

“Preparation of Multi-Flour Sticks”

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Abstract –

Now day's variety of fast food is available in the market. But according to information collected from various internet sources it is revealed and also well known that fast food is rich in fat which is not good for health and ultimately leads to obesity. Hence an effort was made to develop ready-to-eat fast food & a healthy snack multi-flour sticks rich in nutrient particularly protein and carbohydrate for combating malnutrition. At the same time product was also developed with the aim of creating and addition to the diet menu of health conscious people. The traditional recipe of “chakali” was modified with the addition of soya flour in varying ratio with rice flour keeping black gram flour and Bengal gram flour percentage constant; sensory analysis of the product was carried out the result of which favored the sample containing 25% soya flour with 39% rice flour. Chemical analysis of the product was also done which reveals that it is a rich source of protein, calcium and also carbohydrate, also it has a low fat content it is baked and is also low in sodium. Hence according to chemical analysis the product fulfills all the objectives such as combating malnutrition as well as is a healthy food with the view of obesity.

Key Words: *Malnutrition, Fast Food, Chakali, Combating, Chemical Analysis.*

1. INTRODUCTION

The busy lifestyle and high living standards as well as the health related problems in developing countries like India such as Obesity and Malnutrition we thought of developing a product rich in fiber, protein and carbohydrate at the same time low in fat and sodium. OBESITY is known as a medical condition in which excess amount of fat is accumulated in a person's body. People are generally considered obese when their body mass index (BMI) is above 30 kg/m², or in the range of 25–30 kg/m² and are categorized as overweight. BMI is a measurement ratio of a person's weight by the

square of the person's height. Some East Asian countries may have lower values of BMI. Various diseases can be caused due to obesity, which include Cardio-vascular diseases, type 2 diabetes obstructive sleep apnea, certain types of cancer, osteoarthritis and depression. MALNUTRITION-An all-inclusive term that represents all manifestations of poor nutrition. It can mean any or all forms of under nutrition, overweight and obesity. Thus considering the above two day-to-day evolving problems we thought of making a product which would help in reducing them.

Multi-Flour Sticks made up of grains, some legumes and oilseeds. The main ingredients of the baked sticks included rice flour, black gram flour, Bengal gram flour and most importantly defatted soybean flour along with spices for great flavor. Edible seeds are also included in its preparation, such as sesame seeds.

1.1 Justification

The main aim of making these baked sticks was to produce a low cost nutritious RTE product that will be convenient for the consumers to carry anywhere, anytime. The product is Rich in nutrients like protein and carbohydrate which will help to eradicate malnutrition- one of the major problems in our country and also it is a low cost food so people of all economic standards can easily buy and consume it. In this busy lifestyle people don't have time to look after their health and consume junk food filled with fat which increases the cholesterol level in our body leading to many diseases. So our attempt was just to produce a healthy food that will be easily available to the consumer. Baking was preferred over frying to avoid excess of oil and make a healthy product considering health conscious people.

1.1 Health Benefits:

- I. High nutritional content
- II. High calorific value
- III. Easily digestible and palatable

1.2 Justification:

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2. Materials and Methodology:

To prepare Multi-Flour Sticks one will need ingredients like rice flour, black gram flour, Bengal gram flour, defatted Soybean flour, Sesame seeds, Spices like Ajowan, Cumin Seeds, Chilli powder, Turmeric, Garlic and Salt. All the ingredients must be certified by FSSAI mark along with AGMARK certification for agricultural products.

2.1 Processing Equipment:

Process equipment means equipment required when using physical or chemical methods for mechanical and/or thermal treatment or processing of a raw material or product. It includes Digital Weighing Balance, Mixer grinder/ Processor, Baking Oven, Extruder, Grinding Mill, Digital Thermometer.

The utensils required for the preparation of Multi-Flour sticks are plates, spoons, karhai, etc.

