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PROXIMATE ANALYSIS AND CHEMICAL COMPOSITION OF GROUNDNUT OATS LADDU

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ABSTRACT
Different types of food products are developed or modification is necessary for a developing economic source of individuals and country as people get involved more and more in their work schedules. The limitation of time leads the people to eat processed and unhygienic or unhealthy food so the development of nutritious snacks is the requirement of society and also the food industry. The present study was carried out to develop groundnuts oats Laddu which would be beneficial for common peoples as well as conducted for analytical to analyze the chemical composition of Groundnut Oats Laddu. This is a ready-to-eat snack that can be easily available and eaten by individuals. To prepare to develop groundnuts oats Laddu, with the help of developing groundnuts, oats, cardamom, sesame, and Jaggery was used. The results showed that the Groundnut Oats Laddu contains 5.23%moisture, 2.4% ash, 19% protein, 32% fat, and 0.25 % Calcium, and 0.11% iron.

KEYWORDS: Groundnut, oats, sesame, Chemical analysis.

INTRODUCTION
Different types of foods aresavoured by people all over the world. In India, large numbers of traditional foods are known to impart nutritional well-being for all age groups. These products are summarised under sweetmeats, savory, or snack products and are generally prepared with the help of locally available raw materials with a good source of protein, functional ingredients, nutraceuticals, and carbohydrates.

Analysis of possessing food products is continuously requesting the development of more accurate, most efficient, sensitive, and attractive cost analytical methods to confirm the quality, safety, and traceability of food in compliance with legislation and consumers' demands. This improvement has led to significant enhancements in analytical accuracy, precision, detection limits; reduce chronic diseases, or optimizing health and sample throughput, thereby expanding the practical range of food applications. As mentioned by McGorrin "*the growth and infrastructure of the modern global food distribution system heavily relies on food analysis (beyond simple characterization) as a tool for new product development, quality control, regulatory enforcement, and problem-solving.*" (R. J. Mcgorrin, 2009) Besides, recently, there is also more interest in the consumer health-related properties of foods product as a result of an increasing public health concern on how to improve health through the so-called functional foods, functional ingredients, and nutraceuticals. Thus, there is no doubt on the importance and current need of analytical techniques developments able to face all these demands.

Among such foods, *Groundnut oats Laddu* is a popular sweetmeat product enjoyed all over India. It is prepared using peanuts, sesame, and oat using Jaggery. Laddu is a ball-shaped sweet popular in India's Subcontinent. They are made up of different raw materials with added ingredients (Bhargavi Naidu, 2012).Various types of research methods have been directly focused on the analytical technique used for the determination of food quality, while others work on have focused on the type of food, compound, or process investigated. Regarding specific analytical techniques applied to solve different problems in food analysis. Jaggery is used traditionally as a sweetener in the preparation of these products. It is a natural product that is the potential source contains protein, minerals, and vitamins as well as a rich source of copper and iron *(Manay and Swamy*, 2001). Jaggery is obtained by concentrating sugar cane juice to a solid or semi-solid state. It is a natural sweetener having a sweet winy flavor. (shahi, 1999).

Oats (AvenaSativa L.) ranks sixth in the world's cereals production. They are the source of proteins, fiber, and

minerals. The amount of oats used for human consumption has increased progressively, the fact health effects of oats benefit mainly on the total dietary fiber and B- glucan content. **(**Ahmad Mushtaq *et al*, 2014). The oats also contain phytochemicals including tocopherols, tocotrienols, phenolic compounds, and plant sterols, thought to have a beneficial effect on health **(**Wan Ying, Vinso Joe A., Etherton Terry D., *et al*, 2001). Oats is the only cereal containing a globulin or legume-like protein avenalins, as the major (80%) storage proteins. globulins are characterized by water-soluble. Oats also act as antioxidants, anti-inflammatory, moisturizing, and even ultraviolet protecting properties. As a grain without gluten, oat flour and bran are used as alternative food for persons suffering from celiac disease.

