, d-рафиноза, d-мелибиоза, l-орнитин,малтоза и др.На базата на различията в биохимичните свойства,щамовете са отнесени към следните видове: Y.enterocolitica,Y.intermedia,Y.frederiksenii,Y.kristensenii Yersinia x1 и Yersinia x2.Извършено е биотипизиране на щамовете от отделните видове. Дискутира се здравното значение на видовете йерсинии.

5 - 26 НЕКОТОРЫЕ АСПЕКТЫ КАСАЮЩИЕСЯ ЛИОФИЛИЗИРОВАНОГО СОХРАНЕНИЯ БАКТЕРИАЛЬНЫХ ШТАММОВ, ИСПОЛЬЗУЕМЫХ В КАЧЕСТВЕ ЗАКВАСКИ ПРИ ПРОИЗВОДСВЕ МЯСНЫХ ПРОДУКТОВ

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Проучено влияние лиофилизации на жизнеспосооность и биологическую активност штаммов, использованных в виде закваски в производсве мясных продуктов. В качестве стабилизаторов в процесе лиофилизации были включены глютамат-декстрановая среда, 10%-ое обезжиренное молоко и бульон дрожди с 12% сахарозы.

Установлено, что протекторы оказывают благопрятное влияние на сохранение жизнеспособности бактериальных культур в процессе лиофилизации и их сохранение в течение более 10 лет.Высушенные штаммы без протектора погибают в большеи степени, как в процессе лиофилизации, так и в периодих сохранения.

Индивидуальные вариации степени жизнеспособности исследованных штаммов были определены характером протектора и биологичиными особенностями бактериального вида.

5 - 27 ETUDE SUR L'ACTIVITE PROTEOLYTIQUE DES MICROORGANISMES PSYCHROPHILES ISOLES DE LA VIANDE DE VEAU

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Des etudes sont faites sur l'activite proteolytique des microorganismes possedant un caractere psychrophile et psychrothrophe de developpement, isoles de la viande de veau.

Les experiences sont realisees a partir de 248 souches bacteriennes de genres: Pseudomonas, Acinetobacter, Aeromonas, Flavobacter, Corynebacter, Micrococcus, Vibrio et fam. Enterobacteriacea et de milieux de culture additionnes de differents substrats proteiques - viande de veau, porc, mouton, poulet et poisson.

Il est prouve la variation du degre proteolytique des souches en fonction des substrats proteiques.

Pour la determination des microorganismes responsables de la degradation de la viande, recommandation est faite que ceux - la soient eprouves sur des milieux contenant de la proteine correspondante.

5 - 28 STUDIES ON THE ANTIBIOTIC SENSITIVITY OF PEDIOCOCCUS CEREVISIAE STRAINS 136 AND 167 USED AS STARTER CULTURE

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Studies were carried out in model systems. Starter culture of P. cerevisiae strains 136 and 167 were used in form of 24 - hour bouillon suspension in inoculum level 10^6 - 10^7 viable cells/cm^3 culture media. The antibiotic sensitivity was determined by using of the paper - disk method. For measuring of minimal inhibition concentration of the antibiotics the method of dilutions was employed. The experiments were made at medium pH values of 5,5, 6,0 and 6,5 and cultivation temperatures of 16 and 26 °C. The obtained results showed that P. cerevisiae strains 136 and 167 were sensitive to the following antibiotics: tetracyclin, streptomycin, gentamycin, chloramhenicol, ampecillin and Kanamycin. The minimal inhibition concentrarion of the antibiotics was in the interval 0,488 - 0,000062 γ /cm^3. The antibiotic sensitivity of the strains was established to be influenced by the pH values of culture media and cultivation temperature.

5 - 29 STUDIES ON THE POSSIBILITY OF PREPARING FAST-RIPENING MEAT PRODUCTS USING STARTER CULTURES INSTEAD OF G.D.L.

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Attempts were made to establish the possibility of substitution G.D.L. in fast-ripening products using starter cultures.
The sausages were prepared according to the formula for fermented sausage "Zakuska" in the following experimental variants: 1/ with G.D.L. /Control/; 2/ with using starter cultures and 3/ G.D.L. and starter cultures /mixed/. Starter cultures - lactobacilli, micrococci and yeasts, were inoculated in the sausage mixture as broth cultures or freeze-dried.
Investigations were made on the changes of microflora, evaluation of the sensory properties and sanitary-hygienic assessment were done.
The results showed that the starter cultures favourabley affected on the quality of the sausages. Good quality was provided with the combination of G.D.L. and starter cultures as well. The products were superior in flavour and preserved their storage quality longer than the products prepared with G.D.L. only.