2.2 Analyzing Equipment:

For the formulation and preparation of Soybean milk blended with peanut milk, there is requirement of Soxhlet apparatus for fat estimation, Kjeldhal's apparatus for protein estimation, Muffle furnace for Ash estimation, Digital pH meter for measuring the pH of the sample, Laminar Air Flow for the determination of T.P.C. count, Incubator for the incubation of T.P.C. plates, Water bath for the estimation of Crude fiber.

Glass wares including Petri plates, glass bottles, burette, baker, volumetric flask, glass rod, pipette, silica crucible and measuring cylinder. These glass wares are used during analysis of product.

2.3 Product Manufacturing Process:

We have taken five trials with ingredients Bengal gram flour and Black gram flour being constant and changing the proportion of Rice flour and Soy flour. Edible seeds like sesame seeds and spices like ajwain, jeera, turmeric, red chilli powder and garlic powder were added for flavor with salt for taste and balancing the flavor. Baking soda was also added for proper baking of the sticks. Further all the ingredients were mixed with the help of dough mixer and dough was formed with addition of hot water and oil. Once the dough was formed it was left for leavening for about 5-10 mins. and after that it was filled in extruder to give a definite shape to the dough and sticks were prepared. Further baking was done in oven at 150-160°C for 25-30 min. The five samples made were : S0 being the control sample having proportion of rice flour, black gram flour and Bengal gram flour as 52:24:24; Then S₁ sample having the proportion of the above three flours with soy flour as 44:18:18:20; S₂ sample having the proportion as 39:18:18:25; S₃ sample having the proportion 34:18:18:30 and S₄ sample having the proportion 29:18:18:35. After the samples were baked sensory analysis was done on the basis of 9 point hedonic scale. Soy flour addition was started from 20% to satisfy the objective of obtaining nutritious product and soy flour is rich in protein. S₄ sample with 35% Soy flour had great taste but it lacked in texture so further addition of Soy flour was not considered as maintaining texture would be a problem.

3. Proximate Analysis and Quality Control:

3.1 Proximate Analysis:

3.1.1 Estimation of Protein (By Micro-Kjeldhal Method):

| | | |
|-----|---|--|
| | | (sample - blank N of HCL Vol. of digest 0.014) |
| % N | = | ----- |
| | | Aliquot taken Wt. of sample |

3.1.2 Estimation of Carbohydrate: (By Calculation Method)

Carbohydrate is evaluated by formula.

$$\% \text{ Carb.} = \frac{\text{(Weight in gram all protein + fat + ash + moisture) S in to 100 g of sample.}}{\text{Weight of sample}} \times 100$$

3.1.3 Estimation of Energy: (By Calculation)

$$\text{Energy (Kcal)} = \text{Protein (g)} \times 4 + \text{Fat(g)} + \text{Carbohydrate (g)} \times 4$$

3.1.4 Determination of Fat (By Soxhlet Method)

$$\% \text{ Fat} = \frac{\text{Sample B-C}}{\text{Sample A}} \times 100$$

3.1.5 Determination of Ash (By Muffle Furnace)

$$\% \text{ Ash} = \frac{(W3-W1)}{(W2-W1)} \times 100$$

3.1.6 Determination of vitamin A (By Colorimetric method)

The colorimetric method involves adding a chromogenic reagent to a volume of solubilized fortified food sample.

3.1.7 Estimation of Calcium:

$$\% \text{ calcium} = \frac{\text{B.R.} \times 0.02 \times 20 \times 1000}{\text{Volume of Sample}}$$

3.1.8 Determination of Moisture:

$$\% \text{ Moisture Content} = \frac{\text{Initial Wt.} - \text{Final Wt.}}{\text{Wt. of Sample}} \times 100$$

3.1.9 Determination of Crude Fiber:

$$\% \text{ Crude Fiber} = \frac{\text{Loss in wt. in ignition} [(W2-W1)-(W3-W1)]}{\text{Wt. of Sample}} \times 100$$

3.1.10 Determination of Total Plate Count (T.P.C.)

To poured plates are prepared using a specified culture media and a specified quantity of the test sample. The number of microorganisms per mm of per g of sample is calculated from the number of colonies obtain on selected place.

