



*International Journal Of*  
**Recent Scientific  
Research**

ISSN: 0976-3031  
Volume: 7(5) May -2016

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THE OFFICIAL PUBLICATION OF  
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH (IJRSR)  
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ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research  
Vol. 7, Issue, 5, pp. 10891-10894, May, 2016

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## Research Article

### EVALUATION OF ORGANOLEPTIC CHARACTERISTICS OF VALUE ADDED PRODUCTS USING FLAXSEEDS

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#### ARTICLE INFO

##### Article History:

Received 29<sup>th</sup> February, 2016  
Received in revised form 19<sup>th</sup> March, 2016  
Accepted 25<sup>th</sup> April, 2016  
Published online 28<sup>th</sup> May, 2016

##### Keywords:

Flaxseeds, thepla, mathri, Khakra, muffin food based approaches

#### ABSTRACT

Flaxseeds are packed with health-promoting properties. It is good source of macronutrient, micronutrient and nutraceutical components. It contains high levels of omega 3 fatty acid. Flax has high amount of lignans in the hull of the seed and these are a natural plant source of estrogen which helps to prevent post menopausal symptoms. Food based approaches deliberately increases the content of nutrients in the food for improving the nutritional quality of the product. In the present investigation an attempt was made to develop value added products by using flaxseeds. Flaxseeds were roasted and then powdered which was incorporated in different proportions (10%, 20%, 30%, 40%) to standard recipes. Proximate composition of flaxseeds both roasted and unroasted was also analyzed. Cost for different variation of each food product was also calculated according to latest market list. Products developed were Muffin, Khakra, thepla and mathri. The products were evaluated for organoleptic qualities – colour, appearance, taste, after taste and over all acceptability. The overall acceptability of mathri containing 10% flaxseeds was highly acceptable (4.4) leaving behind the standard mathri, followed by mathri containing 20%, 30% and 40% flax seeds respectively. Overall acceptability of standard thepla and thepla containing 10% flax seeds was same ie 4.4 and the overall acceptability of thepla containing 20% and 30% flax seeds was same ie 4. The overall acceptability of khakra containing, 10%, 20%, 30% flaxseed were 4.8, 4.4, 3.8, 3.4. The overall acceptability for Muffins containing, 10%, 20%, 30%, and 40% flaxseed were 4.8, 4.6, 4.4, 3.4 and 3.1 respectively. The cost of value added product were little higher than standard product.

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#### INTRODUCTION

Flax seed, also known as linseed, is one of the ancient cultivated crops since Mesopotamian times, grown for its oil seeds, and fiber. Flax seeds are nutty yet pleasantly sweet in taste. The chewy seeds are packed with full of nutrients, omega-3 fatty acids, antioxidants, minerals, and essential vitamins. Flax seed is rich in monounsaturated fatty acids like oleic acid. It is also one of the top vegetable sources of omega-3 essential fatty acids such as linoleic acid, alpha-linolenic acid (ALA) and arachidonic acids<sup>1</sup>. Flax are an excellent source of vitamin E, especially rich in gamma-tocopherol; containing about 20 g (133% of daily-recommended values) per 100 g. The seeds are packed with many important B-complex groups of vitamins such as riboflavin, niacin, thiamin, pantothenic acid, vitamin B-6, and folates. Phytoestrogens are diphenolic compounds that are present in several plants eaten by human beings. Flaxseed is a particularly abundant source of phytoestrogens. When ingested in relatively large amounts, phytoestrogens have been shown to have significant estrogen agonists/antagonists effects in humans. Phytoestrogens, like

certain selective estrogen receptor modulators, have an anti-proliferative effect on the breast, and positive effects on the lipoprotein profile and bone density<sup>12</sup>. Flaxseed may reduce the risk for breast carcinogenesis<sup>4</sup>. Flaxseed, the richest source of mammalian lignan precursors, such as secoisolariciresinoldiglycoside (SD)<sup>3</sup>. When flaxseeds are consumed, two other omega-3 fatty acids have also been shown to increase in the bloodstream, namely, eicosapentaenoic acid (EPA) and docosapentaenoic acid (DPA). A review of the literature on flaxseed yielded 13 categories for which flaxseed had been studied in humans, including constipation/laxative, attention-deficit hyperactivity disorder, hyperlipidemia, atherosclerosis/coronary artery disease<sup>4,5</sup>, breast cancer, cyclic mastalgia (breast pain), menopausal symptoms, hyperglycaemia/diabetes, hypertension, lupus nephritis, human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and prostate cancer<sup>6</sup>. The main aim of the study was to develop value added products using flaxseed. Proximate composition of flaxseeds both roasted and unroasted were also analysed. Cost for different variation of

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each food product was also calculated according to latest market list.

