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Harnessing the Nutritional Power of Millets: Formulating and Evaluating Multi-Millet Muffins for Enhanced Quality and Health Benefits.

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Abstract: In order to create Multi-Millet Muffins utilising finger millet flour, kodo flour, and barnyard flour, the current study was conducted. Individuals now days invest more time and energy to increase their assist by investigating natural health goods and alternative or herbal remedies for illness prevention or a healthier lifestyle. It is well recognised that those who eat a diet high in whole grains, seafood, nuts, fruits, and vegetables have a lower risk of contracting illnesses. Currently, consumers favour foods that are convenient to handle, store, and consume while still offering health benefits. It is well known that millets are high in phenolic chemicals, many of which have antioxidant properties. Millets are a great source of several nutrients, one of which is B vitamins, which are vital for metabolism, the growth of nerve cells, and good skin and hair. Along with many other essential micronutrients, millets are a good source of fibre, protein, manganese, magnesium, phosphorus, and iron. Finger millet contains a lot of vitamin B12, which is necessary for heart health and the efficient operation of the nervous system. A sensory evaluation of the cake manufactured with a prepared multi-millet cake premix is conducted, and sample S2 is judged to be the best among all in terms of sensory attributes like colour, flavour, overall acceptability, and taste.

Key words: Multi-Millet Muffins, Methods Of Formulation And Processing, Assessment Of Quality, Nutritional Makeup, Advantages For Health, Culinary Creativity

INTRODUCTION

Products from bakeries are among the things that people eat the most of worldwide. Some of them, Cakes are widely consumed and, in the eyes of consumers, represent a delectable sponge product with the ideal organoleptic qualities. The intricate emulsion and foam system that is cake batter. The primary ingredients used in its preparation are flour, milk, fat, sugar, eggs, and the leavening agent; each element plays a crucial role in the structure of the cake (Ishrat Majid et al., 2014).
Baking has been around since at least 2600 B.C. It is said that the baking method was originally used by the Egyptians. They are also known for being the ones who used leavening—the process of using yeast to raise bread dough—for the first time. The first ovens used to make these breads were also invented by the Egyptians. From Egypt, baking made its way to Greece and eventually the Roman Empire, where it reached its zenith in the third century B.C. and pastries gained widespread popularity. A skilled pastry chef was highly valued, and by the year 1 A.D., Rome alone had more than three hundred pastry chefs. The baking technique quickly expanded to other regions of the world due to the Roman Empire's extensive reach. People began baking across Europe and Asia, and it gradually spread to become a more regular everyday activity. Street vendors appeared all throughout Europe, offering onlookers their freshly baked pastries. Pancakes, gingerbread, and cakes were among the products sold. The industrial revolution and the advancement of machinery led to the growth of the baking business, which flourished in the US with the construction of factories and the establishment of railroads as a means of delivering baked goods.
The previous five years have seen a modest expansion in the business because of shifts in customer tastes and the recession.

From 2013 to 2018, yearly growth is predicted to climb by.7%, despite a decline of.3% from 2008 to 2013. This is due to the fact that disposable income has been increasing and sales and revenue are indicators of the state of the economy. Big businesses have experienced exponential growth during the past five years. Mergers and acquisitions are to blame for this. After acquiring Weston Bread Unit and Sara Lee, Grupo Bimbo became the biggest baked goods firm in the United States. Even if there aren't many mergers and acquisitions right now, market concentration is starting to rise. According to the industrial lifecycle, the baking sector is currently mature. This indicates that a majority of US families embrace bread and other baked items (Rifna E. Jerome et al., 2014).

One unusual characteristic of refined wheat flour (RWF) is that when it is kneaded with water, it forms into an extensible, viscous dough. The gluten protein found in wheat is responsible for this characteristic. A network of gluten gives bread structure by stopping the gas released during the fermentation process (Brites et al. 2010).