3.2 Quality Control:

3.2.1 Raw material quality control:

Before buying raw material in bulk, food manufacture generally buying sample to make sure it fulfills the factory's specifications. Raw materials examined for different parameters and it carries with nature and type of ingredients.

3.2.2 Process Control:

All treatments given during processing are standardized, ingredients used in correct amounts, accurate methods of preparation and mixing are employed, and checks are made on the containers used to make sure that they are sound. Satisfactory hygienic conditions are also maintained during processing.

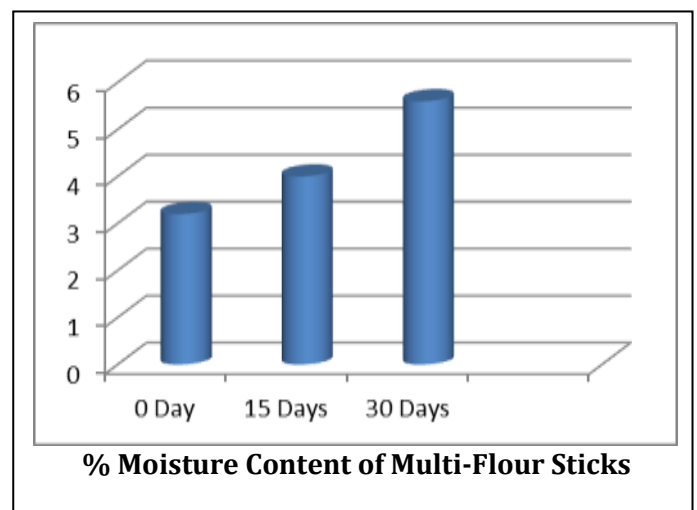
3.2.3 Inspection of finished product:

It is carried out to determine to what extent the desired quality specifications have been achieved. Some tests are performed to check certain properties which are related to palatability and acceptable.

4. Results and Discussion:

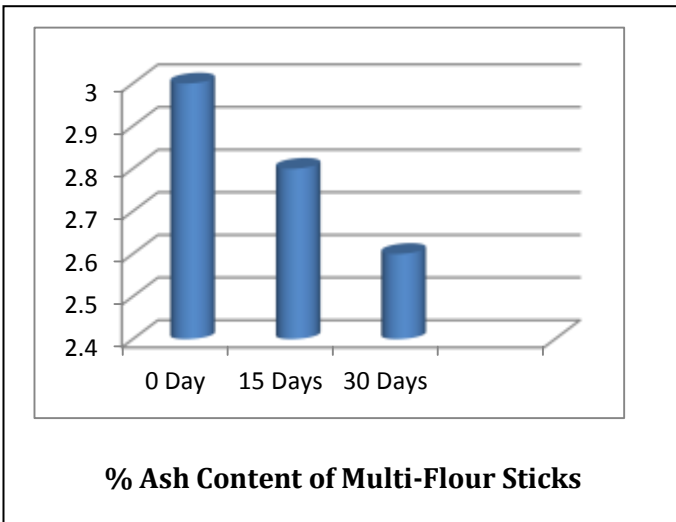
4.1 Effect of storage on Moisture content of Multi-Flour Sticks:

| Duration | Storage Period (Days) | | |
|------------------|-----------------------|---------|---------|
| | 0 Day | 15 Days | 30 Days |
| Moisture Content | 3.2 | 4.0 | 5.6 |



