

Proximate Analysis of Developed Therapeutic Waffle by Using Multigrain Flour, Turmeric and Mulethi

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Abstract: - Waffles are a type of bread or battercake that are made by mixing a runny batter (free of lumps) and pressing it on a specially designed iron plate with a crosshatched pattern, which creates a grid of indentations in the finished product. The iron's hinged design of waffle maker allows it to cook both sides of the waffle at once, that creates a crispy golden-brown food which can be served in a variety of ways. Waffles are made by all-purpose flour and waffle filling was a kind of preserve (jam, rind jelly, jelly). Majority of preserves are rich in calories, but this study deals to enrich the nutritive value of the waffle and will also work as an immunity booster. The main ingredients that are used in the waffles are Multigrain Flour, Jaggery, Mixed Dry Fruits, Mulethi, turmeric, Black pepper, Butter, Milk, Baking Powder and Baking Soda. The nutrient of waffle premix is carbohydrate, fiber, vitamin, protein, fat, minerals antioxidants. The objective of the study was to develop a therapeutic waffle by using multigrain flour, turmeric, mulethi and characterize it. The present study was carried out in Food and Nutrition Laboratory, BBAU for a period of 3 months. The sample was immunity booster waffle. An experimental design was conceptualized to meet out all objectives in the research work. The result of chemical analysis shows that the multigrain waffle premix was a good source of carbohydrate, fat and also provides protein in certain amount. The purpose of this study was to enhance nutritional quality with respect to physiochemical properties of the multigrain waffle premix.

Key Words: - *Multigrain waffle premix, Instant waffle premix, Proximate analysis, Physiochemical properties.*

I. INTRODUCTION

Waffles are cake made by pouring yeast dough between two hot patterned plates. Waffles come in many shapes and sizes and are eaten all over the world. Traditionally, waffles are served for breakfast, but they are also great as an appetizer or dessert. Waffle recipes may vary depending on the type of waffle you make or the ingredients you use. Traditionally, waffle batter is made from flour, butter, brown sugar, yeast, milk, and eggs. Waffle mixes are similar to pancake mixes, but often contain more sugar and fat for a crispier crust.

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Ready-made waffle mixes or frozen waffles make it easy to serve delicious waffles in seconds. Americans eat a lot of waffles. According to the Waffle House restaurant chain, American restaurants sell about 145 waffles per minute. Served sweet or savoury with fried chicken, syrup and fruit. In ancient Greece and the Middle Ages, different types of flat bread called oblio (wafers) were prepared. The first known recipe for "waffles" was made in the late 14th century, but they were called waffles because they did not contain baking powder. March 25th is celebrated as International Waffle Day. Basically, waffles are baked with all-purpose flour and have some sort of jam (jam, jelly, jelly) inside. Most jams are high in calories, but this study aims to increase the nutritional value of waffles by acting as an immune booster. The main ingredients used in waffles are multigrain flour, palm sugar, baking soda and salt. Multigrain flours are usually made from at least two whole grains, but usually consist of seven or more, including barley, wheat, oats, brown rice, and even seeds. Commonly used seeds include flaxseed, quinoa, and buckwheat. Multigrain

atta contains more fiber and protein than most other flours. They are low in carbs and high in other essential nutrients. Jaggery, also known as pumpkin, is a great herbal source of iron. Jaggery contains calcium, magnesium, potassium and phosphorus. Dried fruits and nuts are rich in protein, energy, and macro- and micronutrients. They are also a great source of energy because they contain natural sugars. Various nuts and fruits have different nutritional values, and good Licorice or mulethi is an herb used in various Ayurvedic medicines.³ The underground stems and roots are used for medicinal purposes. It has antioxidant, antibacterial, anti-inflammatory and hepatoprotective properties... Licorice or Mulethi is a medicinal plant used in various Ayurvedic medicines. The underground stems and roots are used for medicinal purposes. It has antioxidant, antibacterial, anti-inflammatory and hepatoprotective properties. Mulethi is useful for cough, sore throat, bronchitis, sexual weakness, skin problems, jaundice, hoarseness, vata dosha, ulcers, etc. It has emollient and expectorant properties. Turmeric, particularly its most active compound, curcumin, has many scientifically proven health benefits, such as the ability to improve heart health and prevent Alzheimer's and cancer. It is a powerful anti-inflammatory and antioxidant. It may also help improve symptoms of depression and arthritis. Black pepper contains a chemical called piperine. These chemicals have many effects on the body. It seems to reduce pain, improve breathing and reduce inflammation. Black pepper increases the absorption of key nutrients. It can increase the bioavailability of certain nutrients, such as calcium and selenium, due to its inhibitory activity on drug-metabolizing enzymes. As the demand for healthy foods has increased in recent years, the baking industry is also turning toward functional food development. Waffles are essentially a delicate delicacy similar to cakes. Wafer formation during baking occurs due to steam expansion and starch gelatinization and can be eaten as a snack or at breakfast. Local traditions and eating habits have led to a wide range of waffle products on the market. This research mainly focused on developing immune-enhancing wafers consisting of ingredients such as multigrain flour, palm sugar, mixed dried fruits, black pepper, turmeric, mulethi, milk, butter, baking soda, baking powder and salt. Even children love waffles because they are nutritious for all ages. Therefore, it is a good way to feed children with waffles that increase immunity. Almonds are a rich source of B vitamins, riboflavin and niacin, vitamin E, minerals, calcium, iron and zinc. Almonds are also rich in dietary fiber. They also

