THE INFLUENCE OF ADDED PURE CULTURES ON THE COLIFORMS AND ORGANOLEPTICAL QUALITIES OF GROUND MEAT

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Summary,

The influence from the introduction of a pure culture of Lb. plantarum,along with different kinds of sugars,and combination theof in ground meat was studied, while the meat was stored under refrigeration temperature /+4°C/ for up to 8 days.

Between the different variations no significant difference in total numbers and development of certain microorganisms has been exibited.The organoleptical changes for the batches with added pure culture are insignificant,and up to the eighth day the sensory results are for a good quality, while for the controls, these scores are only to the fourth day.

L'INFLUENCE DE L'ADDITION DE CULTURES PURES SUR LES COLIFORMES ET SUR LES QUALITES ORGANOLEPTIQUES DE LA VIANDE HACHEE

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Résumé

On a étudié l'influence de l'introduction d'une culture pure de Lb. plantarum, de différents sucres et de leurs combinaisons dans la viande hachée, conservée au froid /+4°C/ jusqu'à 8 jours. On n'a pas constaté des différences considérables entre les variantes en ce qui concerne le nombre aérobique total et le développement de quelques genres de microorganismes /coliformes et lactiques/. Les changements organoleptiques chez les variantes, dans lesquelles on a introduit une culture pure, sont insignifiants et les évaluations démontrent jusqu'au 8ème jour une bonne qualité, tandis que chez la viande témoin elles sont inacceptables dès le 4ème jour.

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ÜBER DEN EINFLUSS VON REINEN KULTUREN AUF DIE KOLIBAKTERIEN UND DIE ORGANOLEPTSCHEN EIGENSCHAFTEN VON ZERKLEINERTEM FLEISCH

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Zusammenfassung

Es wurden Untersuchungen über den Einfluss der zum zerkleinertem Fleisch zugesetzten reinen Kulturen (Lb. plantarum), Zuckern und Zuckerkpmbinationen durchgeführt. Das Fleisch wurde innerhalb von 8 Tagen bei einer Temperatur von +4°C aufbewahrt.

Es konnten keine signifikanten Unterschiede in der Gesamtzahl der Aerobier und einiger Arten von Mikroorganismen (Kolibakterien und Milchsäurebakterien bei den verschiedenen Varianten festgestellt werden.

Die organoleptischen Veränderungen bei den Varianten mit reiner Kultur waren unbedeutend, die Qualität des Fleisches wurde bis zum 8. Tag als gut bewertet, dagegen waren die Kontrollen schon am 4. Tag nicht akzeptierbar.

О ВЛИЯНИИ ЧИСТЫХ КУЛЬТУР, ПРИБАВЛЕННЫХ К ИЗМЕЛЬЧЕННОМУ МЯСУ, НА КОЛИФОРМЫ И ОРГАНОЛЕПТИЧЕСКИЕ СВОЙСТВА МЯСА

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Резюме

Изучено влияние чистой культуры Sb. plantarum в сочетании с различными сахарами и их комбинациями на измельченное мясо, сохраняемое при холодильных условиях (+4°C) около 8 дней. Существенной разницы в общем аеробном числе и развитии некоторых родов микроорганизмов между различными вариантами не установлено. Органолептические изменения в вариантах с внесенной чистой культурой незначительны и до 8-го дня качество остается хорошим, тогда как при контролях качество продукта неприемлемо уже на 4-й день.

INFLUENCE OF THE ADDITION OF PURE CULTURES ON THE COLIFORMS AND ORGANOLEPTICAL QUALITIES OF COMMINUTED MEAT

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The antagonistic activity of lacticacid microorganisms on the microflora producing decay of the edible products, has been profoundly studied ./1/. The metabolic products of these microorganisms have an underlined effect on the gramnegative flora. /2/. This inhibiting activity is used for the improvement of storage life in milk products. Little is known for their use as an agent for preserving the quality of meat. Reddy /3, 4/ establishes that lactic acid microorganisms act as inhibitors on gram negative microorganisms in comminuted beef. Exibited is a possibility for use of pure cultures as biological agents for preserving the quality of different foods. /5/. The scope of the present paper is studying the influence of added lb. plantarum on the existing coliforms and organoleptical qualities of comminuted meat, stored at $4^{o}C$.

