# PRODUCTION OF FERMENTED SAUSAGES USING LACTIC ACID BACTERIA AND LACTOSE FERMENTING YEAST ISOLATED FROM KUMISS IN INNER MONGLIA, CHINA

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Background

Asian nomads have succeeded in making various milk products though experimenting with centinuous fermentation by microorganisms. We have succeeded in isolating and identifying the bacteria in kumiss produced in various parts of Mongolia. We found that several strains of Lactic acid bacteria and yeasts are involved in kumiss fermentation. We also found that the microflora used in the production of kumiss differ in each household that produces kumiss and that there is interaction between bacteria in the fermentation process. Such beneficial effects from oral intake of a drink or food are quite unusual,and it is expected that much interest will be shown in kumiss in the future. It is expected that kumiss will be useful in terms of probiotics the future. Now may countries production of fermented sausages using starter for Lacticacid bacteria.This study using *Lactobacillus paracasei* subsp.*paracasei*, *Lactobacillus paracasei* subsp.*tolerans* and *Lactobacillus rhamnosus* and *Kluyveromyces marxianus* var.*lactis* were selected from strains isolated from kumiss for their strong resistances to salt and $KNO_3$ and were used as starters for the production of fermented sausages. Thus, The role that the lactose fermenting yeast plays in the maturation process of the sausages was investigated.

Objective

The objective of this study was elucidation of the question what of the exudate is more elevants for binding ability

Methods

Three lactic acid bacteria and the yeast were cultivated in MRS and YM liquid culture medium at 32℃ for 72h, respectively, and after the bacteria were then washed in solution distilled water, thee times at centrifuged 8000r.p.m for 10 minutes at 4℃ and frozed dried for four days. The amounts of each ingredient and the recipe for making the sausages are shown in Table1. A total of 10 types of sausage were made: 4 types in which 0.05% of each strain of dried lactic acid bacteria was added to the meat and then the sausages were immersed for 20 minutes in 1% yeast solution on the day they had been made (day 0), 4 types in which 0.05% of each strain of dried lactic acid bacteria was added to the meat and then the sausages were immersed in 1% yeast solution on the fourth day after they had been made (day 4), one type that was immersed in the 1% yeast solution on day 0 without the addition of lactic acid bacteria to the ingredient meat, and one type that was immersed in the 1% yeast solution on day 4 without the addition of dried lactic acid bacteria to the meat. The sausages were then dried in a room in which the temperature and humidity were set at 17℃ and 70～80% . It is not pasutialized and smoked . Respectively,The viable cell number of Lactic acid bacteria and yeast, pH, Las baliu and weight of each type of dry sausage were determined.

Result and Discussion

Shown Table 2, More lactic acid was produced by a culture of lactic acid bacteria with yeast than by a culture of lactic acid bacteria alone, suggesting that there was a symbiotic relationship between the lactic acid bacteria and yeast used in this experiment. The numbers of lactic acid bacteria in sausages immersed in 1% yeast solution on day 0 were greater than those in sausages immersed in 1% yeast solution on day 4. Shown Table 3, The pH of sausages immersed in1% yeast solution on day 0 tended to be lower than that of sausages immersed in 1% yeast solution on day 4, and the pH was lowest in sausages to which *lactobacillus rhamnosus* had been added. Shown Table4, The weights of all sausages had decreased by more than 50% on day 14. There was no mold on any of the sausages. And not contamination another bacteria ( *Staplyococcus.aureus* etc) . There was also no loss of aroma or color due to the yeast. Thus,The results of this study have shown that it is possible to make good-quality sausages by using the lactic acid bacteria used in this experiment as starters and by adding yeast.

Conclusion

We study using lactia acid bacteria and lactose fermenting yeast for starter to fermented sausage.In add *lactobacillus rhamnosus* dried bacteria ,pH was lowest for after 7days, and yeast add had experiment as starter.

This bacteria maked lactic acid so much. And it's was good-quality, color and aroma. Further detailed research on fermented sausages starter.

