

## Horseflesh and Its Subproducts in Meat Foods Production

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**SUMMARY:** Technology and recipes for increased protein value sausages and pastes have been developed. Such food mass has a high protein content and low fat content. It contains optimum amount of essential aminoacids, B complex vitamins, principal elements and vital trace elements. Sausages are balanced against 6-7 essential aminoacids, the paste is balanced against 3 essential amino acids - tryptophan, lysine, methionine. Production technology is cheap.

**INTRODUCTION:** Organoleptic combination, chemical composition and the cost of horseflesh and its subproducts as well as milk protein and butter have been investigated. On the basis of the data taken low cost recipes and technology for increased protein value sausages, pastes and food mass production have been developed. The ingredients involved made: horseflesh -20-70%, subproducts - 5-30%, milk protein - 10-40%, blood - 2-10%, fat - 5-15%. Being low cost such food mass contains optimum amount of essential aminoacids, B complex vitamins, principal elements - calcium, phosphorus and also some trace elements.

**MATERIALS and METHODS:** Given below is the liver milked paste production technology. The paste can be processed in the open and closed forms. The recipe includes: blanched first grade horseflesh -30 kg, blanched horse liver - 20 kg, edible milk protein - 30 kg, dry fat-free milk -5 kg, butter -15 kg; spices(gr per 100 kg) are: edible salt-2500, garlic-300, pepper-100, nutmeg-100, plasma, serum or fat-free milk-20l. According to the technology washed in the cold water trimmed subproducts(liver, lungs, heart) and horseflesh should be cut into pieces 5\*5, blanched in the boiling water(the raw and water ratio is 1: 1) for 30min and cooled until 10 degrees C. Then the food mass is chopped and mixed with spices, blood plasma, skimmed milk. Meat grinder plate holes diameter is 2-3 mm. The mass is chopped twice. Then it is put into forms that have been washed with sunflower seeds oil and is baked for 1 hr 45min at 90-145 degrees C, the mass temperature being not less than 72 degrees C as it is held in the baking oven for 30 min. Finished products water content makes 57-59%. Each baking form contains 2 kg of the processed milk.

**RESULTS and DISCUSSION:** The mass produced may be used for cooked sausages, small sausages, in pies. Table 1 shows that the food mass spoken above contains protein and minerals 1,5-2 times more and fats 2 times less than already known in the country products do.

Liver Food Mass Chemical Composition

Table 1

| Food mass            | Moisture  | Protein   | Fat       | Ash       |
|----------------------|-----------|-----------|-----------|-----------|
| top grade liver mass | 57,6±0,48 | 16,2±0,24 | 20,9±0,31 | 1,71±0,05 |
| liver buttered mass  | 55,5±0,40 | 12,1±0,25 | 29,1±0,46 | 1,53±0,02 |

|                      |            |           |           |           |
|----------------------|------------|-----------|-----------|-----------|
| liver with horse fat | 53,01±0,31 | 13,5±0,85 | 30,3±0,85 | 1,51±0,02 |
| liver milked mass    | 59,8±0,35  | 27,6±0,36 | 12,8±0,34 | 1,4±0,05  |

Paste Minerals Content (mg %)

Table 2

| Minerals   | Top grade<br>liver mass | Liver butter<br>ed mass | Liver with<br>horse fat | Liver milked<br>mass |
|------------|-------------------------|-------------------------|-------------------------|----------------------|
| calcium    | 3,15                    | 3,31                    | 3,31                    | 145,7                |
| phosphorus | 221,0                   | 224,2                   | 236,2                   | 270,0                |
| iron       | 6,601                   | 5,136                   | 6,140                   | 3,150                |
| manganese  | 0,108                   | 0,035                   | 0,045                   | 0,047                |
| zinc       | 0,185                   | 0,152                   | 0,265                   | 0,145                |
| copper     | 0,245                   | 0,310                   | 0,320                   | 0,0360               |
| nickel     | -                       | 0,440                   | 0,360                   | -                    |
| titanium   | 0,024                   | 0,013                   | 0,014                   | 0,028                |
| tungsten   | 0,056                   | 0,141                   | 0,041                   | 0,041                |
| chromium   | -                       | 0,056                   | 0,056                   | -                    |
| molybdenum | 0,002                   | 0,002                   | 0,002                   | 0,003                |
| laptanum   | 0,021                   | 0,046                   | 0,061                   | 0,034                |
| silver     | 0,002                   | 0,002                   | 0,003                   | 0,002                |

Milk raw being added the optimum calcium and phosphorus ratio has become 1: 1,85, while top grade liver mass contains phosphorus 72,2 times more than calcium and the same values in liver buttered and liver mixed with horse fat mass are 67,7 and 71,35. Paste protein digestibility in vitro is shown in Table 3.

Table 3

| %   | top grade<br>liver mass | liver butter<br>ed mass | liver with<br>horse fat | liver milked<br>mass |
|---|-------------------------|-------------------------|-------------------------|----------------------|
| Fat caloricity and<br>total caloricity<br>ratio | 64,2                    | 85,4                    | 84,4                    | 54,1                 |
| Fat and protein<br>ratio                        | 1,29                    | 2,40                    | 2,24                    | 0,46                 |
| Digestibility                                   | 45,6                    | 44,3                    | 48,1                    | 58,5                 |

Thus liver milked paste possesses the highest protein digestibility value, then comes top grade liver paste and liver buttered paste. Liver milked paste protein digestibility value being high, its cost is lower. Protein value and quality values of the liver milked paste are

higher than those of the rest pastes and they are given in Tables 4 and 5. Other sorts of the same group food mass except liver milked paste do not meet diet products requirements for they contain either pork fat and fried liver or fried or blanched liver sauce or broth. Liver milked mass production technology has taken into consideration the existing requirements.

CONCLUSIONS: It should be noted that the pastes may be recommended in the diet of people of any age and especially children. They would get more milk protein of high digestibility value. Since extractives are removed by blanching, the milked liver paste may be included the diet of the people suffering from atherosclerosis, obesity, liver diseases, etc. .

Food Mass Protein Quality Value Index

Table 4

| Food mass            | Aminoacids protein ratio % |           | Protein quality values |
|----------------------|----------------------------|-----------|------------------------|
|                      | tryptophan                 | oxyprolin |                        |
| top grade liver mass | 1,42                       | 5,95      | 0,238                  |
| liver buttered mass  | 1,48                       | 5,91      | 0,250                  |
| liver with horse fat | 1,34                       | 5,40      | 0,248                  |
| liver milked mass    | 1,49                       | 5,21      | 0,285                  |

Food Mass Protein Value Index

Table 5

|                      | Aminoacids total amount and protein ratio % |              | Protein value index |
|----------------------|---|--------------|---------------------|
|                      | essential                                   | nonessential |                     |
| top grade liver mass | 37,45                                       | 55,35        | 0,676               |
| liver buttered mass  | 36,85                                       | 56,35        | 0,653               |
| liver with horse fat | 36,44                                       | 56,85        | 0,640               |
| liver milked mass    | 39,95                                       | 54,65        | 0,731               |

It is necessary to note that the combination of meat,subproducts and balanced raw mass have resulted in the balanced ratio of protein, fat (1:1-0,8) and essential aminoacids. Finished products cost was reduced as well. Different acids content combination proves to be important promoting gastric tract enzymes activity, thus improving meat and milk raw protein digestibility in the body.