



Production of Traditional Swallow Blends from Cucumber, Carrot and Broccoli with Corn Flour

¹Onaolapo, Tosin Tunde, ²Ezekiel Samson Oluwasegun, ³Thomas-Buoro, Glory Rejoice, ⁴Faborode, Michael Busola, ⁵Alebiosu, Ibidayo, A

¹Department of Nutrition and Dietetics, Mo-shood Abiola Polytechnic

²Research Department, NSIA-LUTH Cancer Centre ³Nutrition Unit, Naxa Wellness Clinic

⁴Nutrition Unit, Bola Ahmed Tinubu Primary Healthcare Centre

⁵Department of Human Nutrition and Dietetics, Afé Babalola University, Ado Ekiti

*Corresponding author Email:

ezekielsamson26@gmail.com

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Competing Interests.

The authors declare no competing interests.

ABSTRACT

Background: Swallow meals in Nigeria are usually starchy as they are very high in carbohydrate and eaten with different kinds of soups. **Objectives:** The study was carried out to determine the acceptability of traditional swallow produced from cucumber, carrot, and broccoli with corn flour blend at different ratios of sample A (70% cucumber & 30% corn flour), sample B (90% carrot & 10% corn flour) and sample C (65% broccoli & 35% corn flour) was evaluated. **Methods:** The samples were subjected to sensory evaluation using the 9-point hedonic scale with 1 and 9 expressed as dislike extremely and like extremely. The data collected was statistically analyzed with analysis of variance (ANOVA) to test for significant differences among means ($P \leq 0.05$) using Statistical Package for Social Science (SPSS) version 22. **Results:** It was revealed that presence of carrot increased the value of colour, texture, and flavor in sample B while presence of broccoli increased the value of taste. There was no significant ($P < 0.05$) difference among samples in color, texture, taste, flavor, and overall acceptability. Sample C was more acceptable to the panelists. **Conclusion:** The study has shown that traditional swallow can be produced from cheap and locally available vegetables. It can be recommended for overweight and obese patients.

Keywords: Swallow; Carrot; Broccoli; Cucumber; Vegetables

1. Introduction

In Nigeria, Swallow is a popular traditional dish, aptly named because it's meant to be swallowed rather than chewed. Generally, Swallow is enjoyed with various types of soup. Nigeria is known to have varieties of traditional Swallows, such as eba, semovita, amala, pounded yam, akpu (fufu), tuwo shinkafa, and wheat (Okechukwu-Ezike and Oly-Alawuba, 2019).

Carrot (*Daucus carota*) is a small delicious root vegetable. Evidence has shown that carrot is commonly known as rich source of beta carotene, a precursor of vitamin A. Furthermore, it is an essential source of vitamin and minerals, and also a rich source of phytochemicals, such as flavonoids and polyacetylenes which are essential for good health (Aderinola and Abaire, 2019).

Cucumber (*Cucumissativus*) is a commonly cultivated plant within the gourd family, Cucurbitaceae. It is characterized by its creeping vine nature and produces cucumber-shaped fruits that are commonly consumed as vegetables. There are three primary varieties of cucumber: slicing,

pickling, and seedless, with several cultivars developed within each category. In North America, the term "wild cucumber" typically refers to plants in the Echinocystis and Marah genera, although they are not closely related to cultivated cucumbers. Originating from South Asia, cucumbers are now grown on nearly every continent, with many different types traded globally (Chomicki et al., 2020). Despite its common consumption, peeled raw cucumber is composed mainly of water, with 100 grams providing 95% water, 16 kilocalories of energy, and containing low levels of essential nutrients. It is the only primary source of vitamin K supplying approximately 16% of daily value (United States Department of Agriculture, 2016).

Broccoli, a member of the cabbage family, is a green, edible plant prized for its large flowering head, which is commonly consumed as a vegetable. Stansell and Bjorkman (2020) revealed that the term "broccoli" originates from the Italian word broccoli, meaning "the flowering crest of a cabbage," derived from the diminutive form of brocco, meaning "small

nail” or “sprout.” Broccoli is flexible and can be enjoyed boiled, steamed, or even raw. Broccoli is one of the healthiest vegetables due to its abundant nutritional content. Its large, nutritious head is a popular choice among health-conscious individuals.

Traditional swallow dishes commonly consumed in Nigeria are typically low in protein and micronutrients but high in carbohydrates. This study on traditional swallow made from vegetables aims to mitigate the risk of developing certain diseases and health disorders associated with excessive carbohydrate consumption. This study aims to explore the production and acceptability of traditional swallow blends from cucumber, carrot, and broccoli with corn flour.