Groundnut is commonly called the poor man's nut. Groundnut is native to South America and has never been found uncultivated. The botanical name of ground-nut is *ArachishypogaeaLinn*. It is a richsource of energy due to its high oil and protein contents. It supplies about 5.6 calories of grain when consumed raw and 5.8 calories grain when consumed roasted. Groundnut contains protein. Nutritive value is not high because of deficiency in the content of certain essential amino acids-methionine, tryptophan, lysine, and threonine. It is also a rich source of amino acids and vitamins. Biological value is 55%, protein efficiency ratio: 1.65%, net protein utilization: 43%. Groundnut is reported to be rich in monounsaturated fatty acids (MUFA) which are essential for a healthy heart in humans. (Corinna M A & Richard D M, (2003). Groundnut has good digestibility in both raw and roasted forms (Nagaraj, 1988).

Sesame seeds are the oldest condiment known to man. Sesame, Sesamumindicum L. belongs to the family Pedaliaceae. Sesame is a rich source of calcium (1%) and phosphorous (0.7%)(Nayar NM, Mehra KL (2002). Sesame contains ample amounts of oleic (43%), linoleic (35%), palmitic (11%), and stearic acid (7%) which together comprise 96% of the total fatty acids (Saydut A, *et al* 2008).

Sesame seed is benefited to for health in traditional beliefs of Asian countries and this is included in Pharmacopoeia of the People's Republic of China (PPRC, 2015) as liver and kidney benefiting traditional Chinese medicine (TCM). It has been reported that the sesame seed color affects the phytochemical contents and their antimicrobial activities. (F. Shahidi, *et al* (2006) (H. Zhang, *et al*(2013)) Phytochemical compounds in sesame seed such as sesamin, sesamol, and anthracenemone F have been proved to have in vitro/in vivo antioxidant and antiaging activity (Y. Zuo, C. Peng, Y. Liang, et al., 2013) (T. Furumoto and K. Nishimoto 2016.). Moreover, sesamin and sesamolin showed anti-inflammatory, antihypertensive, and anticarcinogenic effects in numerous studies. (D.-Z. Hsu, *et al* 2013), (A. A. Dar and N. Arumugam, 2013).

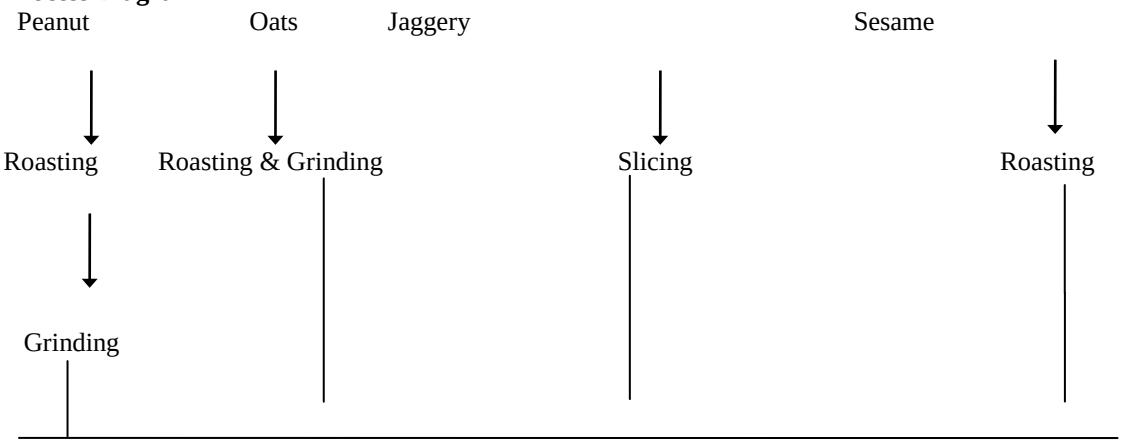
MATERIALS AND METHODS

Proximate composition: After preparation of the samples to a uniform size, they were analyzed for moisture content, protein, fat, ash, calcium, and iron conducted in Department Food Chemistry and Nutrition, Sau K.S.K(Kaku) College of Food Tech, Beed.

