RESEARCH PROPOSAL

ON

UPGRADING THE INDIGENOUS TECHNOLOGY FOR THE PRODUCTION OF COWPEA CHIPS SNACKS

FOOD TECHNOLOGY DEPARTMENT

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1.0 INTRODUCTION

Snacking is defined as eating meals in between regular meals, taking into account both the amount of food consumed and the time elapsed between meals (Field *et al*., 2004). Snack foods are usually smaller or less structured meals often taken at random in between main meals to appease hunger. They are essential vehicles for delivery of essential nutrients because of the growing change in eating habits (Henshaw and Agunbiade, 2004).

In today's society, snacking contributes close to onethird of daily energy intake, with many snacks consisting of energy-dense and nutrient poor foods (Njike *et al.*, 2013). Whatever the consumption patterns are, there is a need to differentiate between snacks and meals to determine their specific roles in recommended dietary intake and general impact on health and well-being. Consumers eating habits could change as a result of different factors which include; type and schedule of occupation, location, purchasing power of different individuals among others.

Consumption of healthy snacks has not been consistent across the globe, and nutrient-poor and energy-dense snacks is regarded as unhealthy and should be discouraged as much as possible. This has prompted the development of healthy snacks which is determined by the nutrients it supplies and the amount of contributing nutrients to the RDA. Healthy snacks should be such that contains more of vegetable and fruits, whole grains as well as pulses and nuts and should contain less of fats, salts and refined sugars.

Cowpea (*Vigna unguiculata*) is a leguminous crop that provides high quality proteins for humans and also rich fodder for animal feed. It has a protein content ranging between (18 – 30%). Cowpea is generally characterized by high quality protein and carbohydrate content with a low-fat content and a complementary amino acid pattern rich in lysine and tryptophan while methionine and cysteine which is deficient can be made up from cereals or tubers when combining foods. Cowpea

also contains an appreciable amount of soluble and insoluble dietary fibre, phytochemicals as well as peptides which are beneficial to humans (Jayathilake *et al*., 2018).

The United States Food and Drug Administration (FDA) estimates that an average adult requires 50g of protein per day while children of different age groups require 18 – 35g of protein daily (USFDA 2021). These values are yet to be met as malnutrition in still largely prevalent in our society. Hence, development of meals (snacks) from cowpea can be used to alleviate this malnutrition challenge and be given to combatant soldiers and citizens in IDP camps.

1.1 JUSTTIFICATION

The global income generated from snacks was put at 450billion USD in 2023, and most of these snacks are wheat-based snacks (Conway 2024). Wheat utilization in Nigeria is largely dependent on importation as the crop is not native to Nigeria. Wheat also poses a health risk for some consumers who are gluten intolerant. Therefore, development of snacks from cowpea will greatly assist in conserving foreign exchange by reducing cost accrued from wheat importation and also reduce ailments associated with consumption of wheat.

As at 2021, the global production of cowpea was 7.5milliom metric tonnes per annum and Africa produces 90% of this estimated volume (FAO, 2021). Nigeria is the leading producer of cowpea in the world producing about 45% of the world's production output of about 3.36million metric tonnes per annum (FAOSTAT, 2021). 75% of cowpea production within the country comes mainly from the North-West and North-East states which include, Kaduna, Katsina, Gombe, Kebbi, Borno, Adamawa, Sokoto, Jigawa etc. Hence, utilization of cowpea for industrial value-added nutritious products will enhance the value chain of cowpea.

Nutritionally, cowpea contains about 18 – 30% protein, 30 – 60% Carbohydrate, 19 – 30% dietary fibre and 1 – 3% fat (Ibrahim et al., 2010). Cowpea contains a large amount of soluble and insoluble dietary fibre which has the potential for maintaining a healthy microbial gut (Ngoma et al., 2018). Cowpea is also rich in bioactive components such as flavonoids and phenolics which impact directly and indirectly on oxidative stress (Awika and Duodu, 2017). Consumption of such snacks from cowpea results to improved health for consumers.

In 2022, the United Nations (UN) reported that between 691 – 738 million people faced hunger, with about 2.4billion people experiencing moderate or severe food insecurity while over 3.1billion people could not afford a healthy diet (UN, 2022). The protein content and quality of cowpea is double that found in most cereals and tubers, and it remains a good source of amino acids such as lysine and tryptophan.

