

ANTIOXIDANT EFFECT OF SPRING ONION (*Allium fistulosum*) ON FRESHLY PREPARED CHEVON SUYA (TSIRE)

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ABSTRACT

This study was carried out to assess the quality of Chevron Suya (tsire) as affected by the addition of varied levels of Spring Onion (*Allium fistulosum*) leaf powder. Spring Onion powder (SOP) was added to suya spices at 5% and 10% inclusion levels (Treatment 1: Control, 2: 5% SOP and 3: 10% SOP). in a completely randomized design. Products yield (%), pH, oxidative rancidity (mg/g) and microbial load (cfu/g) were assessed on prepared Chevron Suya. Data were analysed using descriptive statistics and ANOVA at $\alpha_{0.05}$. Reduction in PY, OR, and ML was observed as the SOP inclusion level increased while pH increased with increasing SOP inclusion. Product yield was 94.8% in control Suya and 73.54% in 10% SOP Suya while Oxidative rancidity was 8.56mg/g in control Suya and 7.29mg/g in 10% SOP Suya. Microbial load decreased from 5.19cfu/g in control to 4.28cfu/g in 10% SOP Suya. The pH increased from 6.47 to 6.92. The result obtained shows that SOP has acceptable antioxidant and antimicrobial activities. SOP could be used up to 10% in spices for Chevron Suya production.

Keywords: Chevron, Suya, Spring Onion (*Allium fistulosum*), Antioxidant

INTRODUCTION

Plants contain different bioactive compounds such as carotenoids, phenolic compounds, tocopherols, carotenoids most of which have been reported to have a variety of biological effects such as antioxidant, anti-carcinogenic, anti-inflammatory, and anti-microbial activities (Ehsani *et al.*, 2017). The Allium group is one of the world's most widely cultivated vegetable groups, with their culinary and medicinal uses. Their antimicrobial activity, long recognised in folk remedies has also been validated (Malairajan *et al.*, 2006).

Suya is an intermediate moisture meat product that is easy to prepare and is highly relished. It is a traditional spicy, ready-to-eat, barbecued, smoked or roasted meat product prepared from beef, mutton or chevon (Oshibanjo *et al.*, 2019). Spring onion is a promising source of bioactive compounds such as quercetin and flavonoids that exhibit various biological activities (Ding *et al.*, 2015) which can be harnessed in meat and meat product preservation.

This study therefore assessed the quality of cheron suya (tsire) as affected by the addition of varied levels of Spring Onion (*Allium fistulosum*) leaf powder..

MATERIALS AND METHODS

EXPERIMENTAL SITE

The experiment was conducted at the Animal Products and Processing laboratory, Faculty of Agriculture, University of Jos , Plateau state, Nigeria.

PREPARATION OF SPRING ONION LEAF POWDER

Fresh Spring Onion Leaves was purchased from the Farin-Gada Market Jos, thoroughly washed with clean distilled water and dried under shade for four days to maintain their greenish colour and nutritive potency. The leaves were thereafter ground and sieved with 0.2mm fine mesh to obtain the Spring Onions leaves powder which were then stored in air tight containers and properly labelled.

MEAT PREPARATION

A mature buck was purchased, rested, stunned using physical method then slaughtered. It was hoisted, skinned and eviscerated. Carcass was cut into its primal parts and refrigerated overnight. The meat was deboned and trimmed of all connective tissues. It was cut into pieces and sliced in the same direction of the muscle fiber. Meat was staked on already tagged slender wooden sticks, meat sheets were weighed and randomly assigned into three treatments with ten replicates per treatment.

PREPARATION OF SUYA INGREDIENTS

Spices were purchased at the Jos Farin-Gada Market, Jos, Plateau State and were thoroughly mixed based on the composition stated below.

Table 1. Composition of suya ingredients with different levels of leek leaf powder

Ingredients	Control	5% SOP	10% SOP
Groundnut cake	52.00	47.00	42.00
Leaf powder	0.00	5.00	10.00
Ginger	6.00	6.00	6.00
Garlic powder	6.00	6.00	6.00
Red dried pepper	12.00	12.00	12.00
Salt	8.50	8.50	8.50
Turmeric	6.00	6.00	6.00
Maggi	7.50	7.50	7.50
Groundnut oil	2.00	2.00	2.00
TOTAL	100.00	100.00	100.00

*SOP: Spring onion powder

PREPARATION OF SUYA

The already staked meat was properly coated with the formulated ingredients (Table 1) and each treatment were labeled using a masking tape at the bottom of the sticks. The weight of each suya was determined after roasting and this was used in calculating the percentage loss and the product yield.

PARAMETERS MEASURED

pH determination

The pH was determined using a digital pH meter model PHS-25 Microfield England according to the method described by AOAC (2010)

PRODUCT YIELD

The meat was cut, weighed and roasted on a fire from wood to an internal temperature of about 72°C. Each roasted sample was cooled to room temperature, blotted dry and weighed.

$$\text{Product yield} = \frac{\text{Weight before roasting} - \text{Weight after roasting}}{\text{Weight before roasting}} \times 100$$

OXIDATIVE RANCIDITY DETERMINATION

Thiobarbituric acid value (TBA) was estimated by modified methods of Buege and Aust, (1976)

MICROBIAL LOAD DETERMINATION

Microbial count was done using pour plate method according to Harrigan W. F and McCanee M. E. (1976).