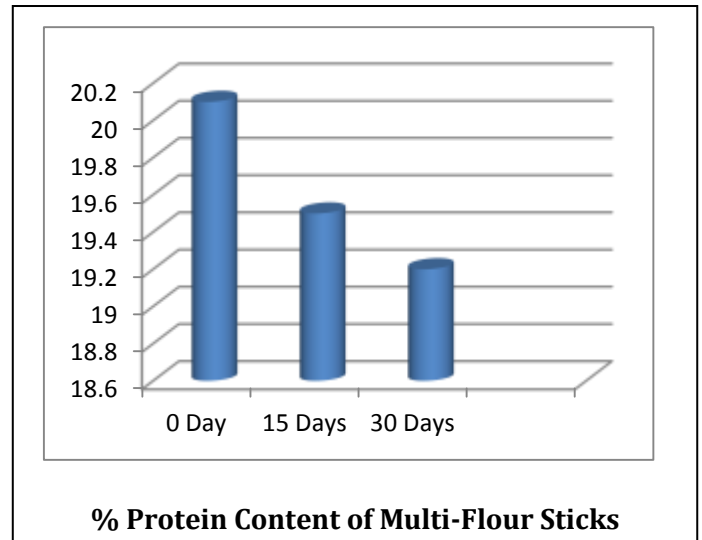
4.2 Effect of storage on Ash content of Multi-Flour Sticks:

| | Storage Period (Days) | | |
|-------------|-----------------------|---------|---------|
| Duration | 0 Day | 15 Days | 30 Days |
| Ash Content | 3.0 | 2.8 | 2.6 |



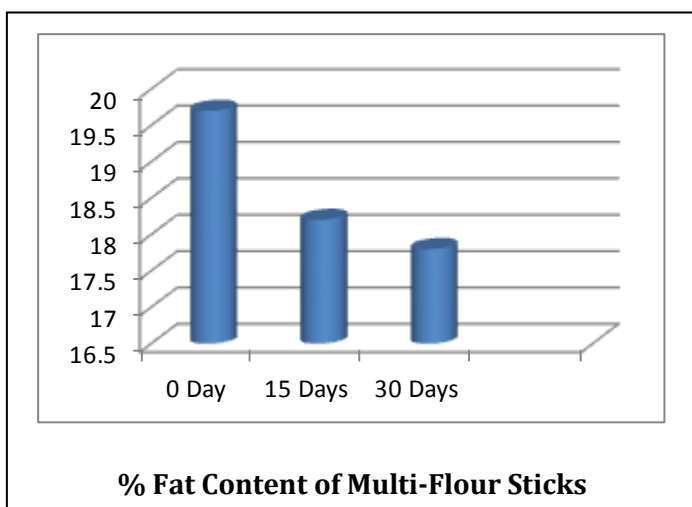
4.4 Effect of Storage on Protein Content of Multi-Flour Sticks:

| | Storage Period (Days) | | |
|-----------------|-----------------------|---------|---------|
| Duration | 0 Day | 15 Days | 30 Days |
| Protein Content | 20.1 | 19.5 | 19.2 |



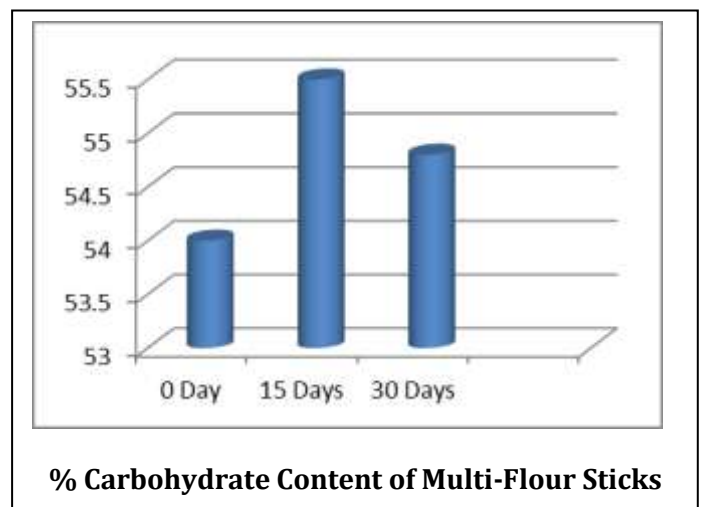
4.3 Effect of Storage on Fat Content of Multi-Flour Sticks:

| | Storage Period (Days) | | |
|-------------|-----------------------|---------|---------|
| Duration | 0 Day | 15 Days | 30 Days |
| Fat Content | 19.7 | 18.2 | 17.8 |