MATERIAL AND METHOD

As test material was used a mixture of comminuted beef and pork meat in a ration of 40: 60 with the addition of 2% table salt. To the mixed meat mass was added 20 hours old culture of Lb. plantarum in a quantity of 10^{8} cl/g product, well homogenized in the meat. The experiments were made in five models: A - addition of lactic bacilli, B - lactic bacilli + 0.1% glucose, C - lactic bacilli +0.2% saccharoses, D - lactic bacilli + 0.05% glucose and 0.15% saccharoses, E - control. The investigations were made on the 0, 4th and 8th day, determining the following indexes: anaerobic count on Plate count agar, lactic acid microorganisms - on Rogosa medium, presence of coliforms on lactose broth and Pepton water /for ascertion of gas and indol/, pH electrometrically. The organoleptic evaluation of the thermally treated comminuted meat /grilled/ was made for the indexes odour, taste, juiciness and an overall evaluation after the 9 point hedonic scale with trained taste panel. The results were evaluated after the variation-statistical method, while for doubtful data the method of random analyses was appplied. Reliability was determined after the table of Student-Fisher with P 0.95.

RESULTS

On fig. 1 are presented the changes in the aerobic count in the comminuted meat. It is evident that in spite of the fact that the initial count is different /lowest in model E and highest in D/ to the fourth day of storage, the total count of the microorganisms in all models is almost equal. After the fourth day of storage the count in all models is increased markedly and at the end of the studied period is almost equal.

The changes in the count of the lactic acid microorganisms are presented on fig. 2. To the fourth day of storage in the models with added pure culture their count increases negligeably and on the fourth day is almost the same. In model E the count of the microorganisms is almost the same with the starting count. After the fourth day is exibited a sharp increase in the counts for all models, best exibited in the control.

On fig. 3 are given the changes in the quantity of the coliforms during storage. It is evident that to the fourth day their count is same as in the start, after which in the models A, B, D and E it decreases in a logarithmic cycle, while in model C with two logarithmic cycles.

The changes in the pH value during the storage are presented on fig. 4. In all models with added pure culture is established a decrease in pH value during storage. The lowest decrease is exibited in model A and highest in models B and D. In the control, after the fourth day there is some increase of the pH value.

The evaluation for odour are the following: to the fourth day of storage there is a negligeable decrease, biggest for the models B and E and least for C. In further storage, they decrease and on the eighth day are almost equal for all models with added pure culture. A sharp decrease is only established in model E /control/ in which the evaluation is "unacceptable" /fig. 5/.

The changes in the evaluations for taste /fig. 6/ for the different models are the same as for the odour.

Figure 7 reflects the changes in the evaluation for juiciness. To the fourth day of storage in models A and B there is a certain increase, while with the rest is observed a slight decrease. With further storage, for all models there is a decrease in the evaluations most evident with the control and least in model A.

The changes in the overall evaluation for the different models are given on fig. 8. To the fourth day, there is a decrease in the values of the evaluations, different however for the different models. To the eighth day of storage, for the models with added pure culture these values are almost the same. In model E they decrease sharply and on the eighth day they are for unacceptable quality.

The obtained results make possible the following conclusions:

1. The added lactic bacilli do not inhibit the development of the existing coliforms in the comminuted meat.

2. Addition of 0.1% glucose, 0.2% saccaharoses and combination of 0.05% glucose and 0.15% saccharoses do not influence the total count of lactic acid microorganisms and the total aerobic count in comminuted meat stored at 4°C.

3. The organoleptical evaluation - flavour, taste, juiciness, and overall evaluation of comminuted meat with added pure culture of Lb. plantarum and a combination of pure sugars is significantly decreased to the eighth day of storage at 4°C, while the evaluation for the control sharply decreases after the fourth day and generally is for unacceptable quality.

The introduction of Lb. plantarum in comminuted meat adds for the keeping quality of the product to the eighth day while stored at 4°C.

