

Sensory Attributes of Dried Chicken Jerky Incorporated with Purple Yam Powder

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Abstract—Consumer demand for protein-rich, convenient snack products, especially dried meats like jerky, has surged in recent years due to dietary recommendations favoring high protein and low carbohydrate intake. Chicken jerky, in particular, has gained popularity, offering a leaner and healthier alternative to traditional beef or pork jerky. Thermal processing during chicken jerky production may result in undesirable sensory attributes. This study has explored the use of purple yam powder to mitigate the undesirable changes of sensory attributes of chicken jerky. This study assessed the impact of incorporating dried purple yam powder at different concentrations (4%, 6%, and 8%) on the sensory characteristics of dried chicken jerky. Sensory evaluation was performed using the 9-point Hedonic Scale. Dried chicken jerky prepared with 6% and 8% purple yam powder exhibited no significant differences in color, flavor, tenderness, juiciness, and overall acceptability compared to those of the control group. Overall acceptability and the flavor attributes of chicken jerky incorporated with 4% purple yam powder were significantly higher (7.85 ± 0.26) than those of the control group. These findings suggest that the addition of purple yam powder can enhance certain sensory attributes of dried chicken jerky, with an optimal concentration of 4%. This study offers valuable insights into enhancing the quality of chicken jerky while meeting the increasing consumer demand for healthier and visually appealing snack options.

Keywords—Chicken jerky, purple yam, natural colorant, thermal processing, sensory evaluation

I. INTRODUCTION

The rising consumer interest in dried meat snacks, fueled by dietary recommendations for higher protein intake and lower carbohydrate consumption, has led to a diverse array of prepared meat snacks in the market, especially notable in Western nations. These meat snacks, including high-nutrient meat sticks, cater to the needs of active individuals and athletes, offering convenient on-the-go options [1]. Jerky, a popular, long-lasting snack made from lean meat strips, is widely consumed globally and is produced from various meats, such as beef, pork, turkey, and chicken [2]. Chicken jerky has gained popularity for its lean profile and is now commonly found in restaurants and food trucks worldwide. Jerky is favored for its nutritional benefits, including high

protein content, low fat, antioxidants, vitamins, and minerals [1]. Chicken jerky, in particular, is often lower in fat and calories than other jerky varieties, making it an attractive choice for those seeking a healthier diet [3]. Sous Vide (SV) cooking has emerged as a unique method for preserving food quality, with extensive research conducted over the past 20 years covering food safety, storage duration, quality enhancement, nutritional impact, and various technical aspects [4] [5]. SV differs from conventional cooking in that it involves vacuum-sealed cooking at precise temperature and time parameters. This method not only reduces the risk of bacterial contamination but also inhibits the growth of anaerobic bacteria during food storage, allowing for longer shelf life and rapid post-cooking cooling. Furthermore, SV cooking preserves the flavor of food by minimizing oxidation, volatile ingredient loss, and moisture reduction [5]. SV cooking is versatile, applicable to a range of foods, including meats, poultry, fish, vegetables, and even desserts. Despite the advantages of SV cooking, a challenge in chicken jerky production is the development of undesirable dark colors during thermal processing, which can be attributed to the Maillard reaction, a chemical reaction between amino acids and reducing sugars [6]. This heat-induced reaction produces compounds that affect food color, flavor, and aroma through various stages. Factors like sugar and amino acid type, cooking temperature, food pH, and other compounds influence the rate and intensity of the Maillard reaction.

To address the issue of dark color development in chicken jerky during thermal processing, the use of natural color extracts has emerged as a viable solution. Natural colorants derived from edible sources, such as beetroot powder, paprika, and tomato powder, are considered safe for consumption, free from synthetic additives and artificial colors that may have potential health concerns [7] [8]. By incorporating natural colorants into jerky production, meat products can enhance their visual appeal, prevent discoloration issues, and maintain freshness and quality by providing vibrant and appealing colors, meeting the demands of health-conscious consumers. Moreover, the appeal of natural colorants aligns with consumers' perception of health, which is driving the demand for meat products with these ingredients. Additionally, the incorporation of purple yam,

rich in carbohydrates, proteins, fats, fiber, vitamins, minerals, and antioxidants, offers antioxidant benefits, particularly from anthocyanin compounds.

These anthocyanin and other phytochemical including polyphenols, carotenoids, dioscorins, phenolic acids indicated by purple coloring, possess strong antioxidant activity and can combat free radicals, potentially offering various health benefits, including anti-aging, anticancer, blood sugar regulation, and antihypertensive effects [9].

II. METHODOLOGY

A. Location of the Research

The experiment was conducted in the Food Science Laboratory of Sri Lanka Technological Campus (SLTC Research University), Padukka, Sri Lanka.

