

PRODUCING FRESH PORK SAUSAGE CONTAINING APPROXIMATELY TEN PERCENT FAT AND FOUR PERCENT CEREAL PRODUCTS

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SUMMARY

The percentage fat in the typical market basket fresh pork sausage product in the USA today was measured using four commercial preparations and was found to be 38% which was used as our standard in this study. However, further reductions of fat content must be accompanied by additives to the sausage to counteract the toughness and hardness of low-fat sausage without additives. Some of the current low-fat sausage products still have a certain degree of toughness associated with them. In preliminary studies these researchers utilized products such as corn meal, rice bran, wheat bran, oat bran, oat meal, egg products, soy bran, soy flakes and carrageenan. Water was added to all low-fat products and it was deemed to be the most desirable when limited to approximately 15% of the total formulation.

Low-fat sausage products (10% fat) with additive of cereal products (4%) tended to become darker after the 3rd week of a shelf-life study, whereas the fatter (38% fat) products held their fresh color up to the 5th week. The low-fat sausage products contained 11.5% fat, and 17.5% protein, and were compared with products containing 20.0, 32.0 and 37.0% fat and 15.0, 13.0 and 12.0% protein, respectively. Sensory panel analysis showed that trained panelists actually scored low-fat products as high as those containing 20% and 32% fat and discriminated against the sausage containing 37% fat.

Introduction

With today's health conscious consumers the main objective of this study was to develop a fresh, low-fat pork sausage that would be accepted by the general public.

Carrageenan is well known for its superb water binding capabilities. It virtually eliminates purge in vacuum-packaged, processed sausages. There is still more bind than we want with the use of carrageenan (Bjerklie, 1992).

Food additives used were soy flour, soy protein concentrate, soy protein isolate, ground corn, eggs, and oat bran. These additives were studied in varying amounts and different combinations with preliminary studies reported by Skelley et al., 1992. The oat bran was first discussed by Webb (Staff report, 1991).

Materials and Methods

Fresh pork came from all parts of the carcass, and was trimmed of most fat. Seasonings and additives were added to the product and it was ground twice through a number 32 inch plate. A two pound portion of sausage was thawed as necessary and a different soy protein was added to establish how the soy would affect the texture and flavor of the sausage. Samples were broiled for ten min. on each side. Laboratory employees determined if the sausage was close to resembling a desirable product. Gradually, different additives were combined together with different types of soy. Sixteen different combinations were developed and tasted and four samples judged to be the closest to commercial sausage were advanced to the next part of the experiment.

Proximate Analysis. Each sample of sausage was placed individually in a food processor to distribute the sample. The sausage was then placed in a small "Whirlpack" freezer bag and frozen. They were later analyzed for percentages dry matter, fat, ash and crude protein (AOAC, 1990).

Shelf Life. A shelf life study was developed comparing the four test samples with two regular sausage samples. Each sausage formulation was packaged into two pound chubs. Four patties from each chub were cut and placed into Cryovac vacuum bags. The six bags were then placed side by side in a 1 °C refrigerator with glass doors and fluorescent lights. All the samples were monitored every other day through the refrigerator doors.

Microbial Counts. Eleven grams of each uncooked sample were aseptically weighed into separate sterile blender jars. Samples were plated in duplicate by the standard plate count method at 0, 7 and 21 days post manufacture. After incubation at 32 °C for 48 hours, plates were examined and average colony forming units per gram of sample were calculated (Busta et al., 1984).

Sensory Analysis. For the palatability portion of the project, a "just right" scale was used to evaluate juiciness, greasiness, saltiness, spiciness, sausage formulation and texture of the low-fat sausage samples. Overall product acceptability was also rated and the four samples were ranked. A sensory panel consisting of 18 faculty, staff and students in the College of Agriculture were involved in a practice/training session. These individuals were already trained taste panelists. Panelists were scheduled to taste samples once a day for three consecutive days.

In a second sensory study, two low-fat sausage samples with the highest acceptability rating were chosen for comparison against two commercial sausages. One of the commercial sausages was a low-fat sausage and the other was a standard sausage. The same panelists and procedures were used. Data were analyzed using the general linear model procedure of SAS (1990).

Results

Proximate Analysis. The results showed that the four samples developed for this project ranged from 10.6% to 12.4% fat. The percent crude protein was greater in the sausages with the lower levels of fat than the higher fat sausages (Table 1). The sausages with a decreased fat level had less dry matter, therefore, more moisture, than the sausages with the increased fat level which is in agreement with Hoffman et al., 1993 and Troutt et al., 1992.

Shelf Life. Throughout the four weeks of the shelf life study, no water loss was observed from any of the control or experimental chubs. After one week the color of all samples was the same as it was when packaged. By the second week, the experimental samples were slightly darker, but the control samples were still pink. Week three had the same color as week two (Table 2).

Microbial Count. Samples were examined for microbial content by the Standard Plate Count Method at 0, 7 and 21 days post manufacture. At 0 days, all samples contained less than 1000 cfu/g. However, cfu/g was markedly higher at 7 days, approaching log 5 and 6. At 21 day, the log number of bacteria was 6 and 7.

Sensory Analysis. A "just right" straight line scale was used for the sensory panel where the center of the scale was "just right". A negative score indicated lacks juiciness, excessive grease, lacks saltiness and compact texture. A positive score indicated excess juiciness, inadequate grease, excessive saltiness and crumbly texture. Most samples were slightly dry but the best score was sample 4 in Trial 1 and sample 6 in Trial 2 (Table 3). These same samples also scored highest for greasiness (Table 3). There were no differences in saltiness in Trail 1 but in Trial 2, sample 4 was scored the closest to the midpoint (Table 4). For texture, samples in Trial 1 were similar but in Trial 2, sample 5 was excessively crumbly and sample 4 was excessively compact. Egbert et al. (1990) suggested that a high-fat content in sausage increases palatability and the current results appear to indicate that increased seasonings will eliminate this trend.

Conclusion

The results of this study show that pork sausage containing 10% fat can be consumer acceptable. It is acceptable to compensate for a lack of fat by incorporating various natural food additives in the sausage mixture. The overall product acceptability measurements show that the experimental low-fat sausage is just as acceptable as normal commercial sausages.

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