

## Preparation and Organoleptic Characteristics of Flaxseed Supplemented Products

Priyanka Kajla<sup>1</sup>, Alka Sharma<sup>2</sup>

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### Abstract

In the present investigation three different products viz., idli, porridge and chutney were prepared using standardized recipes. The standard products were supplemented with various levels of flaxseeds. The aim of the study was to select the best supplementation level of flaxseed in these products. It was found that 10% supplementation level of flaxseeds was found to best in terms of sensory characteristics.

**Keywords:** Porridge; Flaxseeds; Chutney; Idli; Supplementation.

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### Introduction

Flaxseed is now-a-days emerging as a potential food crop as functional food. Amazingly good source of quality nutrients –omega-3 fatty acids, quality protein, lignans, soluble and insoluble dietary fibre make it a wonder functional food source. Alarming increase in obesity and various chronic diseases, people are shifting towards the inclusion of flaxseed in the routine as functional foods and nutraceuticals [1,2]. In recent years, as people have become more aware and conscious about health issues, therefore the demand for flaxseeds in food and beverages, functional foods and dietary supplements has risen drastically both in the United States and other developing countries. Flaxseeds can be utilized in form of roasted, germinated and milled seeds, while flaxseed oil can be used in various food formulations as salad dressings, as an ingredient in ice-cream as stabilizer and also as micro- and nano-encapsulated powder. Bakery sector so far has best utilized the flaxseed in various bakery products formulations to meet customer demands. Flax or flaxseed oil has been

incorporated into baked foods [3], fruit beverages, milk and other dairy products [4], muffins [5], dry pasta products [6], macaroni [7]. FDA has authorized up to 12% incorporation of flaxseeds in foods, and this may be taken as a representative maximum addition level for most of the foods [8].

In India, a variety of chutneys and pickles are prepared using different vegetables, pulses and spices that are consumed with breakfast items like chapatti, idli, dosa. Literature is available on development and standardization of several food adjuncts namely traditional chutneys instant chutneys and chutney powders, instant multigrain porridge, based on the various raw materials available during different seasons [9]. Interestingly, there was no literature available on utilization of flaxseed in products like porridge, idli and chutney, therefore the present investigation was planned to prepare these products and also quality evaluation of these products were also done to check the effect of processing on the nutritional quality of the prepared products.

### Materials & Methods

Roasted and Germinated flaxseed powders were selected on the basis of studied nutritional [10] and organoleptic characteristics for prepared products. Three different types of products were prepared by supplementation- Porridge, Idli and Chutney.

#### *Flaxseed Supplemented Idli*

For the preparation of idli, roasted semolina

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**Author Affiliation:** <sup>1</sup>Assistant Professor <sup>2</sup>Professor, Department of Food Technology, Guru Jambheshwar University of Science & Technology, Hisar-125001, India.

**Corresponding Author:** Priyanka Kajla, Assistant Professor, Department of Food Technology, Guru Jambheshwar University of science & Technology, Hisar, Haryana 125001, India.

**E-mail:** kajlapriyanka18@gmail

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was mixed all other ingredients and was blended together. Proportion of flaxseed was varied from 5g to 20 g in the above blend. The blend was allowed to stand for 10 minutes. Then the whole mixture was steamed for 15 minutes.

**Table 1:** Various trials of flaxseed supplemented chutney

Flaxseed supplementation level	0(%)	5	10	15	20
Ingredients (g)					
Semolina	25	25	25	25	25
Flaxseeds	0	5	10	15	20
Curd	5	5	7	10	10
Leavening agent	0.25	0.25	0.25	0.25	0.25
Salt	0.50	0.50	0.50	0.50	0.50

#### *Flaxseed Supplemented Porridge*

Porridge was prepared using the traditional recipe by boiling the coarsely ground wheat (100g) in 350 ml water for 30 minutes in covered pan. The level of supplementation of flaxseed varied from proportion of wheat: porridge -100:0; 95:5; 90:10; 85:15; 80:20. All the trials were evaluated for various sensory characteristics and best supplementation level was selected on the basis of maximum sensory scores.