2. MATERIALS AND METHOD

2.1. Source of materials

The materials and ingredients required for preparing the formulated traditional swallow were procured from Kasuwa-birshi and Bakin-dogo markets situated in Kaduna, Kaduna State.

Preparation of traditional swallow

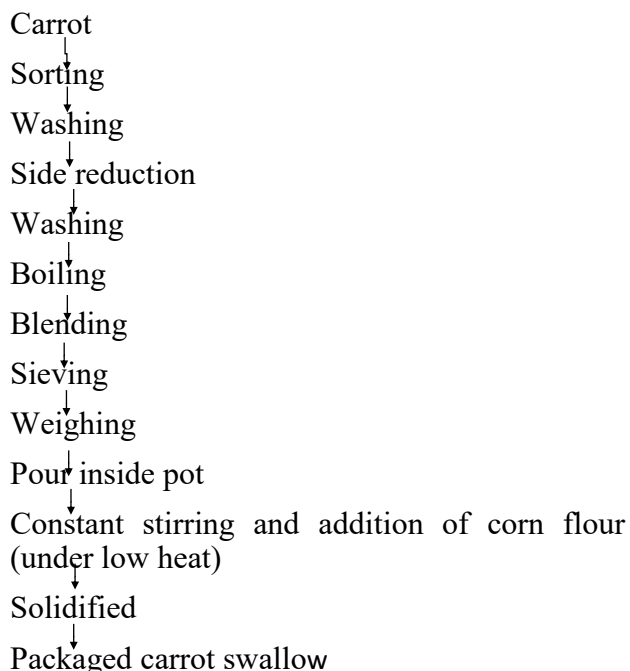


Fig 1: Flow charts for the production of carrot swallow **Source:** Ihekoronye A.I., Ngoddy P.O (1985)

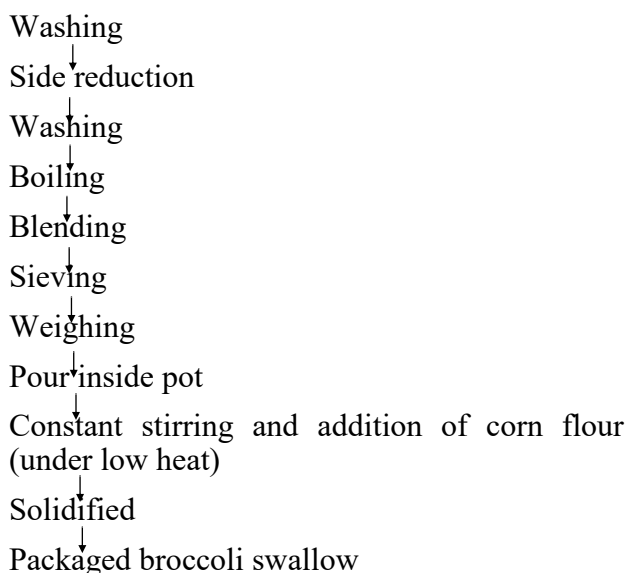
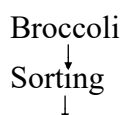


Fig 2: Flow charts for the production of broccoli swallow. **Source:** Ihekoronye A.I., Ngoddy P.O (1985).

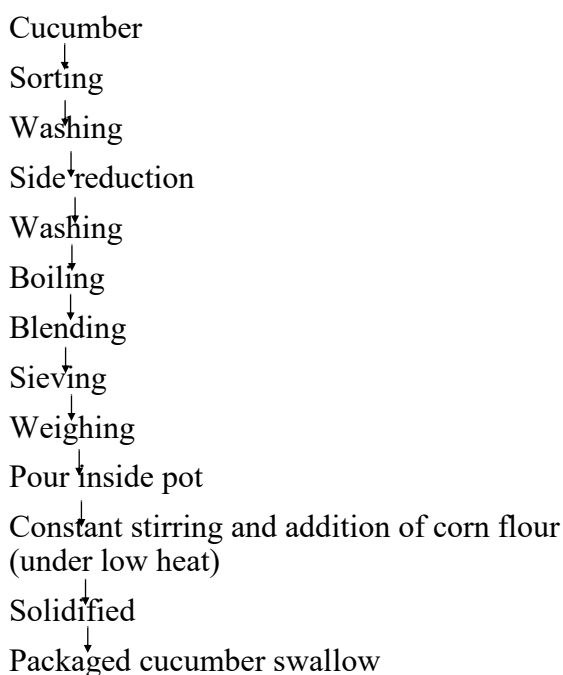


Fig 3: Flow charts for the production of cucumber swallow. **Source:** Ihekoronye A.I., Ngoddy P.O (1985).