EXPERIMENTAL DESIGN

The experimental design was a completely randomized design

STATISTICAL ANALYSIS

Data collected were analyzed using General Linear Model of SAS (2019) with storage days and method as fixed factors. Statistical variations were observed and means were separated using Duncan's multiple range test.

RESULTS AND DISCUSSION

Product yield of Suya prepared with spring onion powder-based spices is presented in table 1. The control has the highest product yield of 94.8%. The product yield decreased from 84.38 to 73.54% in the Suya with the Spring onion powder as its inclusion level increased. This agrees with reports by Omojola (2008) on the yield and organoleptic characteristics of Suya prepared from three different muscles of matured bulls.. The result obtained in this study could be due to low water holding capacity of the test ingredient.

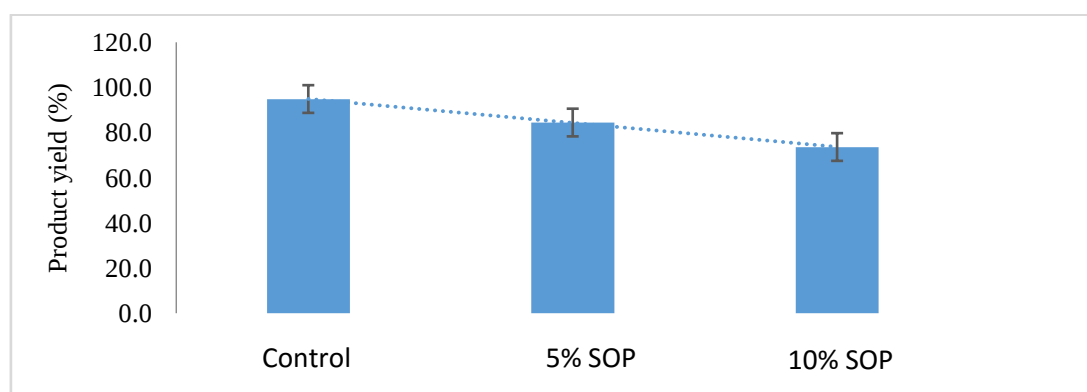


Figure 1: Product yield of Suya prepared with spring onion powder-based spices

*SOP: Spring onion powder

Figure 2 shows the physicochemical properties and microbial count of chevon Suya prepared with spring onion powder. The pH value of chevon Suya was significantly higher in 10% spring onions with least pH in the control treatment. The oxidative rancidity ranged from 7.29 to 8.56 mg/g. This result shows that as the inclusion level of Spring Onion increased, the oxidative rancidity values decreased. This could be due to the antioxidant activity and phytochemical substance presence in the spring onion.

Oxidative rancidity value determines the extent of lipid oxidation. Results on oxidative rancidity of this study is similar to reports by Magra *et al.* (2006) and Zaki *et al.*, (2018). There was significant difference ($p < 0.05$) in Aerobic bacteria count (CFU/g) among the treatment with the control having the highest value (5.19 CFU/g) and 10% spring onion having the least value (4.28 CFU/g). Total aerobic plate counts for chevon suya treated with spring onion powder are acceptable when compared to suggested range of 2.5×10^5 - 1.0×10^8 CFU/g by Pearson (1996) as cited by Fakolade (2012). The result obtained in this study could be due to the antimicrobial activity and the phenols presence in the tested ingredient.

CONCLUSION

Spring onion powder could be added to spices used in Suya production up to 10% because of its high antioxidant and antimicrobial properties

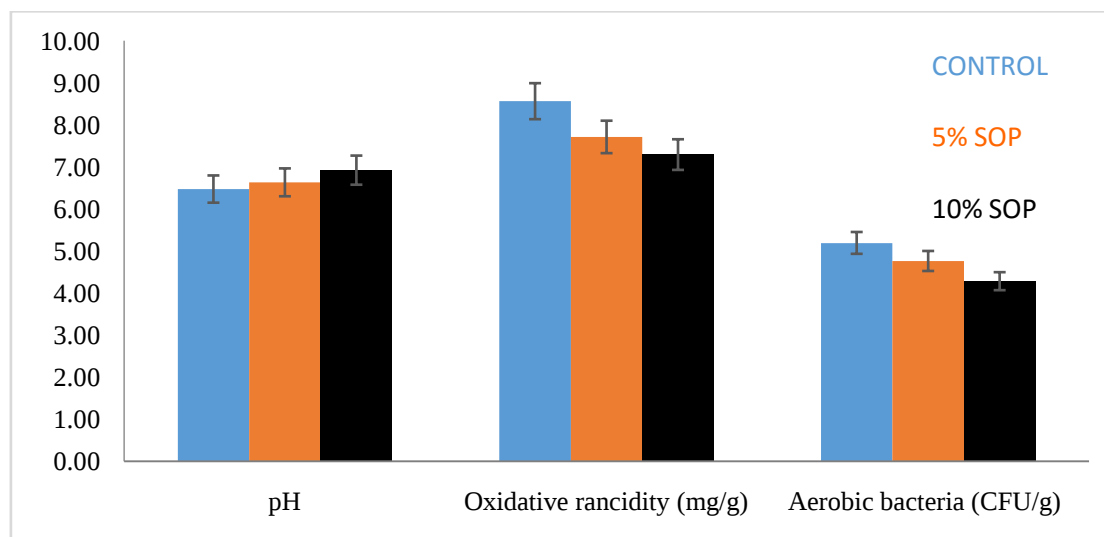


Figure 2: physicochemical and microbial count of chevon Suya prepared with natural antioxidant
*SOP: Spring onion powder

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