#### *Flaxseed supplemented Chutney*

50 parts of roasted and germinated flaxseed flour was mixed with other ingredients namely green chillies (10 parts), coconut (5 parts), mint leaves (5.5 parts), garlic (5.5 parts), tamarind (7 parts), jaggery (4 parts) and along with common salt and dry mango powder (13 parts) blended in a laboratory mixer to obtain flaxseed chutney. The recipe for the preparation of flaxseed supplemented chutney was standardized in several trials by varying the quantities of roasted and germinated flaxseed powder and other ingredients in different proportions -25:75, 30:70, 50:50, 60:40 and 80:20.

**Table 2:** Various trials of flaxseed supplemented chutney

Supplementation level (%)	25:75	30:70	50:50	60:40	80:20
Ingredients (g)					
Flaxseeds	25.0	30.0	50.0	60.0	80.0
Green chillies	15.0	14.0	10.0	8.0	4.0
Coconut	7.5	7.0	5.0	4.0	2.0
Garlic	8.25	7.7	5.5	4.4	2.2
Mint	8.25	7.7	5.5	4.4	2.2
Tamarind	10.5	9.8	7.0	5.6	2.8
Jaggery	6.0	5.6	4.0	3.2	1.6
Salt and Dry mango powder	19.5	18.2	10.4	10.4	5.2

#### *Sensory evaluation*

The supplemented recipes were subjected to sensory evaluation using 9 point hedonic rating scale such as appearance, odour, taste and flavour to find the overall acceptability. The recipes were evaluated by a panel of semi trained panellists. Sensory evaluation of standard recipes on 0 (disliked extremely)-9 point (liked extremely) scale.

## **Results & Discussion**

#### *Preparation of flaxseed supplemented idli and its sensory evaluation*

Supplemented idli was selected for further studies on basis of sensory characteristics. Data pertaining to the various levels of supplemented idli is presented in Table 3.

Scores for various sensory parameters presented in table clearly depicted that idli prepared with incorporation of 10% flaxseed was found to be best in terms of good overall acceptability in comparison to other supplementation levels. 10% flaxseed supplemented idli scored maximum for colour (6.19), texture (5.85), aroma (6.67), appearance (6.80) and taste (7.08). While control idli i.e. without addition of flaxseeds scored maximum value for all sensory characteristics as compared to various levels of flaxseed supplemented idli. As the level of supplementation of flaxseeds increased in idli sensory scores followed a significant decreasing trend i.e. idli prepared by the incorporation of 20% flaxseeds showed poor sensory scores for all sensory parameters. Therefore, 10% supplementation level was selected for further studies. Then, the idli was prepared for further studies by incorporating 10% raw, roasted and germinated flaxseeds.

#### *Preparation of flaxseed supplemented porridge and its sensory evaluation*

Porridge was supplemented with the flaxseeds @ 5% to 20% and then sensory evaluation was done to found out best acceptable level of acceptability of flaxseed in porridge.

On the basis of sensory scores, best acceptable supplementation level was selected for further studies.

Data pertaining to sensory characteristics of flaxseed supplemented porridge is presented in Table 4. The flaxseed porridge was evaluated for various sensory parameters such as colour, texture, aroma, appearance and taste etc. In the wheat porridge flaxseeds were incorporated @ 5%

to 20%. On the basis of overall acceptability best supplementation level was selected. As the data related to overall acceptability shown in Table 4 revealed that wheat porridge supplemented with 10% flaxseeds scored highest for all sensory parameters. The score of overall acceptability was 7.76 for 10% supplemented porridge followed by & 7.52 for 5% supplementation porridge. The scores for sensory parameters for control/ wheat porridge were highest among all types of supplemented porridge. On the hand among the flaxseed supplemented porridge, 20% flaxseed supplemented porridge scored lowest values for sensory characteristics. Therefore, on the basis of 10% flaxseed supplemented porridge was selected for further quality analysis.