1.2 GENERAL OBJECTIVES

The general objective of project is to optimization and conduct storage studies on the optimized snacks

1.3 SPECIFIC OBJECTIVES

The specific objectives are to;

1. Optimized the process conditions (frying time and temperature) for the production of optimized cowpea snacks samples using design expert software package.
2. Analyzed the optimized sample.
3. Carry out storage studies of the optimized samples
4. Production of sizable number of well packaged cowpea snacks.

2.0 MATERIALS AND METHODS

2.1 Materials: The materials (cowpea varieties, vegetable oil and seasoning) were purchased from Mushin market.

2.2 Methodology:

Lagos variety of white cowpea beans was used for the this investigation.

2.3 Analysis

A. Optimization Studies – (Design expert software package) Would be used to optimized the process conditions

Analysis

1. Proximate and mineral analysis (Moisture, fat, protein, fibre, ash, carbohydrates – AOAC,2006)
2. Colour properties (Anyasi *et al.,* 2017)
3. Texture properties (Khem *et al.,* 2013)

B. Storage studies

1. Proximate analysis (Moisture, fat, protein, fibre, ash, carbohydrates – AOAC,2006)
2. Oxidative tests (Free fatty acids FFA, Peroxide value (PV), TBA – AOAC, 2000)
3. Microbial Analysis
4. Consumer preference (sensory evaluation) to determine the acceptance of cowpea snacks

DRUM VARIETY

OLOYIN VARIETY

IRON VARRIETY

LAGOS VARIETY

GOMBE VARIETY

Plate 1: Different varieties of cowpea (Brown and white) available in open market

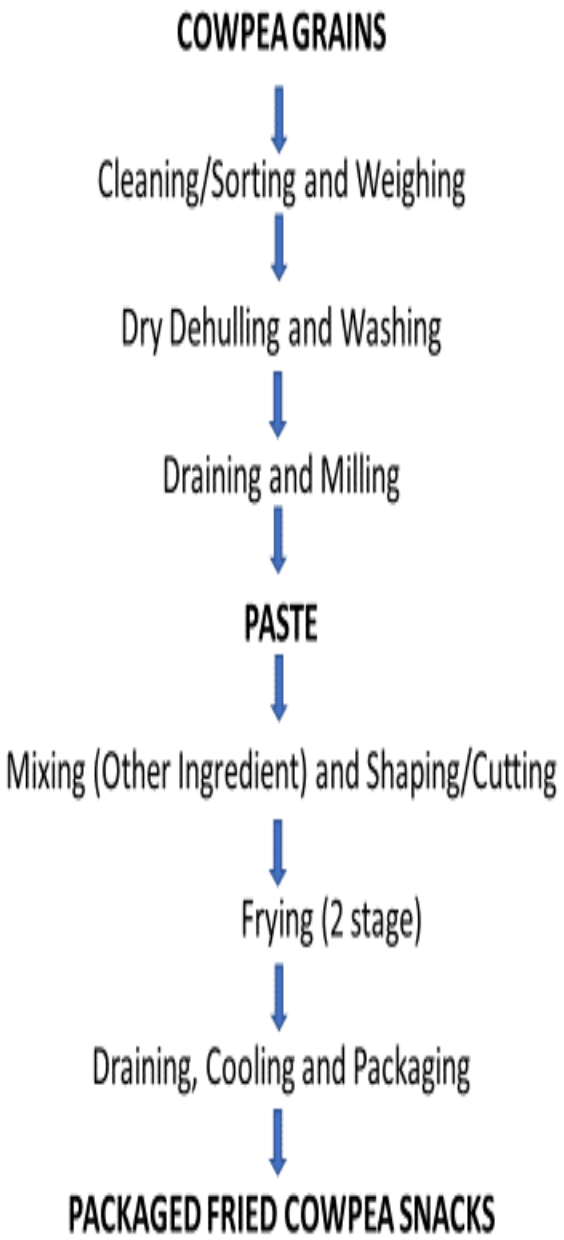

Fig 1: Production of fried