## MATERIALS AND METHODS

**Procurement of flaxseed:** Flaxseeds were procured from the local market. Cleaning and sorting were done manually to remove impurities.

**Product development:** Four products were developed by using flaxseed namely Muffins, *Khakra*, *Thepla* and *Mathri*. Four variation of all these product were developed. Flaxseed was incorporated to the product in the proportion of 10%, 20%, 30% and 40%. Flaxseed was substituted for refined wheat flour or wheat flour and all other ingredients were kept constant.

**Organoleptic evaluation:** The value added products were evaluated for organoleptic qualities – colour, appearance, taste, after taste and over all acceptability by ranking the responses using 5 point rating scale method by a panel of ten semi-trained judges from the department of food and Nutrition, ICG-The IIS university, Jaipur<sup>7</sup>.

## RESULTS AND DISCUSSION

The seeds of the flax are tiny, smooth, flat and pointed at one end. Flaxseeds are an essential source of high quality protein and soluble fiber and have considerable potential as a source of phenolic compounds. Flaxseed contains both soluble and insoluble fiber.

The results of the present study indicated that all products developed by incorporating flaxseed was highly appreciated by the panellist. The mean score of all the four product is shown in the table given below:

The overall mean scores of different variations of muffin were 4.8 (MU1), 4.6 (MU2), 4.4(MU3), 3.4(MU4) and 3(MU5). The Muffin's were more spongy after the addition of flaxseed due to it's raising quality. The overall mean score of Mathri for different variations were 4.2 (MA1), 4.4 (MA2), 4.15 (MA3), 3.7 (MA4) and 2.1 (MA5).The mathri's prepared become more acceptable and appreciated by the panellist after addition of 10gm ad 20gm of flaxseed.

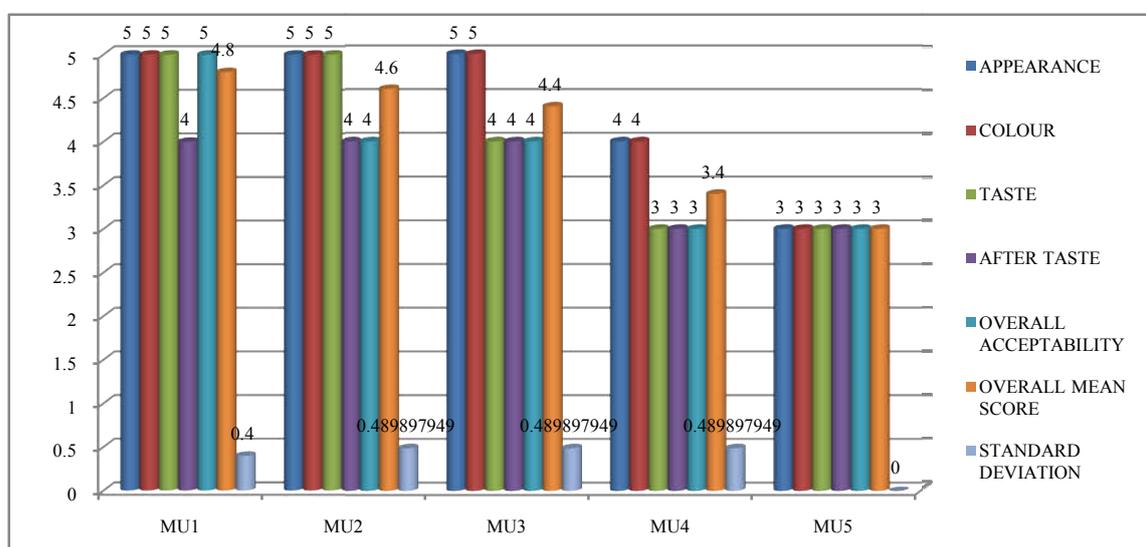


Figure 1-Mean Overall acceptability score obtained by muffin

**Nutritional quality:** Both roasted and unroasted ground flaxseed was analysed in triplicate for energy carbohydrate, moisture, protein, fat, and ash, by standard procedure given by AOAC method<sup>8</sup>. Moisture (oven drying method), fat (soxhlet apparatus method), crude fibre (Acid-alkali wash method), ash (muffle furnace method). While the protein and carbohydrate content was estimated by micro kjeldhal method and composite method respectively. The energy content of the flaxseed was computed by summing up the values obtained by multiplying the values with Atwater constants for carbohydrate, crude fat and protein with the 4, 9 and 4 respectively. Iron were analysed by Wong's method<sup>9</sup>.

**Cost analysis:** Cost analysis of the developed products i.e., Muffin, *Thepla*, *Khakra* and *Mathri* and their variation were done on the basis of latest market price.