*Preparation of flaxseed supplemented chutney and its sensory evaluation*

Various trials of flaxseed supplemented were prepared in different proportions and then sensory evaluation was done to found out best acceptable level of acceptability of flaxseed in chutney. On the basis of sensory scores, best

acceptable supplementation level was selected for further studies

Data pertaining to sensory characteristics of flaxseed supplemented chutney is presented in Table 5. The flaxseed chutney was evaluated for various sensory parameters such as colour, texture, aroma, appearance and taste etc. In the chutney flaxseeds were incorporated 25g-80g in proportion to other ingredients. On the basis of overall acceptability best supplementation level was selected. As the data related to overall acceptability shown in Table 5 revealed that control chutney supplemented with 50:50 flaxseeds: ingredients scored highest for all sensory parameters. The score of overall acceptability was 6.54% for 50:50 supplemented chutney followed by & 6.14% for 30:70 supplementation chutney. The scores for sensory parameters for control chutney were highest among all types of supplemented chutney. On the hand among the flaxseed supplemented chutney, :80:20 flaxseed supplemented chutney scored lowest values for sensory characteristics. Therefore, on the basis of 50:50 flaxseeds supplemented chutney was selected for further quality analysis.

**Table 3:** Sensory characteristics of flaxseed supplemented Idli

Flaxseed supplementation	Colour	Texture	Aroma	Appearance	Taste	OA
0(%)	7.16±0.40e	6.84±0.04e	6.83±0.44e	7.22±0.07e	7.63±0.54e	7.12±0.29e
5(%)	6.67±0.51d	5.42±0.05c	6.33±0.54c	6.41±0.04c	6.42±0.43c	6.25±0.32c
10(%)	6.19±0.40c	5.85±16 .0d	6.67±0.47d	6.80±0.44d	7.08±0.08d	6.51±0.44d
15(%)	5.34±0.56b	5.41±48 .0b	5.16±0.03b	5.41±0.57b	5.43±0.23b	5.35±0.09b
20(%)	3.83±0.75a	4.63±0.08a	4.17±0.07a	4.23±0.09a	4.41±0.77a	4.25±0.26a

Values are means of 8 values± SD. Means in each column with different letters are significantly different. OA-Overall acceptability

**Table 4:** Sensory characteristics of flaxseed supplemented porridge

Wheat:Flaxseed (g)	Colour	Texture	Aroma	Appearance	Taste	OA
100:0	8.140.40±e	8.860.04±e	8.790.44±e	8.490.07±e	8.630.54±e	8.580.29±e
95:5	7.870.51±d	7.440.05±c	7.290.54±c	7.560.04±c	7.450.43±c	7.520.32±c
90:10	7.890.40±c	7.8516 .0±d	7.670.47±d	7.600.44±d	7.800.08±d	7.76±0.44d
85:15	6.140.56±b	6.1148 .0±b	6.160.03±b	6.410.57±b	6.430.23±b	6.250.09±b
80:20	5.830.75±a	4.220.08±a	4.290.07±a	4.360.09±a	4.410.77±a	4.620.26±a

Values are means of 8 values± SD. Means in each column with different letters are significantly different. OA-Overall acceptability

**Table 5:** Sensory characteristics of flaxseed supplemented chutney

Flaxseed:Ingredients	Colour	Texture	Aroma	Appearance	Taste	OA
25:75	6.67±0.65d	7.36±0.49e	7.02±0.06d	7.41±0.23e	7.81±0.27e	7.25±0.38e
30:70	6.34±0.06c	6.33±0.17c	5.21±0.08b	6.24±0.58c	6.61±0.53c	6.14±0.48c
50:50	6.51±0.38c	6.85±0.42d	5.63±0.12c	6.65±0.57d	7.07±0.28d	6.54±0.49d
60:40	5.00±0.52b	4.84±0.11b	5.12±0.45b	5.41±0.11b	4.65±0.39b	4.98±0.25b
80:20	3.82±0.11a	3.83±0.32a	4.43±0.13a	3.86±0.42a	3.69±0.71a	3.92±0.25a

Values are mean of 8 values±SD. Means with different letter are significantly different

## Conclusion

From the present study it can be concluded flaxseeds can be supplemented up to 10% level. This supplementation level is best acceptable level organoleptically as well as nutritionally.

Incorporation of flaxseeds into the traditional products like idli, porridge not only improved the nutritional profile but also its nutritional quality is maintained while processing by decreasing antinutritional factors to a greater extent. Therefore flaxseed can be incorporated into various recipes to a wide variety of value added nutritional product at economical rates.

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