

Development and Standardization of Naturally Fortified Litti – Chokha

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ABSTRACT

In addition to being popular today in India, Litti Chokha, a traditional dish that comes from Bihar state, is now a dish of people globally. Litti appears to be baati with similar durability and shelter that makes food easy to store and carry on long journeys. The nutritional value of the different filled spices and herbs adds to the potential value of the food in nutraceuticals. In addition, chickpea is an excellent source of minerals (calcium, phosphorus, magnesium, zinc, and iron), fatty acids unsaturated, and β -carotene. Due to these properties and compatibility with wheat flour and chickpeas, Litti is suitable as an amplification agent. In this research, Remove these words development and standardization of the preparation of chickpea flour fortified Litti was studied. Nutritionally enhanced litti were prepared using wheat flour and chickpea flour incorporated in various ratios (20%–60%). Litti prepared from 40% incorporation (C2) had a higher acceptance compared to others. The variant C2 contained protein 8.20g, fat 3.22g, carbohydrate 26.83g, energy 523.0 kcal, and fiber 7.06g.

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Received: October 26, 2021; **Accepted:** November 11, 2021; **Published:** November 25, 2021

Keyword: Litti Chokha, Chickpea, Fortified Food, Product Development, and Sensory Evaluation

Introduction

Food fortification is defined as the practice of adding vitamins and minerals to commonly used foods during processing to increase their nutritional value. The 2008 and 2012 Copenhagen Agreement included the enhancement of food in one of the most profitable development priorities. Although mandatory food fortification has been used as a strategy to prevent micronutrient deficiencies in High-Income Countries (HIC), dating to the first ionization of salt in Europe and North America in the 1920s [1].

Litti

Litti-chokha is a conventional Bihari meal that's famous and cherished through each Bihari household. Litti is just like Rajasthani Baati in appearance, however, it has a stuffing made up of sattu mixed with spices and condiments. Littis are spherical highly spiced fried balls of wheat flour or sattu with a crisp outer texture. It is regularly served with chokha that's a vegetable dish made with boiled/ roasted mashed highly spiced aggregate of potatoes and brinjals. Sattu is ready through dry roasting particularly barley or Bengal gram. They are made into flour after roasting. In Bihar, sattu is served as a savory drink or maybe crammed in a litti/paratha [2].

Wheat

Wheat, any of numerous species of cereal grasses of the genus *Triticum* (own circle of relatives Poaceae) and their fit for human consumption grains. The dietary composition of the wheat grain varies fairly with variations in weather and soil. On average, grains are composed of 12% water, 70% carbohydrates, 12% protein, 2% fat, 1.8% minerals, and 2.2 % crude fibers. Thiamin, riboflavin, niacin, present, however, the milling methods eliminate the maximum of these vitamins with the bran and germ [3].

Chickpea

Chickpea (*Cicer arietinum*) is a member of the legume, pea, or pulse own circle of relatives, "Fabaceae". This mild brown-colored pulse is taken into consideration to be a very good supply of protein. Thought to had been first grown in Mesopotamia as much as 7,500 years ago, chickpeas are taken into consideration as one of the earliest cultivated greens on Earth. Chickpeas are divided into kinds: Desi and Kabuli [4].

Sattu

Sattu (Roasted Bengal Gram) is made from grains. Due to its high protein content, long shelf life, and excellent taste, sattu is a popular food supplement, especially in rural areas of India. Bengal gram is the legume of the first choice for sattu, especially in Bihar and eastern Uttar Pradesh, but legumes or cereals alone cannot provide balanced nutrition. However, mixing legumes with cereals can improve overall nutrition [5].

Kalonji

The kalonji (*Nigella Sativa*) he became relating to is *Nigella sativa*. The species is hermaphrodite (has each male and lady organs) and is pollinated with the aid of using Bees. “This *Nigella sativa* is recuperation for all illnesses besides death.” Medicinal flowers had been used for treating illnesses numerous long times in numerous indigenous and conventional structures of medicine [6].

Black pepper

Black pepper (*Piper nigrum*), an Indian local spice, has been broadly utilized in human food plans for numerous heaps of years. Piperine has additionally been observed to own anti-mutagenic and anti-tumor influences. Clinical research is limited, however numerous have said the useful healing results of black pepper with inside the remedy of smoking cessation and dysphasia [7].

