

Formulation and quality evaluation of Multigrain Nutra-chikki**Sachin B. Somwanshi¹, Shital Godase², Chaitali Avhad³**¹Associate Professor, Department of Pharmaceutics,

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^{2,3}Department of Pharmaceutics, PRES's, College of Pharmacy
(For Women), Chincholi, Nashik, Maharashtra, India**Abstract**

An organism assimilates food and utilises it for development and maintenance through the process of nutrition, which is an organic process of nourishing or being fed. The study of food and drink in humans is a field of science that provides sources of nutrients for the body. Nutrition is the process of giving the materials required for life in the form of food to cells and organisms. A healthy diet can prevent or treat a number of common health issues.

Chikki a traditional candy delicacy created with groundnut and jaggery is enjoyed by people of all age group in India. An attempt was made to improve its nutritional quality by developing a multigrain Nutra-chikki with pumpkin seed, fennel seed and peanut, and the nutritional assessment were evaluated. The prepared multigrain Nutra-chikki was also organoleptically assessed using a sensory affective hedonic scale.

The results indicates that multigrain Nutra-chikki comprises of protein 14.78 g, fat 16.6 g, and minerals like iron 9.67 mg, calcium 269.9 mg which is nutritionally superior to groundnut chikki. It also showed acceptable sensory score of 8.3 for overall characteristics against groundnut chikki.

Keywords: *Nutraceutical, Chikki, Pumpkin, Fennel, Peanut.*

Introduction

The term "nutraceutical" is a combination of "nutrition" and "pharmaceutical." Nutraceuticals, broadly speaking, are foods or components of foods that significantly alter and maintain the normal physiological processes that support healthy human beings. The food products used as nutraceuticals can be categorised as dietary fibre, prebiotics, probiotics, polyunsaturated fatty acids, antioxidants and other different types of herbal natural foods. These dietary supplements are used to treat a number of illnesses, including diabetes, cholesterol, osteoporosis, cancer, obesity, and cardiovascular disease. Overall, "nutraceutical" has ushered in a new era of medicine and health, one in which the food industry has evolved into a field focused on research. This article aims to educate readers on the benefits of dietary supplements for treating a variety of diseases.¹

The global market for nutraceuticals, which include herbal and dietary supplements, is expanding quickly and is already worth more than \$100 billion USD. Curcumin from turmeric, glucosamine from ginseng, and omega-3 fatty acids from linseed are a few of the popular plant-derived (herbal) nutraceuticals.²

Pumpkins seeds are produced all over the world as a vegetable and medicine.³ Pumpkin seeds are rich in antioxidants, healthy fats, and minerals. Possible benefits of eating pumpkin seeds include boosting bone health, sexual wellbeing, and the immune system.^{4,5} It also contains a lot of different amino acids, carotenoids, dietary fiber, vitamins, and minerals. It is a very effective health supplement as a result.⁶

The dried form of fennel, known as saunf, is a storehouse of essential nutrients. Low in calories and high in vitamin C, saunf seeds support the immune system, promote the creation of collagen, and act as a strong antioxidant that scavenges free radicals. Fennel seeds, which are high in manganese, stimulate metabolism, activate enzymes, control blood sugar, and build bones. In addition to these, significant amounts of selenium, calcium, magnesium, potassium, and iron support skin health, regulate blood pressure, and treat anaemia.^{7,8}

Thus present study was developed with the intention of incorporating these multigrains such as pumpkin seeds, fennel seeds and peanuts as nutritional source to the traditional Indian sweet jaggery based chikki, which is popular throughout the country and consumed by all the sections of the population.

Materials And Method:**Materials used:****1. Pumpkin seeds:**

Pumpkin seeds are a nutrient-dense food that has also demonstrated several medical benefits. It has 2gms of protein, 2gms of fat, and 7 gm of carbohydrates. The seed may be used as a dietary supplement since it contains a high quantity of macro elements (magnesium, phosphorus, and calcium) and a moderate amount of micro elements (calcium, manganese, copper, and zinc)⁸.

2. Jaggery:

Traditional Indian sweetener known as jaggery is both readily available and nutritive. The macronutrients included in jaggery provide a variety of health benefits, including antitoxin and

anticancer properties. It has been shown to be superior to white sugar. It is known to create heat and provide a human body with rapid energy. It contains 0.15 gm of proteins, 574.5 calories, 0% fat and 147 gm of carbohydrates⁹.

3. Fennel Seeds:

Fennel has long been employed as a carminative ingredient. It could assist in removing the built-up gas from the stomach, reducing bloating. Infants’ gas (flatulence) may also be treated with fennel water. The release of digestive secretions required for efficient meal digestion and absorption may be encouraged by fennel seeds. Fennel extract may be employed due to its ability to prevent gastrointestinal injury. But, if you encounter gastrointestinal issues, you must contact your healthcare professional¹⁰.

4. Peanuts:

Interestingly, peanuts do not belong to the nut family. Together with green peas, soybeans, and lentils, they are classed as legumes. The peanut plant most likely originated in South America, most likely in Brazil or Peru. In South America, scientists discovered 3,500-year-old ceramics shaped like peanuts and adorned with peanuts. It contains 39 gm of protein, 850 calories, 73 gm of fats and 24 gm of carbohydrates¹¹.

