A STUDY ON PROCESSING TECHNOLOGY OF CHILDREN NUTRITIONAL SAUSAGE

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ABSTRACT:

Based on an analysis of the major characteristics of animal bones, this paper studied processing technique of bonemud in comparative method, and by using the formula and technology of the national brand quality product "Harbin Red Sausage", the paper identified the approprite amount of anamial bonemud added in children nutritional sausage as well as the ratio of all the ingredients. Adopting the new type of smoking agent,we improved the primary production technology. The result indicates that adding bonemud by15% is suitable and results in an increase of calcium content by 60-70 times than before. Furthermore, this technique has eliminated the contamination of benzopyrene during the production, therefore, it is both feasible and necessary to add poultry bonemud into sausage products and serve as nutritional food for children.

INTRODUCTION:

Stuffed meat product has long been an important food in our daily life. Such product serves as a convenient food and is loved by businessmen and travellers. It provides indipensible nutrient to human body, extend length of human life, and plays an important role in supplying energy sources to human activities. Sausage as a children food is particularly important because it helps promote normal growth of children and provides excellent nutrient. In order to develop children food, and on the basis of special needs of chldren to some nutrients during their growth and in consideration of their eating habits, we made a serie of research in the varity of foods. Children's nutritional sausage is one of the products.

In recent years, the widespread deficiency of calcium in the growing stage of Chinese children has brought attention of the society. parents are busy looking for calcium additives but have ignored the functions of animal bones. Although some use cooked bone soup as a way of adding calcium content, the nutritional value of animal bones has not yet been fully explored. China has an aboundant supply of animal bones, the quantity of animal bones left out during the raw meat processing is very significant, especially the bones peeled off from pork, beef and mutton. The annual quantity is estimated at four million tons. Animal bones are sufficient, their price is low and more important,their nutritional value is very high. (Please refer to Table 1).

Table 1. Nutrient Component of Pork Bones

Item / Name	Water content (%)	Dry Substance (%)			Ca:P content in ashes(%)	
		coarse protein	coarse fat	coarse ashes	Calcium	Phosphorus
Porkbone	30.77	28.02	26.52	45.35	7.65	17.77

After processing with special technique, animal bones can be used as a food additive or enhancer and added into stuffed meat products in appropriate ratio. This will not only increase the calcium content in the product, but also maintain the original taste of the product. As a result, the product has gained addtional nutritional value. This technique, helps to solve the calcium and animal protein deficiency problem in China. On the other hand, it makes full use of resources by turning waste into values and is economically and socially desirable.

The paper stressed on the processing method of bonemud, technique and ratio of nutritional sausages and made the experiments and tests, the conclusion is meaningful in guiding actual production processes.

MATERIALS AND METHOD

1. Materials: Pork, starch, salt, flavors, smoking-perfume, sausage casing, porkbone (ribs or low-hardness bones).
2. Equipment: Chopper, sausage stuffer, bone smasher, high pressure cooker, colloidal mill, baking oven and cooking boiler, etc.

3. Method:

3.1 Identification of processing method

There are several ways to make bonemud. We made comparative study on the two methods that can be more easily used in the factory, one is raw processing method, the other is cooked processing method. A sense evaluation was made based on a comprehensive consideration of color, flavor, texture, mouth-feel of the product, along with its safety on children. The better of the two processing methods was selected.

Raw Processing Method:

Fresh/frozen bone—>Clean—>dig(2-3cm pieces)—>rough grind—>
—>refined grind(Phase I)—>refined grind(Phase II)—>End product

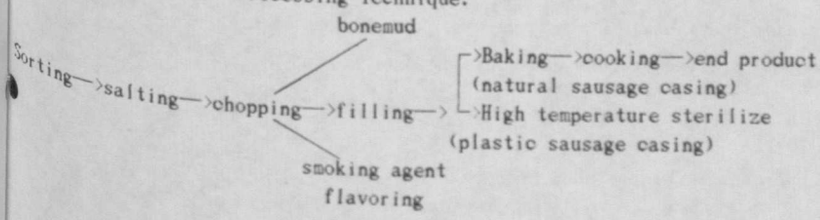
Cooked Processing Method:

Fresh or frozen bones—>Clean—>High pressure (steam or boil)—>rough grind—>refined grind—>End product

3.2 Selection of Raw and Supplimentary Materials and Formula.

Adopting the formula of "Harbin Red Sausage", bonemud was added in 5%, 15%, 20% and 30% of total weight of meat. A sense grading was made and adding amonunt was determined based on a comprehensive evaluation of quality, texture, slice propenty, histostate, color and flavor of the product.