Standard Recipe

Sr. No.	Name of ingredients	Quantity of ingredients
1.	Peanut	400 gm
2.	Jaggery	400gm
3.	Oats	100 gm
4.	Sesame	100gm
5.	Cardamom	5 gm

Process Diagram



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Mixing
(Mix All The Ingredients Properly To getting Uniform Mixture)

↓

Grinding
(Grind All the Ingredients withthe Help of Grinder)

↓

Making of Balls
(Make the Round Balls (Laddu) With the Help Of Molder)

↓

Packaging and Labeling
(Pack the Laddu in PolytheneBags)

Determination of moisture

Moisture was determined by the oven drying method. 1.5 g of well-mixed sample was accurately weighed in the clean, dried crucible (W_1). The 1 crucible was allowed in an oven at 100-105oC for 6-12 h until a constant weight was obtained. Then the crucible was placed in the desiccators for 30 min to cool. After cooling, it was weighed again (W_2).

The percent moisture was calculated by the following formula:

Moisture (%) = (W1-W2)/ W ×100

Where

W_1 = Initial weight of crucible + Sample

W2 = Final weight of crucible + Sample

W = weight of the sample

Note: Moisture-free samples were used for further analysis. (AOAC International (2007).

Determination of ash

Ash determination was followed by the charred method. Dry ashing refers to the use of a muffle furnace capable of maintaining temperatures of 500- 600ºC. Water and volatiles are vaporized and organic substances are burned in the presence of oxygen in the air to CO2 and oxides of NO2. Most minerals are converted to oxides, sulfates, phosphates, chlorides, and silicates. Elements such as Fe, Se, Pb, and Hg may partially be volatile with this procedure.

Determination of Iron

Iron content was estimated according to the procedure described by (Ranganna, 2000). Iron content in the food is determined by converting the iron to ferric form using oxidizing agents like potassium Persulfate or hydrogen peroxide and treated with potassium thiocyanate to form red ferric thiocyanate which is measured at 480 nm. (AOAC International (2007). Use the ash solution of the sample prepared by dry ashing for color development. Into the separate stoppered measuring cylinders pipette the solution as given below:

Reagents	Blank (mL)	Standard (mL)	Sample (mL)
Standard iron solution (1mL=0.1mg of Fe)	0.0	1.0	0.0
Sample ash solution	0.0	0.0	5.0
Distilled water	5.0	4.0	0.0
Conc. H2SO4	0.5	0.5	0.5
Potassium Persulfate	1.0	1.0	1.0
Potassium thiocyanate	2.0	2.0	2.0

And the final volume was made up to 15 ml with distilled water. Measure the color at 480nm setting the blank at 100% transmission.

Calculation

Iron (mg/100g) = O.D. of sample × 0.1 × total volume made up of ash × 100/ O.D. of standard × 5 × wt. of sample taken for ashing

Determination of Calcium

Calcium content in samples was determined by the visual titration method (Ranganna, 2000). 20 ml of ash solution, 25 ml of distilled water, and 10 ml of saturated ammonium oxalate were taken in a beaker. To this, 2 drops of methyl red indicator were added and the pH of the contents was adjusted to 5.0 using dilute ammonia (1:1) and dilutes acetic acid (1:4) solution. The contents were boiled and left at room temperature overnight. The next day, the contents were passed through a filter paper. The residue thus obtained was washed with hot distilled water until it became oxalate-free. The filter paper was broken by a pointed glass rod and washed with 10 ml of hot dilute H2SO4 (1:4) followed by distilled water. The contents were heated to 80°C and titrated against 0.01N KMnO4 to a stable pink color. Finally, the filter paper was also dropped into the solution, and titration was completed. Calcium was calculated as follows:-

$$\textbf{Calcium (mg/100gm)} = \frac{\text{(Titre value} \times \text{normality of KMnO4} \times \text{total volume of ash solution)}}{\text{(Ml of ash solution taken for estimation} \times \text{wt. of a sample taken for ashing)}}$$