Sensory Evaluation

The sensory evaluation of the traditional swallow samples aimed to determine consumer acceptance and preference. It involved 20 untrained panelists selected randomly from students at Kaduna Polytechnic, Kaduna State. A 9-point hedonic scale guidelines was employed for assessment, where 1 indicated “dislike extremely” and 9 indicated “like

Table 1. Recipe formulation for the cucumber, carrot and broccoli with corn flour

Sample	Cucumber	Carrot	Broccoli	Corn flour
A	70%			30%
B		90%		10%
C			65%	35%

Table 2: Sensory evaluation of the prepared traditional swallow

Sample	Colour	Texture	Taste	Flavor	Overall acceptability
A	6.90±0.99 ^a	5.70±1.34 ^a	7.00±1.05 ^a	6.00±1.49 ^a	7.30±1.06 ^a
B	7.60±1.65 ^a	6.90±1.20 ^a	7.10±1.37 ^a	7.00±1.41 ^a	7.30±1.34 ^a
C	7.10±2.13 ^a	6.80±1.55 ^a	7.30±1.49 ^a	6.60±1.35 ^a	7.50±1.080 ^a

extremely” (Ivo *et al.*, 2024). Each panelist received three coded samples of the traditional swallow, labeled A-C, and was tasked with evaluating the quality attributes such as color, texture, taste, flavor, consistency, and overall acceptability. The panelists were assigned appropriate scores and ratings for each sample based on their perceptions. The recipe comprises of cucumber, carrot and broccoli with corn flour as shown in Table 1.

2.2. Statistical Analysis

The collected data were subjected to Analysis of Variance (ANOVA) using the Statistical Package for Social Science version 22. This analysis aimed to determine any significant differences among means, with a significant level set at $P \leq 0.05$.

3. Results and Discussion

The sensory evaluation of the food samples in this study has no significant difference ($p > 0.05$) in terms of taste, texture, colour, flavour, and even overall acceptability, which may be due to the same cooking method adopted for the production.

The colour mean values obtained ranged from 6.90-7.60. The highest value observed from sample B (90% carrot and 10% corn flour) maybe as a result of presence of beta-carotene which is responsible for the bright orange colour of the food sample. Carrot play an important role

for maintaining healthy vision, boosting the immune system, supporting cell growth, reduce the risk of chronic diseases such as high blood pressure (hypertension) and cancer (Miller and Snyder, 2019).

The mean and standard deviation for texture were obtained as 5.70±1.34, 6.90±1.20 and 6.80±1.55 for sample A, B & C respectively. The highest value obtained from sample B (90% carrot & 10% corn flour) may be a result of presence of 10% corn flour substitution which affected the texture of the sample B. There was no significance difference ($P > 0.05$) in texture. This study values within 2.50 – 7.90 reported by Okechukwu-Ezike and Oly-Alawuba (2019) for traditional swallow from blends of acha, fluted pumpkin seed and soybean flours.

Taste plays a crucial role in the acceptability of any food product among consumers. Increase in the level of corn flour substitution increased the value of taste. Sample C (65% broccoli & 35% corn flour) had the highest mean value (7.30) for taste may be due to factors such as iso-thiocyanates and polyphenols which are likely involved in the taste perception in broccoli (Bell *et al.*, 2018). Broccoli is an essential source of vitamin C and vitamin K which play crucial role in preventing neo-natal hemorrhage and scurvy. Sample B (90% carrot 10% corn flour) had the highest mean score (7.00) in terms of flavour.

Overall acceptability revealed that sample C (65

% broccoli & 35% corn flour) was the most favored by the panelists, followed by sample B (90% carrot & 10% corn flour), and then sample A (70% cucumber & 30% corn flour). However, despite these differences in preference, there was no significant distinction ($p>0.05$) in overall acceptability among the samples.

4. Conclusion

This study has shown that traditional swallow can be prepared at household levels from cheap and locally available vegetables. It can be recommended to prevent and reduce micronutrient deficiency (Hidden hunger). The sensory attributes of the traditional swallow revealed that sample C was more accepted.

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