B. Experimental Design

TABLE 1. EXPERIMENTAL DESIGN FOR THE MARINADE

Ingredients of Marinade per 50 g of Chicken Slice	Experimental Group			
	Control	T1	T2	T3
Purple Yam Extract	-	4%	6%	8%
Salt	-	1%	1%	1%
Sugar	-	3%	3%	3%

C. Preparation of Purple Yam Powder

Purple yam was purchased from a local market in Western Province Sri Lanka. The purple yam was thoroughly washed with portable water, peeled, and then cut into thin slices. Purple yam slices were dipped in 1 % citric acid for 10 mins and blanched at 60°C for 5 mins. Purple yam slices were dried in a hot air-dry oven at 55°C for 2 hours. Then dried yam was crushed with a grinder and sieved with a 100 - mesh.

D. Preparation of Yam Extract

Purple yam flour weighed as 4%,6% and 8% according to the Table 1. Each weighed purple yam flour samples were mixed with 50 ml hot water (60°C) and kept for 16 minutes to dissolve anthocyanin pigments [10]. Then extracts were filtered using a cheesecloth.

E. Preparation of a Chicken Jerky Snack

Boneless chicken breasts were purchased from a local Supermarket in Western Province, Sri Lanka. Chicken breasts were washed and cut into 50g weighed, 5 mm thin slices in equal-weight sections.

Marinade was prepared according to the Table 1. Meat slices were mix with marinade by hand marination for 3 min and marinated for overnight at refrigerated temperature (4°C). Marinated chicken jerky samples were dried at 70°C for 4 hours using a hot air oven.

F. Sensory Evaluation

Sensory evaluation was conducted at Food Science Laboratory of SLTC Research University, Padukka with an untrained sensory panel consisting of 30 panelists. A ballot papers were given to the untrained panelist. Sensory evaluation was done for color, juiciness, flavor, tenderness and overall acceptability acceptance using a 9-point hedonic scale (ranging from 1 =Dislike extremely and 9 = Like extremely). It was done according to ISO 11136:2014 standard (11). Sensory Evaluation was performed on a white background tray and each panelist was given fresh light warm water to rinse their mouth.

III. RESULTS AND DISCUSSION

TABLE 2. RESULTS OF THE SENSORY EVALUATION

Sensory Attribute	Control	T1	T2	T3
Color	8.85±0.10 ^A	8.90±0.10 ^A	8.90±0.10 ^A	8.70±0.17 ^A
Juiciness	6.05±0.32 ^A	6.65±0.39 ^A	5.70±0.32 ^A	5.60±0.19 ^A
Flavor	5.80±0.37 ^B	7.50±0.22 ^A	6.85±0.24 ^{AB}	6.55±0.27 ^A B
Tenderness	5.80±0.33 ^A	6.70±0.40 ^A	6.65±0.25 ^A	6.45±0.25 ^A
Overall acceptability	6.70±0.24 ^B	7.85±0.26 ^A	7.10±0.25 ^{AB}	6.65±0.31 ^B

^{A-B} Mean values in the same row with different superscripts differ significantly ($p < 0.05$)

According to the results (Table 2), there were no significant differences in color between the control group jerky and the jerky prepared with purple yam powder. T1 (Purple Yam Extract 4%) jerky experimental group received the highest preference for Juiciness, Flavor, Tenderness ($p < 0.05$). Color attribute of T1 was not significantly different from the color preference ratings of T2 (Purple Yam Extract 6%) experimental group. T1 had the best overall acceptability compare to control group and other experimental groups the highest flavor score, enhancing the jerky's taste. As the purple yam powder content increased, the flavor, juiciness and tenderness gradually decreased. When high concentrated marinated meat exposed to drying it concentrate the yam extract compounds by removing excessive amount of juiciness. Tenderness also could be affected by this. This could lead to receive dry, brittle texture with low chewiness in jerky samples. This might be the reason for gradual decrement of sensory results as the purple yam powder content increased. T1 experimental group have well balanced level of yam extract which leads to balance all sensory attributes. Therefore, the addition of 4% purple yam powder to dried chicken jerky enhances its flavor without significantly affecting other sensory attributes, making it a promising option for product improvement.

IV. CONCLUSION

The study investigated the impact of adding different concentrations of purple yam powder to dried chicken jerky. The sensory evaluations revealed that the jerky with 4% purple yam powder had the highest overall acceptability score. This sample showed significantly higher flavor while

no significant differences in color, tenderness, and juiciness compared to the control group. However, as the concentration of purple yam powder increased to 8%, the overall acceptability scores decreased. Therefore, 4% concentration of purple yam powder appears to be the optimal choice for enhancing the quality attributes of dried chicken jerky.

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