Determination of protein

In the Kjeldahl procedure, proteins and other organic food components in a sample are digested with sulfuric acid in the presence of catalysts. The total organic nitrogen is converted to ammonium sulfate. The digest is neutralized with alkali and distilled into a boric acid solution. The borate anions formed are titrated with standardized acid, which is converted to nitrogen in the sample. The result of the analysis represents the crude protein content of the food since nitrogen also comes from nonprotein components (note that the Kjeldahl method also measures nitrogen in any ammonia and ammonium sulfate). (Official Methods of Analysis of AOAC International2016)

Determination of Fat

Moisture-free sample (2.5g) was put into a thimble and placed in soxhlet`s extractor (SocsPlus, Pelican/SCS-AS08) fitted with a pre-weighed collecting vessel. Fats were extracted with petroleum ether (boiling point 60-70o C) for 2 h, At the end of 4 hours the ether left was dried in a hot oven at 100ºC for 30 minutes. The collecting vessel was then cooled in desiccators and weighed. It gives the amount of ether soluble fat present in the sample. Percent crude fat was calculated as under the following formula.(Luque de Castro, M.D. and Priego-Capote, F2010)

Calculation

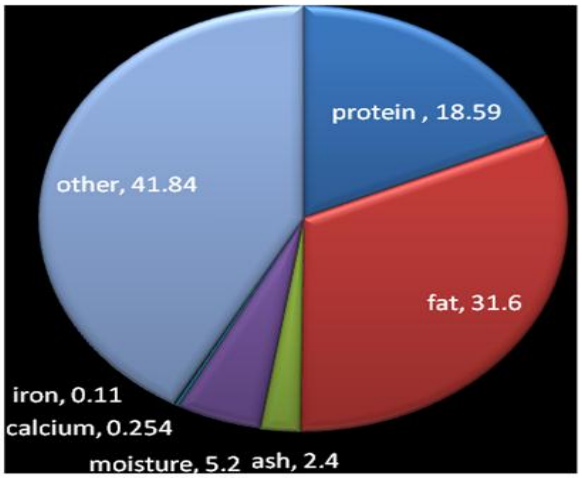
Crude fat (%) = (weight of fat) / (weight of sample) × 100.

RESULTS

Proximate analyses of Groundnut Oats Ladduare showed in Table. It contains 5.23%moisture, 2.4% ash, 19% protein, 32% fat, 0.25% Calcium and 0.11% iron.

Compositions	Moisture	Ash	Protein	Fat	Calcium	Iron
Percentage (%)	5.23%	2.4%	19%	32%	0.25%	0.11%

(**Table:-**Proximate analyses of Groundnut Oats Laddu)



(Graph: - Proximate analyses of Groundnut Oats Laddu in %)

CONCLUSION

To conclude creating awareness is very important as well as taking steps to improve the quality of this type of Laddu by eliminating the adulteration practices. A combination of strategies like supplementation, fortification, and public health interventions have to be focused which will help to achieve goals of reducing this preventable condition of malnutrition in rural diets of pregnant women and all groups in India. It is provide the nutritional supplement to all groups of age.

DISCUSSION

Food is a very complex heterogeneous "material" composed of thousands of different nutritive and non-nutritive compounds embedded in a variety of different raw materials. In analytical technique, sample preparation, identification, and quantification of both desirable and undesirable compounds continue to pose immense challenges to food analysts.

This study is mainly focused on analytical chemical methods used to determine the presence, identity, and quantity of all compounds of interest in food. The major techniques used in food analysis are being well addressed in detail. The food analyst has a variety of available tests but the test choice is primarily dependent on the goal of the food analysis and the use of the final data.

While useful, traditional analytical methods are continually being challenged by technological and instrumental developments. Technology is moving chemical analysis toward the use of more sophisticated instruments (either individually or in tandem) as both instrumental specificity and sensitivity are continually being "pushed" to new limits.

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