Literature

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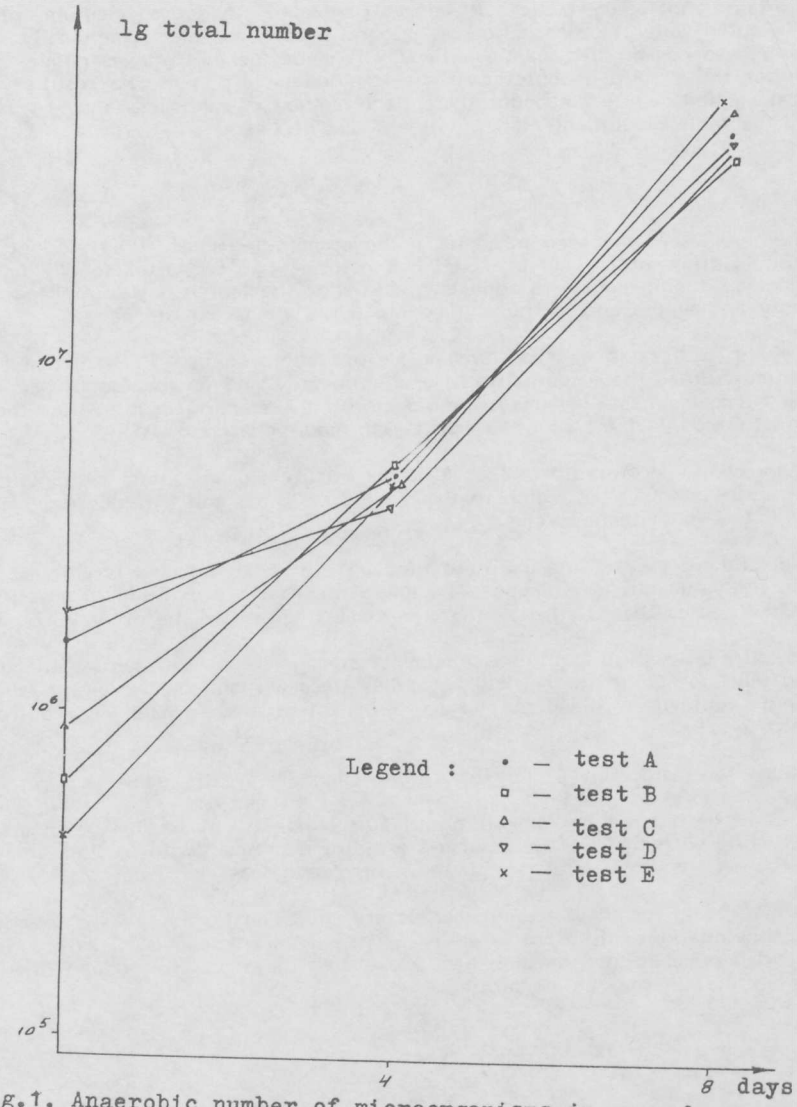