### Code for Variation were

MU1,T1,K1,MA1 - the Standard recipes without flaxseed  
 MU2,T2,K2,MA2 - the products contained 10gm of flaxseed.  
 MU3,T3,K3,MA3 - the products contained 20gm of flaxseed

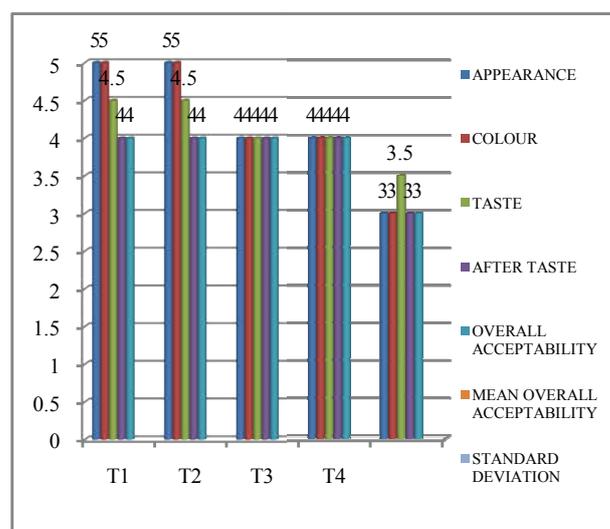


Figure 2-Mean overall acceptability score obtained by thepla

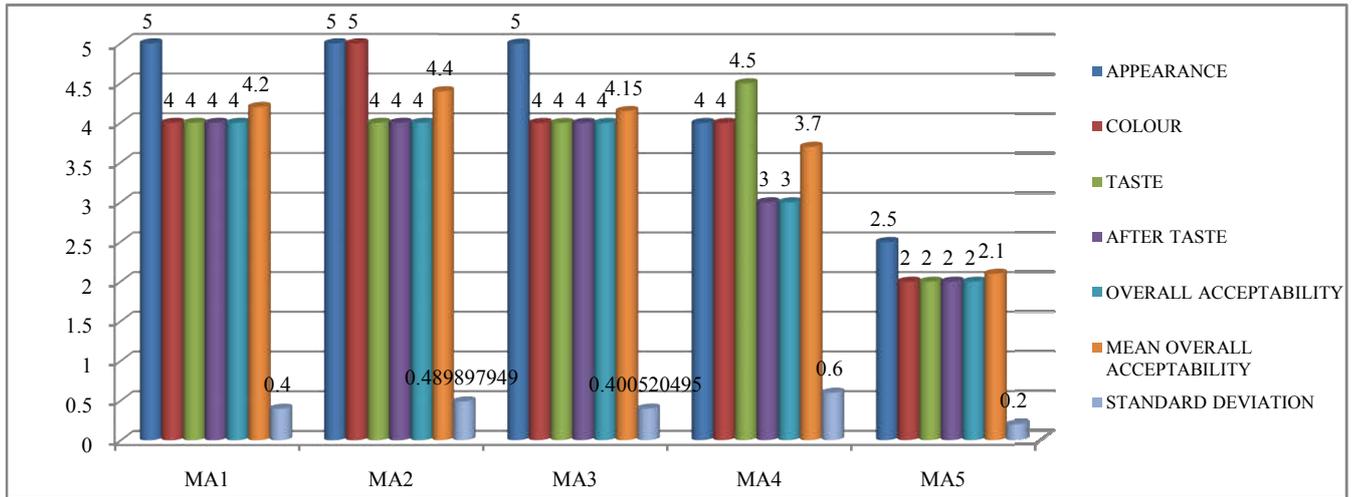


Figure-3 Mean overall acceptability score obtained by *mathri*

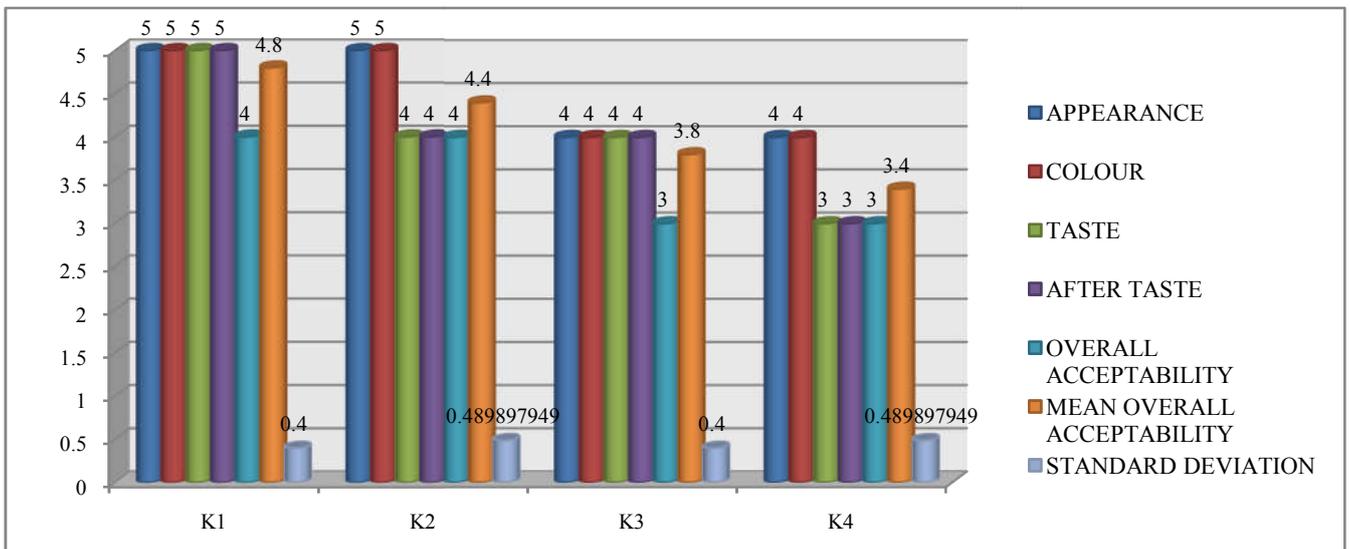


Figure 4 Mean overall acceptability score obtained by *khakra*

The overall mean score of khakra were 4.8 (K1), 4.4 (K2), 3.8 (K3) and 3.4 (K4). Khakra were more crispy when 10gm of flaxseeds were added. If more than 20gm of flaxseed was added to make the dough for khakra, it was difficult to roll and was also unacceptable in colour.

The overall mean scores of *Thepla* were 4.42 (T1), 4.42 (T2), 4 (T3), 4(T4) and 3.1 (T5). *Thepla* containing 10, 20 and 30gm of flaxseed were appreciated by the panel members.

The proximate composition was analysed by using standard techniques and the estimated value per 100gm of roasted flaxseed for energy, protein, carbohydrate, fat, crude fibre, and iron were 473kcal, 38.47g, 24g, 16g respectively. The moisture content in the roasted flaxseed was 2.9 whereas the estimated value per 100gm of unroasted flaxseed for energy protein, carbohydrate, fat, crude fibre, and iron were 478kcal, 40.99g, 23g and 15g respectively. The moisture content in the unroasted flaxseed was 5.66.

The cost of all the variations was calculated and the recipes were found to be cost effective. MU1, the standard recipe of muffin per 100gm costed Rs 4.85.