Garlic

Garlic (*Allium sativum*) is commonly used for conditions related to the heart and blood system. Garlic produces a chemical called allicin. People usually use garlic to treat high blood pressure, high blood cholesterol or other fat content, and arteriosclerosis. It is also used for the common cold, osteoarthritis, and many other conditions [8].

Ginger

Ginger, (*Zingiber officinal*), herbaceous perennial plant of the family Zingiberaceae, probably native to southeastern Asia, or its aromatic, pungent rhizome (underground stem) used as a spice, flavoring, food, and medicine. Ginger contains about 2% essential oil; the principal component is zingiberene and the pungent principle of the spice is zingerone. The oil is distilled from rhizomes for use in the food and perfume industries [9].

Asafoetida

Asafoetida (*Ferula assa-foetida*) has been fed on as a spice and a people’s medication for centuries. Asafoetida is used as a flavor enhancer in foods and as a traditional medicine for many diseases in many parts of the world. Asafoetida is an oleogumresin obtained from the stem of the *Ferula* plant in the camellia family. Asafoetida acts as memory enhancer, antioxidants, antispasmodic, antibacterial, anticancer, antitoxic, improve digestion, lower blood pressure, prevent liver damage, deworming and reverse effects [10].

Material & Methods

In this study, wheat flour and chickpeas were used as the main ingredients to prepare litti. All the ingredients were purchased from Jaipur’s local market.

Ingredients –

Chickpea, Wheat Flour, Sattu, Brinjals, Potato, Tomato, Green Chilli, Onion, Salt, Kalonji, Black Pepper, Ginger Powder, Garlic Powder, Asafoetida Powder, Carom Seed, Cumin Powder, Dry Mango Powder, Coriander Leaves, Mustard Oil, Refined Oil.



Figure 1: Raw Material Used for Litti Preparation

Procedure

Take the bowl; pour chickpea flour and wheat flour in different ratios (1:4, 2:3, and 3:2). Mix refined oil (as moion). Add carom seed, kalonji, and salt. Thoroughly mix all the ingredients. Add a sufficient amount of water for making the soft dough.

For Stuffing : In a bowl mix, all the ingredients such as roasted gram flour (Sattu) carom seed powder, asafoetida powder, ginger powder, black pepper, kalonji powder, dry mango powder, garlic powder, cumin powder, salt, and mustard oil.

The formulation for Litti: Take the prepared dough and cut it into small pieces. Each Dough should be a 5-6 inch ball. Make a round cover and fill the stuffing in it. Fold the edges and press the joined edges together. Roll the stuffed dough balls to make a round shape litti. Fry the litti in hot oil on a low flame until become golden brown in color.

Table 1: Fortification of Chickpea Flour Litti

Ingredients	20% incorporation	40% incorporation	60% incorporation	Dry control	Fresh control
Wheat flour	400	300	200	500	500
Chickpea	100	200	300	-	-
Sattu	300	300	300	300	300
Carom Seed	18	18	18	18	18
Asafoetida Powder	4	4	4	4	4
Ginger Powder	10	10	10	10	-
Garlic Powder	5	5	5	5	-
Cumin Powder	10	10	10	10	10
Black Pepper	10	10	10	10	-
Kalonji	13	13	13	13	13
Dry Mango Powder	5	5	5	5	5
Salt	24	24	24	24	24

Sensory Evolution

A 9-point hedonic scale was used to perform the sensory evaluation. A panel of 5 semi-trained panel members was chosen for the process [11].

Nutrient Content

Moisture content is done using the hot air oven [14]. Nutrient content (Protein, Carbohydrate, Energy, Fiber) of litti were calculated using IFCT [12].

pH Content

pH was calculated using a pH meter [13].

Results and Discussion

Sensory Analysis

The litti is prepared by the incorporation of chickpea flour in different concentrations. That is 20%, 40%, 60% (C1, C2, C3,) which is compare with control. The mean score obtained for color varied from 7.33±0.82 to 8.16±0.41. The data indicated that the mean score obtained for the taste was between 7.16±0.75 to 8.00±0.63. The mean scores for fresh control & dry control were all most similar (7.16±0.75). The mean score secured for the appearance was ranging from 7.33±0.82 to 7.66±0.82 the variant with 20%, and 60% levels of incorporation showed almost similar score as the dry control (7.66±0.52). However, the fresh control secured a minimum score (7.33±0.82). The mean score secured for the texture of litti were ranging from 7.00±0.89 to 7.50±0.55 the C2 with a 40% level of incorporation show a higher score. However, both the control obtained min. score (7.00±0.89). The mean score registered for the overall acceptability varied from 7.33±0.82 to 7.66±0.52 the C2 and C3 with 40 & 60% incorporation and fresh control & dry control obtained a similar score i.e., 7.33±0.82 & 7.33±0.82 respectively. Compared with other variants, Litti prepared with 40% incorporation (C2) has higher acceptability.