Fig.1. Anaerobic number of microorganisms in ground meat with Lb.plantarum

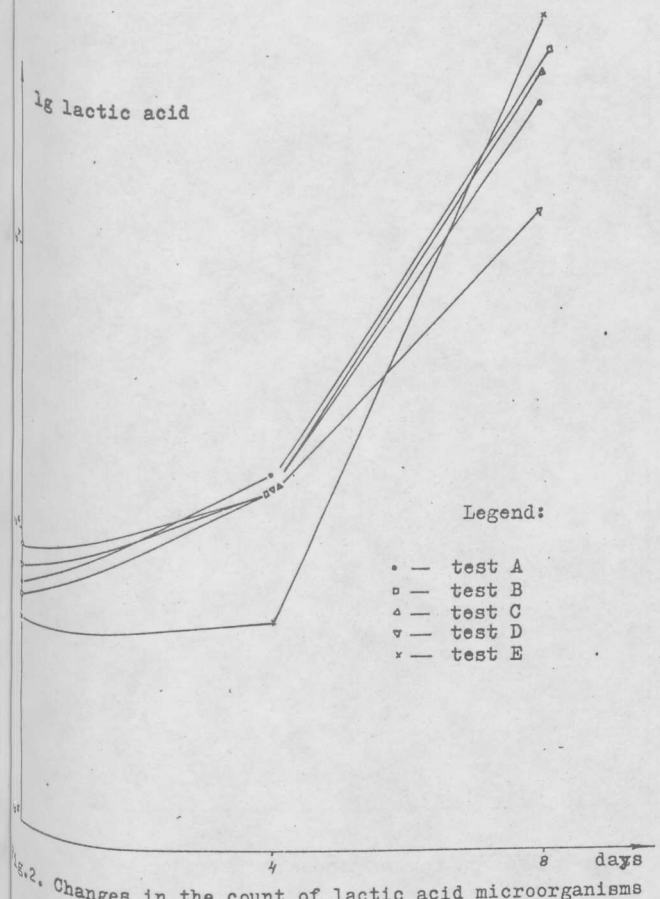


Fig.2. Changes in the count of lactic acid microorganisms

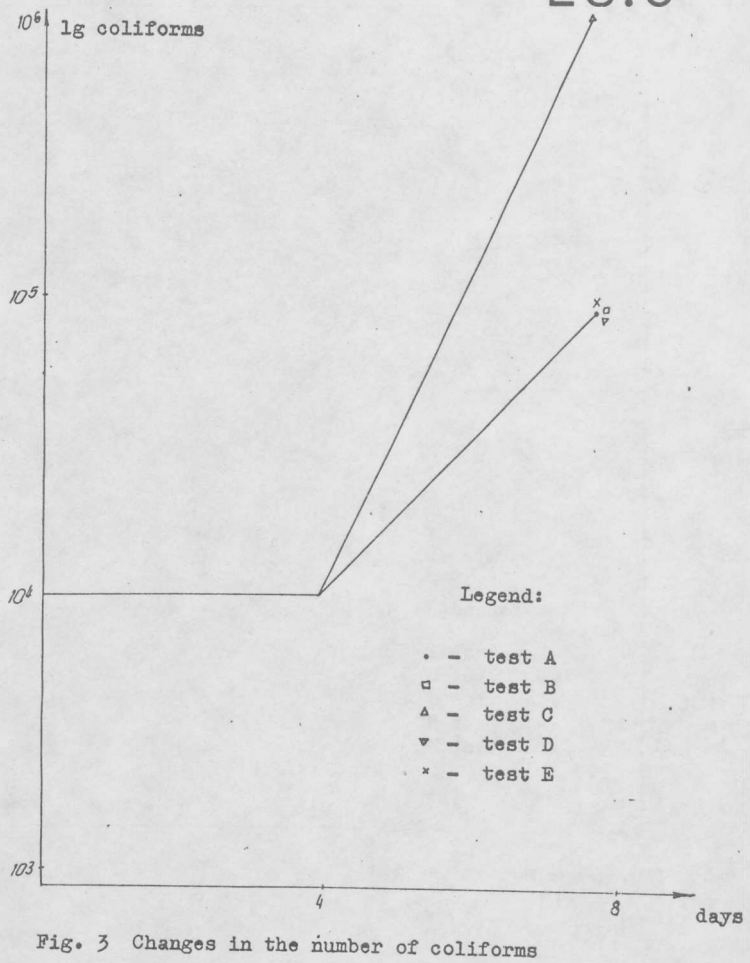
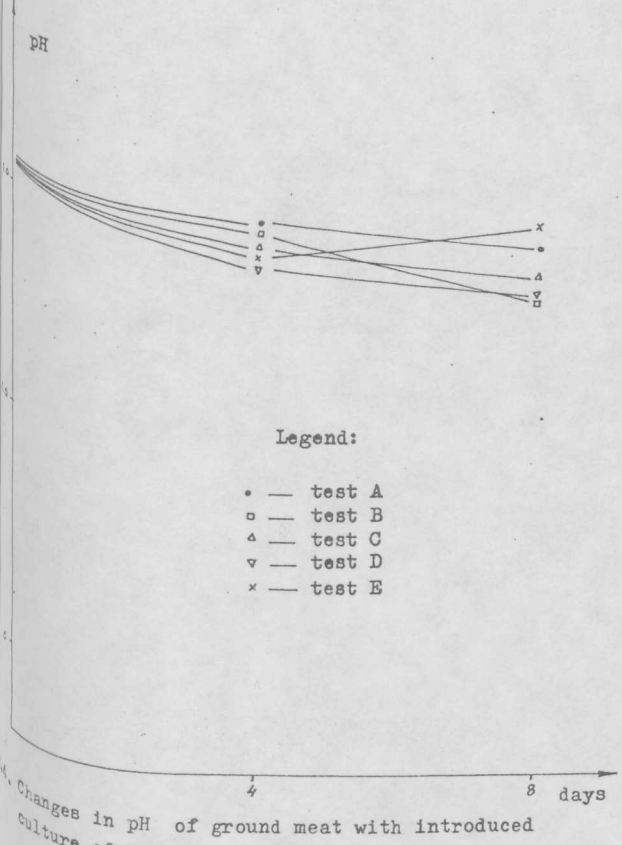
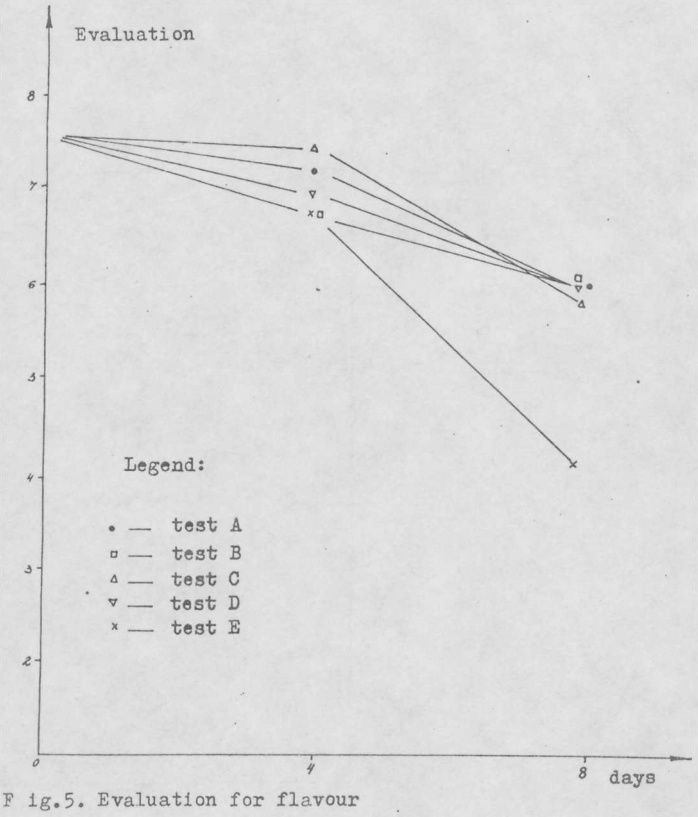