Table no. 1: Composition of Chikki¹²

Sr. No	Composition	Ratio
1	Pumpkin Seeds	13gm
2	Jaggery	150gm
3	Fennel	2gm
4	Peanuts	150gm

Preparation & Standardization of Chikki:

a. Selection of material

Selection of good quality material was done such as Pumpkin seeds, groundnuts, fennel and Nutraceutical jaggery.



b. Weighing of material

Weighing the material was done for its correct proportion.



c. Roasting of Peanuts

Peanuts were roasted at 120-140 °C for 25 min. The roasted were split, uncovered & germ removed. The peanuts were then crushed into small bits and these were collected into a bowl.



d. Roasting of pumpkin seeds:

Pumpkin seeds were roasted at 50-100 °C for 10 min.

e. Preparation of jaggery syrup:



Small quantity of jaggery with 10 ml of water was heated to dissolve. And the syrup was prepared.



f. Preparation of Nutra-chikki:

The syrup was heated at 148 °C to liquify the syrup and then roasted peanuts, pumpkin seeds and fennel were add to it one by one. All the ingredients were mixed together.



g. Dusting of tray:

Sugar powder was sprinkled on the tray to avoid sticking of the chikki.



h. Cutting of chikki:

With a knife, the chikki was cut into square pieces.



i. Packaging:

Primary packaging and secondary packaging was done.^{12,13,14}

Quality analysis

In this analysis we estimated Protein content through Kjendhal method, Fat was estimated by soxhlet method, Carbohydrates, Moisture, Ash and Crude fiber was determined by AOAC, 2002 method.^{15,16}

Sensory evaluation

The organoleptic evaluation with respect of colour, odour, texture, taste, appearance and overall acceptability were evaluated by Twelve trained/semi trained judges evaluated using 9 point hedonic scale.¹⁷

Storage condition

Chikki (100g) were stored at room temperature in polypropylene bags. The product's stability was assessed based on its texture, flavour, taste, appearance, and colour.¹⁸

Result And Discussion

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads:



Figure No. 1: Formulated Chikki

Chemical composition of the prepared Nutra-chikki:

The chemical constituents like moisture, protein, fat, ash content of standardized Nutra-chikki and groundnut chikki were analysed and given in table 2.

Table No. 2: Proximate analysis of Chikki

Sensory analysis

Sr. No.	Parameters (per150 gm)	Nutra chikki
1	Protein (g)	14.78g
2	Fat(g)	16.6g
3	Calcium(mg)	269.9mg
4	Iron(mg)	9.67mg
5	Ash(g)	46.5%
6	Moisture(g)	59.87

The nutra-chikki is prepared with combinations of grains was organoleptically accepted with the range of scores (7.8 to 8.4). The nutra-chikki consisting of Pumpkin seeds, fennel, peanuts had an average score of 8.3. Then the prepared chikki was appealed to have good taste and better Nutraceutical value.

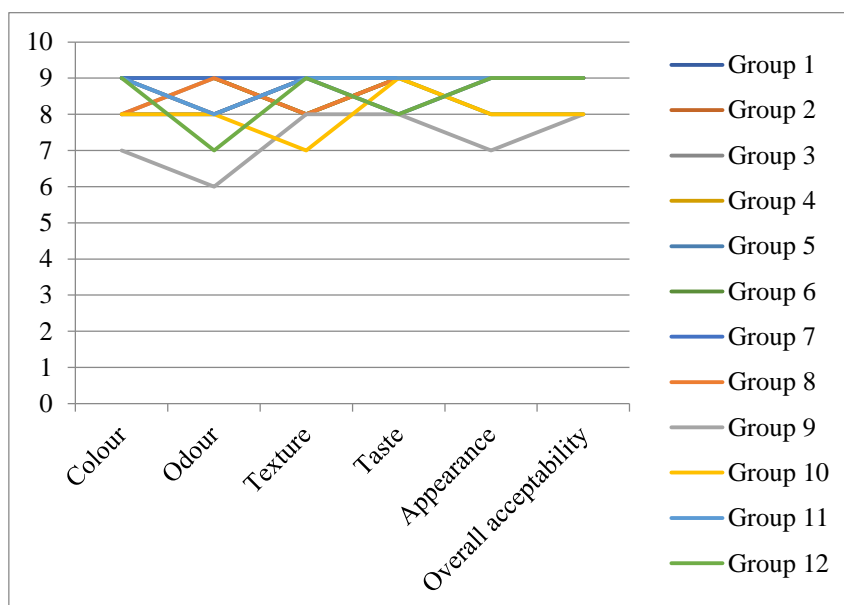


Figure No. 2: Evaluation scores of Prepared Chikki (Hedonic Scale)

Conclusion

The lifestyle modifications have contributed many disorders to the people due to reduction of needed nutrients from the Food they eat. Considering this, the multigrain Nutra-chikki was prepared by mixing of pumpkin seed, fennel seeds and peanuts. The study was carried out with the view to study the health Benefits, physical appearance and evaluation parameters of Nutra-chikki.

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