Table 1 Composition of fermented susage

| Conposition | weight |
|---|---|
| Pork meat | 5000g |
| $NaNo_2$ | 0.7g |
| $KNo_3$ | 6.6g |
| Nacl | 100.0g |
| Glucose | 50.0g |
| Sucrose | 30.0g |
| White pepper | 25.0g |
| Hold pepper | 25.0g |
| Onion powder | 15.0g |
| Garlic powder | 10.0g |

Add 0.05% of each strains od dried lactic acid bacteria

Making sausage after add 1% dried yeast strain solution 20min's

Table 2 Lactic acid production by single of Lactobacillus spp. or mixed culture with Kluyveromyces marxianus var.lactis

| Species | Lactic acid (%) | |
|---|---|---|
| | Single culture | Mixed culture |
| *Lactobacillus paracasei* subsp.*tolerans* | 0.49 | 1.07 |
| *Lactobacillus paracasei* subsp. *paracasei* | 0.48 | 0.85 |
| *Lactobacillus rhamnosus* | 0.43 | 0.7 |
| *Kluyveromyces marxianus* var.*lactis* | 0.1 | – |

One of the strains of Lactic acid bacteria and *Kluyveromyces marxianus* var.*lactis* were inoculated to the 10% skimed milk medium to create an initial cell density of $10^6$/ml and $10^5$/ml.
Incubation was performed at 32°C for 48hrs.

Table 3 pH of fermented sausages during ageing

| Species | 0d | 4d | 7d | 14d |
|---|---|---|---|---|
| *Lactobacillus paracsei* subsp. *tolerans* a) | 6.2 | 5.9 | 5.8 | 5.5 |
| *Lactobacillus paracsei* subsp. *tolerans* b) | | 5.8 | 5.8 | 5.7 |
| *Lactobacillus paracsei* subsp. *paracasei* a) | 6.2 | 6.1 | 6.0 | 5.5 |
| *Lactobacillus paracsei* subsp. *paracasei* b) | | 6.1 | 6.1 | 5.7 |
| *Lactobacillus rhamnosus* a) | 6.2 | 5.7 | 5.7 | 4.4 |
| *Lactobacillus rhamnosus* b) | | 5.7 | 5.7 | 4.7 |
| *Lactobacillus rhamnosus* (Single culture) | 6.2 | 6.2 | 5.9 | 5.7 |
| Lactic acid bacteria mix culture a) | 6.2 | 5.8 | 5.8 | 5.2 |
| Lactic acid bacteria mix culture b) | | 5.9 | 5.9 | 5.7 |
| *Kluyveromyces marxianus* var.*lactis* a) | 6.2 | 6.2 | 6.2 | 5.9 |
| *Kluyveromyces marxianus* var.*lactis* b) | | 6.2 | 6.2 | 6.2 |

a) Add 0day 1% dried yeast solution 20min's for sausage
b) Add 4day 1% dried yeast solution 20min's for sausage

Table 4 Weight loss of fermented sausages during ageing

| Species | 0d | 4d | 7d | 14d |
|---|---|---|---|---|
| *Lactobacillus paracsei* subsp. *tolerans* a) | 100 | 60 | 51 | 46 |
| *Lactobacillus paracsei* subsp. *tolerans* b) | 100 | 64 | 54 | 47 |
| *Lactobacillus paracsei* subsp. *paracasei* a) | 100 | 62 | 52 | 46 |
| *Lactobacillus paracsei* subsp. *paracasei* b) | 100 | 64 | 54 | 48 |
| *Lactobacillus rhamnosus* a) | 100 | 62 | 53 | 46 |
| *Lactobacillus rhamnosus* b) | 100 | 64 | 54 | 47 |
| *Lactobacillus rhamnosus* (Single culture) | 100 | 68 | 56 | 45 |
| Lactic acid bacteria mix culture a) | 100 | 60 | 52 | 46 |
| Lactic acid bacteria mix culture b) | 100 | 63 | 53 | 48 |
| *Kluyveromyces marxianus* var.*lactis* a) | 100 | 61 | 52 | 47 |
| *Kluyveromyces marxianus* var.*lactis* b) | 100 | 62 | 54 | 48 |

a) Add 0day 1% dried yeast solution 20min's for sausage
b) Add 4day 1% dried yeast solution 20min's for sausage