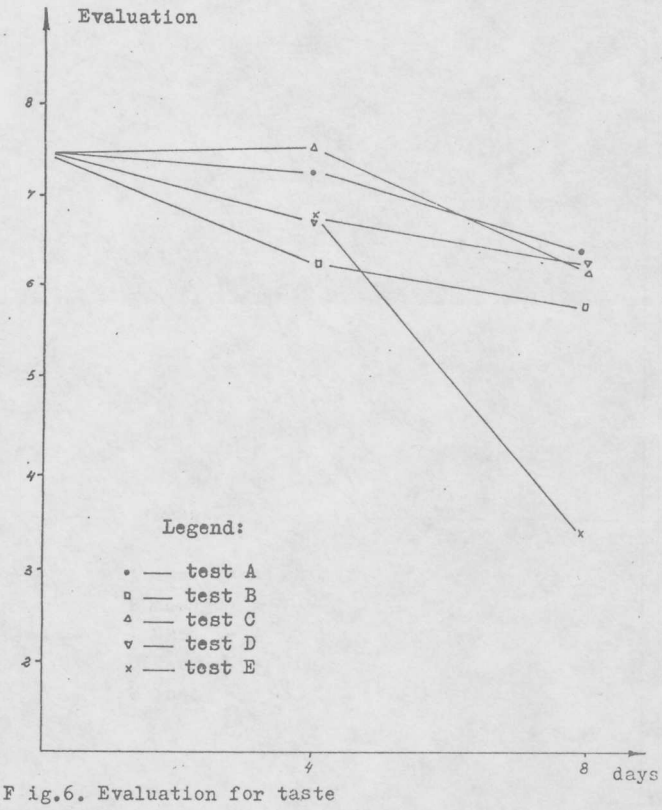
Fig. 3 Changes in the number of coliforms



