

# MOISTURIZING AGENTS AS DETERMINANTS OF PHYSICOCHEMICAL AND SENSORY CHARACTERISTICS OF DEER MEAT PRODUCTS

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**Abstract** –The study was carried out to determine the effects of glycerol and sorbitol on the physical traits and shelf-life of Taiwanese venison jerky using thigh muscle. Processes of venison jerky were cooking, trimming, slicing, mixing ingredients, drying, roasting and packaging. The venison jerky with glycerol was significantly lower in moisture content and crude protein. Also, the water activity values of venison jerky with glycerol were significantly lower than those in the control and sorbitol groups. The shear force values of venison jerky in the control group were significantly higher than those with glycerol or sorbitol. The glycerol addition in venison jerky might improve the overall acceptance of the sensory evaluation.

## I. INTRODUCTION

Game meat has a characteristic texture and taste: it is generally darker, has a stronger taste and is often tougher than meat from farm animals. In the last 10 years, cured, fermented and dried products made from hunted game species have become more popular and are easily found on the market in many European countries. Dried meat products commonly referred to as jerky. The characteristic appearance of the final

products has been sold for many years as snack foods. These products are available to sell in large supermarkets as well as shops. Jerky type products are characterized by a considerable diversity with different kinds of the applied raw materials, but little information is available concerning the influence and role of glycerol or sorbitol on the venison jerky quality of deer. The objectives of the study were to characterize the nutritional quality of the venison jerky and evaluate the effects of moisturizing agent (glycerol or sorbitol) on nutritional quality, by the determination of venison jerky proximate analysis physical characteristics, and sensory evaluation.

## II. MATERIALS AND METHODS

The formula of ingredients (based on raw meat weight) included 1% sodium chloride, 1% monosodium glutamate, 5% soybean sauce, 0.3% sodium tripolyphosphate, 0.2% sorbic acid, 0.1% cinnamon, 0.05% ascorbic acid, 0.01% sodium nitrite, 0.01% sodium nitrate, 0.1% five-spices powder and 18% of sucrose. The treated groups were added extra 6% glycerol or 6% sorbitol. The venison jerky was processed by the following procedure: cooked venison thigh (*Formosan Sambar* deer ham) at 95°C for 2.5 h, removed subcutaneous fat and connective tissue, sliced

meat to 3 mm thickness, mixed ingredients, dried at 55 °C for 80 min, roasted at 150 or 200°C by far-infrared grill and final products were packaged in a polyethylene film without vacuum, stored at room temperature (26 °C) for subsequent quality measurement

### III. RESULTS AND DISCUSSION

The venison jerky with glycerol was significantly lower in moisture content and crude protein ( $P<0.05$ ). The crude fat content of venison jerky with glycerol or sorbitol was higher than that of the control group. The addition of the glycerol or sorbitol might affect the moisture, crude protein and ash content of venison jerky. The venison jerky may absorb glycerol or sorbitol during the processing period, therefore, the crude protein of venison jerky in the glycerol and sorbitol groups might be lower. The results are agreed with the reports of pork jerky with humectants whose moisture is reduced by the addition of glycerol (1, 2).

The shear force values of venison jerky in the control group were significantly higher than those with glycerol or sorbitol (Table 1). The lower shear force values of venison jerky might be attributed the addition of glycerol or sorbitol. Higher contents of the addition of glycerol or sorbitol were found to improve the meat tenderness. The glycerol function in meat products may be an effective textural plasticizer in certain meat products.

The sensory evaluation results in this study are displayed in Table 2. The flavor values of venison jerky in the control group were significantly higher than those of the glycerol or sorbitol groups ( $P<0.05$ ). The venison jerky in the glycerol or sorbitol groups showed significantly better values in hardness values ( $P<0.05$ ). The overall acceptance was not significant between the control or glycerol groups. The overall acceptance of venison jerky in the control or glycerol groups was significantly higher than that of the sorbitol group ( $P<0.05$ )

Table 1. Effect of glycerol and sorbitol on physical traits of venison jerky

| Items           | Control           | Glycerol          | Sorbitol          | S.E. |
|-----------------|-------------------|-------------------|-------------------|------|
| Water activity  | 0.75 <sup>a</sup> | 0.71 <sup>b</sup> | 0.75 <sup>a</sup> | 0.02 |
| Shear force, kg | 11.8 <sup>a</sup> | 5.1 <sup>c</sup>  | 7.0 <sup>b</sup>  | 3.45 |

<sup>a,b</sup> Means within the same row without the same superscript are significantly different ( $P<0.05$ ).

Table 2. Effect of glycerol and sorbitol on sensory evaluation of venison jerky

| Items              | Control          | Glycerol         | Sorbitol         | S.E. |
|--------------------|------------------|------------------|------------------|------|
| Flavor             | 5.2 <sup>a</sup> | 4.9 <sup>b</sup> | 4.7 <sup>c</sup> | 0.25 |
| Hardness           | 4.8 <sup>c</sup> | 5.6 <sup>a</sup> | 5.4 <sup>b</sup> | 0.42 |
| Overall acceptance | 5.1 <sup>a</sup> | 5.2 <sup>a</sup> | 4.8 <sup>b</sup> | 0.21 |

<sup>a,b,c</sup> Means within the same row without the same superscript are significantly different ( $P<0.05$ ).

Preference scores ranged from 1=extremely dislike; 2=dislike; 3=slightly dislike; 4=moderate; 5=slightly like; 6=like; 7=extremely like.

### IV. CONCLUSION

The chemical, physical, microbiological and sensory evaluation items of venison jerky were analyzed in the study. Venison jerky with glycerol might lower the moisture content and  $a_w$  values, which can be beneficial for the preservation of venison jerky. The shear force might be improved by the addition of humectants. The addition of glycerol might improve the sensory evaluation.

### REFERENCES

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