5 - 30 VITALITY OF THE MICROORGANISMS IN FREEZE-DRIED STARTER PREPARATIONS UNDER REFRIGERATION CONDITIONS

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Starter preparations were obtained from freeze-dried lactobacilli and micrococci treated in the presence of dry skim milk. Dry material is pasked in plastic bags in air or under vacuum and stored in refrigerator at 5°C-1.
Changes in vitality of microorganisms were followed during different storage periods. In some of the experiments the importance of the period between the freezing and the drying process was studied. The results showed no significant differences in the number of surviving microorganisms immediately after two to eight mounths of storage.
Some of the samples packed in the presence of the air were left at room temperatures for more than four years. The studies on these samples showed that about 10,000 lactobacilli and 100 micrococci per gramm of the preparation had preserved their vitality.
Preserved vitality of the starter cultures under normal storage conditions diminishes the problems connected with the storage and the transport before their application in meat products.

5 - 31 Einfluß der technologischen Bearbeitung auf die Mikroflora der gefriergetrockneten Fleischprodukte

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Es wurden Untersuchungen für die Feststellung des Einflusses der technologischen Bearbeitung (Kuttern, Kochen und Gefriertrocknung von Kalbs- und Geflügelfleisch und Kalbsleber) auf die Mikroflora durchgeführt.

Die mikrobiologischen Untersuchungen umfassten:
- die Bestimmung der Gesamtzahl der mesofilen aeroben Mikroorganismen;
- Coli-Titer;
- das Vorhandensein von Staphylokokken;
- das Vorhandensein von Salmonella-Bakterien;
- das Vorhandensein von sulfidreduzierenden Clostridien.

Die Ergebnisse haben gezeigt, daß die Rohprodukte die übliche Menge Mikroorganismen enthalten, und ihre Zahl befindet sich in den vorgeschriebenen Grenzen.Nach der thermischen Bearbeitung und der Gefriertrocknung reduziert sich die vorhandene Mikroflora auf die für Fleisch-Halbkonserven normierten Mengen.

5 - 32 УСОВЕРШЕНСТВОВАНИЕ МЕТОДА ПРОИЗВОДСТВА СЫРОВЯЛЕННОГО СВИНОГО ОКОРОКА ПРИ ПОМОЩИ ЗАКВАСКИ

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Исследованы возможности усовершенствования метода производства оригинального болгарского ассортимента из пареной свинины – сыровяленного свиного окорока типа "Еленскии".

Воспринят способ засола в результате которого засол совершается за 4 – 6 дней, чем за 30 – 35 дней. Пользуется смешанная бульонная культура из штаммов 136 и 167, которую шприцывают вместе с засоляющим раствором, обеспечивающим 10^8 – 10^9 микробных клеток на грам сырья.

Эффективность предлагаемой нами технологии засола установлена путем прослеживания изменении pH стоиности, скорости массообмена, скорости и степени засола и развития использованной культуры.

Установлено, что использование метода смешанного засола в производстве сыровяленного свиного окорока с променением бактериальной куль туры штаммов 136 – 167 приводит к совершенствованию производственного процесса и к улучшению качества готового продукта.

5 - 33 MICROFLORA OF RAW-DRIED BEEF PRODUCTS MANUFACTURED BY AN ACCELERATED TECHNOLOGY

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Changes in microflora were monitored in delicacy beef products manufactured by an accelerated technology of dry curing. In the beginning of the production process (5 days), the counts of lactic acid microorganisms were found to be low in both variants. During this period, micrococci (staphylococci) reached 10^3 in the experimental variant, while they were hardly detected in the control variants. Gradually, in the course of the ageing and drying process, the levels of both micrococci and lactic acid microorganisms rose and reached, on day 18, 10^5 for sample and control variants. In experimental variants, that level was preserved till day 28, when the products were ready for marketing. In finished control products (after 42 days), a certain reduction was found in the counts of both groups of microorganisms (10^3 - 10^4). No difference was found in the titres of sanitary indicators (coliforms and Proteus) between the two variants of delicacy products. No salmonellae, pathogenic staphylococci or sulfite-reducing anaerobes were found in any case. Irrespective of the fact that, towards day 18, the counts of micrococci and lactic acid microorganisms were equalized in the products manufactured by the two technologies, the faster initial growth had a positive effect on finished products. The accelerated technology of curing induced an acceleration in the growth of desirable microflora without resulting in an increase in the counts of sanitary-indicative microorganisms.