The cost of MU2, MU3, MU4, MU5 containing 10, 20, 30, 40 gm of flaxseed were Rs 5.49, Rs 6.13, Rs 6.77 and Rs 7.41 respectively. T1 was the standard recipes of *Thepla* costing Rs 5.87 per 100gm and the cost of other variations ie. T2, T3, T4, T5 containing 10, 20, 30, 40 gm of flaxseed were Rs 6.34, Rs 6.83, Rs 6.98 and Rs 7.48 respectively. MA1, the standard recipe of *Mathri* costed Rs 3.24 and the cost of variations ie. MA2, MA3, MA4, MA5 containing 10, 20, 30, 40 gm of flaxseed were Rs 4.2, Rs 5.16, Rs 6.12 and Rs 7.08 respectively. The cost of different variations of *Khakra* were Rs 4.06 (K1), Rs 5 (K2), 5.94 (K3) and K4 (6.88).

### CONCLUSION

From the present investigation it can be concluded that products containing 10% and 20% of flaxseed were most acceptable by the panel members. The products containing 10% flaxseed were more acceptable than standardized products as they were more crispy, soft and good to taste. The acceptability of the products decreases as the amount of flaxseed increases. Products containing more than 30% of flaxseed become unacceptable because of the taste and colour. Thus flaxseed been rich in so many nutrients and possess lot

many health benefits, so, can be incorporated in different product for different age group and has a great scope in therapeutic and commercial field. Flaxseeds are easily available in the market at reasonable price, so by substituting flaxseeds for the basic ingredients like -refined wheat flour/ wheat flour/ bengal gram flour etc. and with little increase in the price one can get highly nutritive product.

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## How to cite this article:

Gargi Saxena and Aparna Vashishth. 2016, Evaluation of Organoleptic Characteristics of Value Added Products Using Flaxseeds. *Int J Recent Sci Res*. 7(5), pp. 10891-10894.

T.SSN 0976-3031



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