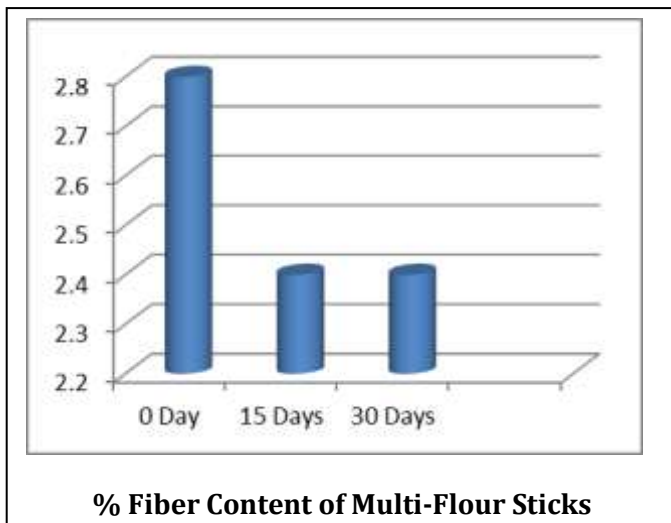
4.5 Effect of Storage on Carbohydrate Content of Multi-Flour Sticks:

| | Storage Period (Days) | | |
|----------------------|-----------------------|---------|---------|
| Duration | 0 Day | 15 Days | 30 Days |
| Carbohydrate Content | 54.0 | 55.5 | 54.8 |



4.6 Effect of Storage on Fiber Content of Multi- Flour Sticks:

| Duration | Storage Period (Days) | | |
|---------------|-----------------------|---------|---------|
| | 0 Day | 15 Days | 30 Days |
| Fiber Content | 2.8 | 2.4 | 2.4 |



4.7 Packaging and Labeling:

Packaging can be defined as a socio-scientific discipline which operates in society to ensure delivery of goods to the ultimate consumer of these goods in the best condition intended for their use. A package provides protection, tempering resistance and special physical, chemical or biological needs. It may bear a nutrition facts label and other information about food being offered for sale.

Function of packaging:-

Physical protection, Barrier protection, Information, Marketing, Security and Convenience.

The most common material used in packaging are; Plastics, Paper/Board, Metals, Glass, Wood. Commercially available cardboard box is made from cellulose or wood fiber.

We have selected the P.E.T. (Poly Ethylene Terephthalate) bottles for the packaging of Multi-Flour Sticks.

Objectives of Packaging:

They provide physical protection, Barrier protection, Information transmission, Convenience.

4.7.1 Labeling:

Labeling is most important to attract consumers. It plays important role in marketing of product. It should be attractive, colorful, having lots of graphics, picture with label. Labeling contains the following information:

Logo, Brand Name, Product Name, Nutritional information, List of ingredients, Net weight (when packaged), Max. Retail price (MRP), Manufactured by, Date of Mfg., Expiry Date.

5. Conclusion:

As it is important to have innovation in the product it should be necessary to take no. of trials to get final perfect recipe. We went through three different samples with 20%, 25%, 30% and 35% of Soy flour respectively. When samples were analyzed for sensory by panel then 25% Multi-Flour Sticks were more acceptable as it has good taste and texture. In bakery department, working in baking oven and handling of other equipment is also important. Chemical analysis of the product was also done which reveals that it is a rich source of protein, calcium and also carbohydrate, also it has a low fat content it is baked and is also low in sodium

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