5 - 34 ИНТЕНЗИФФИЦИРОВАННОЕ ПРОИЗВОДСТВО СЫРОВЯЛЕННЫХ МЯСНЫХ ПРОДУКТОВ ИЗ СВИНИНЫ ПРИ ИСПОЛЬЗОВАНИИ СТАРТЕРНЫХ КУЛЬТУР
II. ИЗМЕНЕНИЯ ЦВЕТОВОЙ ХАРАКТЕРИСТИКИ ПРОДУКТА

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Исследованы возможности интензифицирования производства сыровяленного свиного окорока при использовании стартерных культур. Использована смешанная бульонная культура штаммов 136 и 167. Свиные окороки из охлажденного мяса шприцывают вместе с раствором для засола, обеспечивающий 10^8 - 10^9 микробных клеток на грамм сырья. Изменения цветовой характеристики установлены путем определения показателей Rd, a_t и b_t в системе "Hunter"
Установлено, что использованная закваска ускоряет понижение pH еще в начале технологического процесса и этим обеспечивает условия для правильного протекания оцвечивательных процессов.
При всех исследованных мышцах процесс цветообразования протекает интензивнее в опытных окороках, где получается и более насыщенный красный цвет.
После десять суток, стоймости на a_t опытных окороков имеют уже 17,5, а a_t контрольных окороков - 13 и эта значительная разница сохраняется во время всего технологического процесса.
У опытных окороков более равномерное оцвечивание всей разрезной поверхности.

5 - 35 ВЛИЯНИЕ ВЪРХУ МИКРОФЛОРАТА НА КРАЙНАТА ТЕМПЕРАТУРА ПРИ СЪХРАНЯВАНЕ НА МЕСОТО В ЗАМРАЗЕНО СЪСТОЯНИЕ

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Опитите са проведени върху 24 говежди четвъртинки, получени по хигиенен начин при спазване на ветеринарно-санитарните изисквания.

Замразяването на месото е извършено интензивно при -35°С за 24h, след което замразените четвъртинки са разделени на две групи: едните са съхранявани при крайна температура -10°С, а другите при -18°С за 6 месеца. Материали за бактериологично изследване са вземани от повърхността на месото (m.long.dorsi) в динамика на 1-ия, 2-ия, 3-ия и 6-ия месец. Определени са общия брой на аеробнорастящите микроорганизми (мезофили, психрофили, психротрофи) и броят на бактериите със санитарно-хигиенно значение (коли-бактерии, протеус, стафилококи, ентерококи и др.) на 1 cm².

Установено е, че крайната температура от -10°С при съхраняване на месото взамразено състояние оказва по-неблагоприятно отражение върху микрофлората, отколкото -18°С. В най-значителни количества микроорганизмите отмират през 1-ия месец - средно 30% при месото, съхранявано при -10°С (мезофили 35%, психрофили 25,5%, психротрофи 30%) и средно 25% при месото, съхранявано при -18°С (мезофили 27%, психрофили 23%, психротрофи 26%). В края на 3-ия месец при месото, съхранявано при -10°С загиват 70%, а в края на 6-ия месец при месото, съхранявано при -18°С - 65% от наличната микрофлора. От санитарно-показателните микроорганизми най-чувствителни са коли-бактериите, а най-устойчиви - плесените. В края на 1-ия месец отмират 62% от коли-бактериите (с превес при -10°С), а плесените - едва 14%. За разлика от останалите микроорганизми крайната температура на съхранение от -18°С оказва върху плесените по-неблагоприятно отражение, отколкото -10°С.

5 - 36 INFLUENCE OF NITRITE ON THE ULTRASTRUCTURE OF STREPTOCOCCUS FAECALIS

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One of the major functions of nitrite, used in meat curing, is its inhibitory action on microorganisms. The exact mechanism of this action remains still unknown.
The influence of two nitrite concentrations - 50 and 100 ppm, added to the cultural medium, has been investigated. A well-developed intracytoplasmic membrane system is observed. In some of the cells, cultivated in the presence of the highest nitrite concentration, disintegration of cell wall and cytoplasmic membrane is observed as well, resulting in flowing of cytoplasmic content out of the cell.
The ultrastructural changes in the cells of Streptococcus faecalis characterize the action of this exogenic factor, which corrects and adapts the cell organisation to the varying conditions of the medium.