have cholesterol-lowering properties. Black Pepper and Turmeric - A healthy combination of Black Pepper and Turmeric increases absorption by up to 2000%.⁴ Mulethi has antiviral, anti-inflammatory and antibacterial properties. It maintains the health of the mucous membranes of the digestive tract, relieves constipation and prevents gastric and peptic ulcers.⁵ Ingredients are readily available at any time of the year. The main goal of this study was to bring healthy and nutritious wafers with the ability to prevent various diseases and disorders in the market.

II. MATERIAL AND METHODS

The present study was conducted at Food and Nutrition Laboratory Babasaheb Bhimrao Ambedkar University, Lucknow, for a total period of 9 months. The present study is experimental research with conceptual experimental research design.

2.1 Sampling

The raw material for the development of food products like Multigrain flour, Mulethi, Jaggery, Dry fruits, Turmeric, Black pepper, Butter, Milk, Baking powder and baking soda was purchased from a local market near BBAU University Lucknow.

2.1.1 Preparation of instant waffle premix

Multigrain flour, mulethi powder, dry fruits, jaggery, turmeric, black pepper, butter, milk, baking soda, baking powder, were mixed in various composition and make powder as a premix and stored it in an air tight container.

2.1.2 Formulations

Formulation of Instant Multigrain Waffle premix

Formulation	Multigrain flour (gm)	Mulethi (gm)	Jaggery (gm)	Black pepper (gm)	Turmeric (gm)	Baking Powder (gm)	Baking soda(gm)
T1	100	10	50	0.36	0.36	2.5	1

Formulation of All-purpose flour waffle

Formulation	All-purpose flour(gm)	Sugar (gm)	Milk (ml)	Baking Powder (gm)	Bakin soda (gm)	Butter (gm)
T1	100	50	150	2.5	1	50

2.2 Proximate Analysis of Multigrain waffles premix

2.2.1 Moisture

Moisture Weigh approximately 10 g of waffle premix into a pre-weighed Petri dish and place in a hot oven at 70°C for 6 hours. The dried residue was weighed after cooling in a

desiccator to calculate the moisture content. The moisture content was calculated with the help of Eq. (1)

2.2.2 Procedure

- 10g sample was taken
- Placed in a petri plate
- Dried in a hot air oven for 24hrs
- Then final reading was taken

Formula:

$$\text{Moisture (\%)} = \frac{(W1-W2) \times 100}{W1} \quad (1)$$

Where W1 = weight(g) of sample before drying
W2 = weight (g) of sample after drying

2.3 Ash

Place the crucible and lid in a muffle furnace at 550 °C overnight to completely burn away impurities on the surface of the crucible. Cool the crucible in a desiccator (30 min). Weigh the crucible and lid to three decimal places. Place approximately 5 g of the sample into the crucible. Heat the Bunsen over low heat with the lid half-closed. When no more smoke comes out, place the crucible and lid in the oven. Heat at 550 degrees Celsius overnight. Do not cover while heating. Cover the lid after heating sufficiently to prevent the puffy ash from flying away. Cool in a desiccator. When the sample turns gray, weigh the ash using the crucible and lid. If not, place the crucible and lid back in the oven for additional heating. The ash content of the sample was determined by using Eq(2)

Formula

$$\text{Ash (\%)} = \frac{\text{Weight of ash} \times 100}{\text{Weight of sample}} \quad (2)$$

2.4 Fat

Fats are valued as crude ether extracts from dry raw materials. Accurately weigh a dry sample (5–10 g) and carefully place it into the prepared thimble using filter paper. The sample containing the thimble is placed in a Soxhlet device and extracted with diethyl ether for approximately 16 hours. The extract is then filtered into a clean, dry conical flask, the ether is removed by evaporation, and the flask containing the remaining residue is dried in a hot air oven at 100 °C, cooled in a desiccator and weighed.

Formula:

$$\text{Fat(\%)} = \frac{\text{Weight of fat} \times 100}{\text{Weight of sample}} \quad (3)$$

2.5 Protein Reagents

- Kjeldhal catalyst: Mix 9 part of potassium (K₂SO₄) with 1 part of copper sulphate (CuSO₄)
- Sulfuric acid (H₂SO₄)
- 40%NaOH solution
- 0.2 NHCl solution
- 4%H₃BO₃
- Indicator solution: Mix 100mi of 0.1% methyl red (in 95% ethanol) with 200ml of 0.2% bromocresol green (in95% ethanol).