Changes in pH of ground meat with introduced culture of Lb.plantarum



F ig.5. Evaluation for flavour



F ig.6. Evaluation for taste

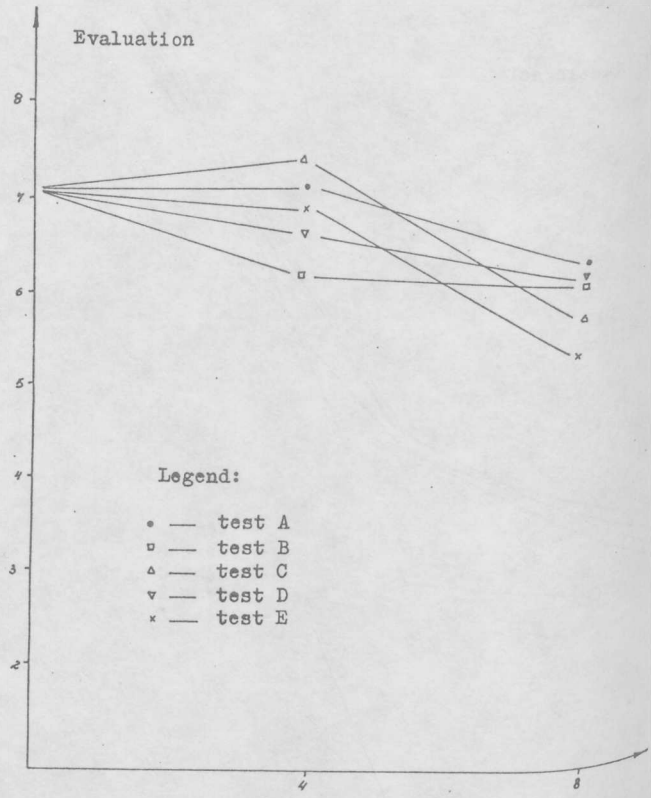


Fig.7. Evaluation for juiciness

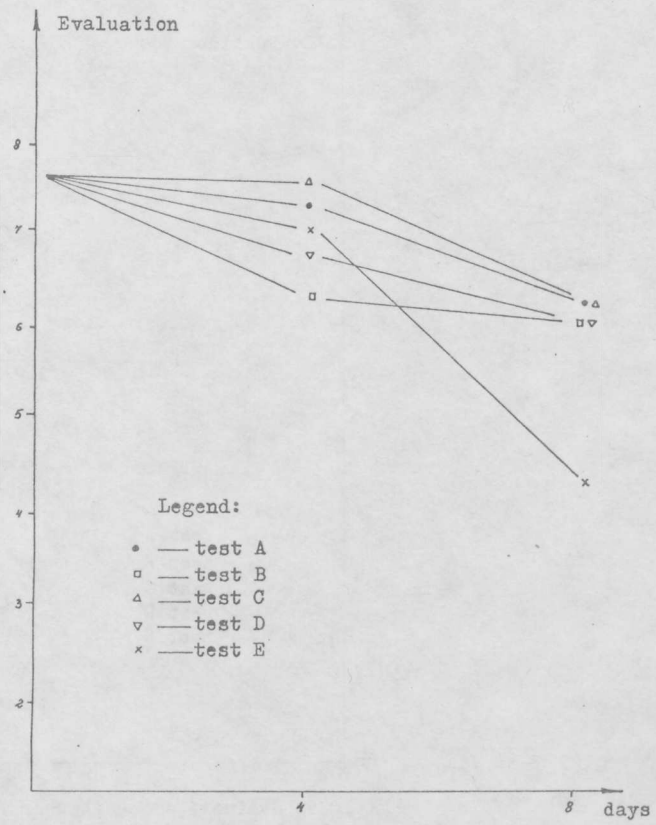


Fig.8. Changes in the overall evaluation