3.3 Flowchart of Processing Technique.



DISCUSSION ON CONCLUSION:

1. Selection of Bonemud Processing Method

A comparison and sense evaluation of the two processing methods is given in Table 2.

Table 2. Sense Evaluation of Bonemud

Item / Method	Color	Flavor	Histostate	Mouth-feel
Raw Processing	light brown	raw bone flavor	minced sticky	coarse and hard
Cooked Processing	light brown	fragarant	minced sticky	smooth, fine and soft

Note: Sense evaluation of quality was made on uniformity of bonemud, texture, fine and smooth taste, color and flavo generally good or bad, etc. Twenty people were randomly selected to make the evaluation of the product.

From the above analysis, we think the cooked method is the better of the two since the product is mainly used as additiv in children food and safety is a major concern. Raw processing method may leave small bone pieces and cause danger to childr

2. Selection of Raw and Supplimentary Materials and Formula

Using cooked processing method as the production technique, different results when adding different amount of bonemud i nutritional ausage are shown in Table 3.

Table3.Quality (Sense Evaluation) of Nutritional Sausages with Different Amount of Bonemud Added

bonemud (amount %)	Slice Property	Color	Flavor	Form	Taste	Summary
30	Poor, Loose	Gray	normal	soft, poor elasticity	worse	Inacceptable
20	good	light gray	normal	loose	poor	acceptable
15	better	normal	normal	good elasticity	normal	good
10	excellent	normal	normal	good elasticity	normal	good
0	excellent	normal	normal	good elasticity	normal	good

From Table 3, we learnt that the best adding amount of bonemud is around 15%. A 20% addition may be accepted if th product is of low grade. Such product quality is generally accepted by consumers.

Based on the experiment results and other considerations, we find the most appropriate formula of children nutritiona sausage is as such: bonemud 15%, fine meat 60-65%, fat 15-20%, starch 5%.

3. Nutrient Component Analysis of Children Sausage

Table 4. Nutrient Components

Component	Water	Protein	Fat	Total Sugar	Ashes	V_{B_1}	V_{B_2}	Fe	Zn	Ca
Content(%)	48.3	14.8	21.5	3.9	10.7	0.08	0.02	5.2	6.0	835

Note: V_{B_1}, V_{B_2}, Fe, Zn, Ca are all in unit of mg/100mg.

From the above table, we can see that the greatest change that occurred in children nutritional sausage is the calciu content. Theoretically, calcium content has increased by about 60 times (495mg/8.41mg), however, the actual measurement ha shown an increase of about 100 times. The daily in-take of 100g of such product for a child would satisfy the required amoun of calcium amount published by the state.

In addition to rich calcium, there are also ample phosphatide and phosphoglbulin in bonemud that are indispensible t human brain and can moist skin and help build vigor. The presence of bone collagen chondroitin helps postpone aging, an methionine promote liver functioning, as well as many other animo acids such as V_A, V_{B_1}, V_{B_2}, etc. Most importantly, th calcium to phosphate ratio is reasonable and therefore can be readily absorbed by human body.

CONCLUSIONS:

After the experiment and analysis of the experiment results, we conclude that making porkbone into bonemud through cooked rocessing technique and using bonemud as food additive in production of children nutritional sausage is not onl necessary, but is also feasible. It will contribute to solving the problem of widespread deficiency of calcium and protei additive among Chinese children. The best adding amount determined is about 15%-20%. A new technique of smoking - liqui smoking method that has started being used in the sausage production has shortened production time, avoided th benzopyrene produced and its contamination. This has made the sausage product more sanitary and safer. Application of th technology in production process will lead to both economic effectiveness and socially desirable.

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