2.6 Method

Add the sample (0.5-1.0 g) to the digestion flask. Add 5 g of Kjeldahl catalyst and 200 ml of concentrated H₂SO₄. Prepare tubes with the above chemicals except blanks. Tilt the flask and heat gently until bubbling stops. Boiling will quickly erase the solution. Cool and carefully add 60ml distilled water. Immediately connect the flask to the condenser's dissolving flask by dipping the tip of the condenser into standard acid and dipping the receiver's indicator 5-7. Rotate the flask to thoroughly mix the contents. Then heat until all NH₃ is distilled off. Remove the receiver, rinse the condenser tip, and titrate the excess distilled standard acid with NaOH standard solution.

Formula:

$$\text{Protein (\%)} = \frac{(A-B) \times N \times 1.4007 \times 6.25}{W} \quad (4)$$

Where

- A = volume (ml) of 0.2 N HCl used sample titration
- B = volume (ml) of 0.2 NHCl used in blank titration
- N = Normality of HCl
- W = weight (g) of sample
- 14.007 = atomic weight of nitrogen
- 6.25 = the protein nitrogen conversation factor for fish and its by products

2.7 Carbohydrates

The content of available carbohydrate was determined by difference i.e. by subtracting from 100 the sum of values (per 100g) for moisture, protein, fat and ash.

Formula-

$$(\%) \text{ Carbohydrates} = 100 - (\% \text{ protein} + \% \text{ fat} + \% \text{ ash} + \% \text{ moisture}) \quad (5)$$

2.8 Microbial Analysis

The medium was prepared by suspending 28 g of nutrient agar powder in 250 ml of distilled water. Dissolve the nutrient agar medium in distilled water by shaking gently. Autoclave the dissolved mixture at 121 °C and 15 psi for 15 min. After autoclaving the nutrient agar, allow to cool but do not harden. Pour nutrient agar onto each plate in laminar flow, place the plate on a sterile laminar flow surface, and turn on UV light in laminar flow until the agar hardens. After the serial dilution was done. I have selected T-4 and T-5 dilution factor for inoculation. Spreading was done equally all over the plate without damaging the solidified media. Cover the spreaded plate with their lid and put it by inverting them in the incubator at 37 degree C for incubation. Incubation was done for 24-48 hrs. After the incubation time is completed, colonies was counted manually by making quadrant and CFU was calculated with the help of Eq(6) which is given below-⁶

$$CFU/ml = \frac{\text{no. of colonies (whole plate)} \times \text{dilution factor}}{\text{Volume of culture plate}} \quad (6)$$

CFU = Colony forming unit

III. RESULT AND DISCUSSION

The nutritional profile and some physiochemical properties of multigrain waffle premix are exhibited in table. Proximate composition of waffle premix presented in table -1 revealed that it contains 20.1 percent moisture, 33.5 percent ash, 4.3 percent fat, 9.54 percent protein and 54.33g carbohydrate. The result of chemical analysis show that the multigrain waffle premix was good source carbohydrate fat and also provides protein in certain amount. Following table shows the results of chemical analysis of multigrain waffle premix.

Table.1. Proximate Composition of Multigrain Waffle premix

S.No.	Parameter (%)	Multigrain waffle premix
1	Energy	280.2kcal/100gm
2	Moisture	20.1(%)
3	Ash	33.5 (%)
4	Fat	4.3 (%0
5	Protein	9.54(%)
6	Carbohydrate	54.33g

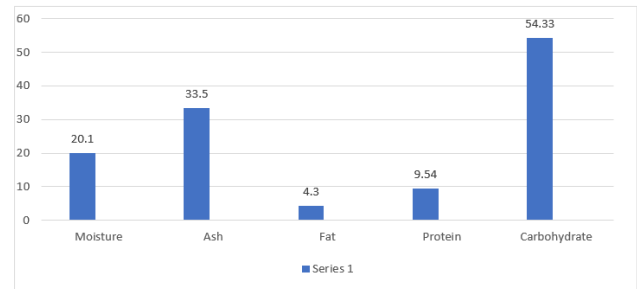


Fig.1. Graphical representation of proximate analysis

3.1 Microbial Analysis

A microbiological study performed on the total number of plates showed 110 cfu/ml in the waffle premix and 200 cfu/ml in the control sample, less microbial growth in waffle premix is due to use of turmeric which acts as a preservative. Based on these results, it can be argued that the product is safe to consume due to proper hygienic considerations when preparing premixes for multigrain waffle.

IV. CONCLUSION

The formulation of waffle premix with multigrain flour, Mulethi, jeggary, turmeric, black pepper, milk, butter and mixed dry fruits in appropriate proportions makes increases the nutritive value of the product. Multigrain waffle are good source of carbohydrates protein and fats which are important to maintain health and provide certain health benefits such as beta glucan in oats that reduces the risk of heart diseases and reduce the bad cholesterol level. The purpose of this study was to enhanced nutritional quality with respect to physiochemical properties of the multigrain waffle premix.

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