Table 2: Acceptability Evaluation of Food Product (Litti) In Terms of Sensory Attributes

Parameter	Fresh Control	Dry Control	C1	C2	C3
Colour	7.50±0.55	7.33±0.82	7.50±0.55	8.16±0.41	7.66±0.52
Taste	7.16±0.75	7.16±0.75	8.00±0.63	7.83±0.75	7.66±1.03
Appearance	7.33±0.82	7.66±0.52	7.66±0.82	7.50±0.84	7.66±0.82
Texture	7.00±0.89	7.00±0.89	7.33±0.52	7.50±0.55	7.16±0.75
Odor	7.33±0.82	7.00±1.09	7.66±0.52	7.83±0.41	7.50±0.84
Overall acceptability	7.33±0.82	7.33±0.82	7.50±0.55	7.66±0.52	7.66±0.52



Figure 2: Prepared Litti with Chokha

Nutrient content

The moisture content of Litti

The moisture content of prepared variants of Litti was observed is given in Table No. 3 highest moisture content in C1 is 4.12±0.06 and the lowest moisture content in dry control is 2.55±1.09. The Moisture content Observed of litti fresh control 4.01±0.27g, dry control 2.55±1.09g, C1 4.12±0.06g, C2 3.12±0.84, C3 2.96±0.85g, respectively.

Table 3: Mean Moisture Content of Litti

Variants of Litti	Moisture (g)
Fresh control	4.01±0.27
Dry control	2.55±1.09
C1	4.12±0.06
C2	3.12±0.84
C3	2.96±0.85

Nutrient content of Litti

The nutrient content of litti was calculated using IFCT [12]. Were added to obtain the nutrient content for 70g of each variant of litti. The result is presented in Table No. 4 shows an analysis of proximate composition for protein, fat, carbohydrate, energy, crude fiber. The protein content of litti was lower in dry control (7.24g) and highest in C3 (8.68g). The fat content of litti was lower in fresh and dry control (2.80g), and C3 is highest (3.43g). Carbohydrate of litti was lower in C3 (25.39g) and highest in dry control (29.72g). The energy of litti was lower in C3 (514.8kcal) and higher in dry control (539.3kcal). The fiber of litti was lower in fresh control (3.98g) and higher in dry control (11.34g). Observed the Nutrient content of litti protein content 8.68g, fat content 3.43g, carbohydrates 29.72g, energy 539.3kcal, and fiber 11.34g, respectively.

Table 4: Mean Nutrient Content of Litti

Variants of Litti	Protein (g)	Fat (g)	Carbohydrate(g)	Energy (kcal)	Fiber (g)
Fresh control	8.04	2.80	28.45	526.2	3.98
Dry control	7.24	2.80	29.72	539.3	11.34
C1	7.72	3.01	28.28	532.4	9.22
C2	8.20	3.22	26.83	523.0	7.06
C3	8.68	3.43	25.39	514.8	4.90

pH Analysis

pH: pH was calculated using a pH meter. Table No. 5 shows analysis pH in litti. The pH content of litti was 6.62±0.01 (dry control) to 6.71±0.01 (C3) which shows that the pH of litti was slightly towards the acidic side. Observed the pH content of litti fresh control 6.70, dry control 6.62, C1 6.65, C2 6.69, C3 6.71, respectively.

Table 5: Mean pH content of Litti

Variant of Litti	Fresh control	Dry control	C1	C 2	C3
pH	6.70±0.01	6.62±0.01	6.65±0.01	6.69±0.01	6.71±0.01

Conclusion

This study has demonstrated that addition of increasing levels (20%- 60 %) of chickpea flour in the litti affected the quality of sensory attributes. Litti with 40 % chickpea flour has highest acceptability. The findings of the present study may help in developing commercial processing technology for effective utilization of chickpea flour especially for preparation of litti. So it can be inferred from the present study that the litti developed by using chickpea flour was highly acceptable. Therefore, results suggest that there is a great scope for use and marketing of value added litti using chickpea and it can be concluded that chickpea can be utilized for achieving food and nutritional security for nation.

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