A very diverse family of small-seeded grasses known as millets is widely cultivated as a grain or staple crop for human consumption and fodder all across the world. In post used for storing grains and seeds found at archaeological sites in modern-day China, India, Europe, and other parts of Africa, millet grains have been found. The two states in India with the highest consumption of tiny millets in rural areas are Assam (18.82 kg/hsh/m) and Bihar (18.69 kg/hsh/m). The largest percentage of tiny millets (32.4%) is found in Madhya Pradesh, with 19.5%, Uttarakhand (8%), Maharashtra (7.8%), Gujarat (5.3%), and Tamil Nadu (3.9%) following. Around the world, millets have long been a staple food in many tribes. Although some millet also belongs to other taxa, the majority of species often referred to as millet are members of the group Panaceae. The anti-diabetic qualities of millet and its low glycemic index make it a promising food ingredient with potential health advantages, including a potential reduction in post-prandial glucose levels and glycosylated haemoglobin.In addition, millet contains the protein of pearl millet and has antioxidant and antibacterial qualities. Millets are often high in nutrients, fibre, and B-complex vitamins. Additionally to being easy to digest and non-allergenic, millet does not form acids.Additionally, millets had a significant role in the prehistoric laws of Chinese, Indian, Neolithic, and Korean Mumun cultures. China and Niger are the next two largest millet producers, after India. Other significant millet-producing nations are Mali and Burkina Faso. The most significant cereal crop grown in the world's semi-arid regions is finger millet. Approximately 12% of the world's millet land is currently used for finger millet production, primarily in more than 25 Asian and African nations. Many local names from different countries are used to refer to finger millet, such as bulo in Uganda, wimbi in Kenya, ragi or mandua in India, koddo in Nepal, coracan, Koracan in France, African millet, finger millet in England, tokuso in Ethiopia, fingerhirse in Germany, and so on. There are roughly ten genera and twenty species of finger millet (Lupien, 1990). When preparing traditional dishes like roti, pancakes, dumplings, porridge, etc., finger millet is frequently utilised as a whole meal (Bennetzen et al., 2003) [1].

In addition to being a healthy food for babies and a wonderful source of nutrients for developing children, finger millet is also utilised in the baking of goods. When boiled or roasted, finger millet grains emit a delightful flavour and provide numerous health benefits. Since millets don't require pesticides, they may be stored without being damaged by insects, pests, or rodents, making them a more desirable crop in areas where famine is likely to occur. In conclusion, the crop exhibits productivity across an extensive spectrum of growth and environmental conditions. Excellent malting adds individuality to the grain and makes it useful for a wide range of food processing applications, including value addition. Currently, they are considered to be among the top ten most significant grains, providing food for almost one-third of the global population (Changmei and Dorothy, 2014).

The earliest little millet to be cultivated is barnyard millet. There are two primary species of barnyard millet: Echinochloa frumentacea, also known as Indian barnyard millet, and Echinochloa esculenta, also known as Japanese barnyard millet. Billion Dollar Grass is another name for Indian barnyard millet. (USDA NCRS, 2002). [24]The crop Echinochloa frumentacea is self-pollinating and a member of the Poacea family.The hardest millet, Echinochloa frumentacea, goes by a number of names, including Sanwa and Jhangora in Hindi, Shyama in Sanskrit, Oodalu in Kannada, Kuthiravaali in Tamil, Udalu and Kodisama in Telugu, Shamul in Marathi, Sama in Gujarati, Shamula in Bengali, and Swank in Punjabi. Numerous nations, including Africa, the United States of America, Malaysia, China, India, and the East Indies, cultivate it. In 2014. Anuradaha et al. The primary growing regions in India include the hills of Uttarakhand, Orissa, Maharashtra, Madhya Pradesh, Tamil Nadu, Bihar, Punjab, and Gujarat. (Kumar and others, 2000). With production and productivity of 87 thousand tonnes and 857 kg/ha, respectively, barnyard millet is the second most important small millet in India after finger millet (Padulosi et al., 2009). It is mostly grown in two distinct agro-ecolOgies in India: one in the Deccan plateau region of Tamil Nadu in the south, and another in the mid-hills of the Himalayan region of Uttarakhand in the north. In many Indian states, wild barnyard millet (Echinochloa colona) is commonly seen growing as a weed in rice fields and is used as food during drought years (Padulosi et al. 2009). Barnyard millet can provide up to eight harvests annually and has garnered some attention as a fodder crop in Japan and the United States due to its rapid growth and early maturity. In terms of protein and calcium content, the crop straw is regarded as better fodder than rice, oat, or Timothy straw (Obara 1936). In the United States, ducks and other birds primarily eat its grains (Mitchell 1989). Origin, History, and Domestication Echinochloa frumentacea displayed a comparable evolutionary history in Africa and India. It is grown as an annual in Tanzania, Malawi, India, and the Central African Republic (Doggett 1989). The tropical grass E. colona (L.) Link, also referred to as jungle rice, is its natural progenitor; however, it is unclear when exactly it was domesticated. Echinochloa esculenta is an annual plant that is mostly grown in temperate regions of Japan, Korea, China, Russia, and Germany (De Wet et al., 1983). It was directly domesticated in Japan about 4000 years ago from its wild parent, barnyard grass (E. crus-galli (L.) Beauv.) (Doggett 1989).

A healthy grain that works well as a stand-in for wheat or rice is kodo millet. Compared to main cereals like rice, the concentration of protein, fibre, and minerals is significantly higher. Eight percent of the grain in the kodo millet has protein. Glutarol is the main protein component found in Kodo millet (Sudharshana et al., 1988). Compared to wheat (1.2%) and rice (0.2%), kodo millet (9%), a great source of fibre, is available. Comparable to other millets, kodo millet has 353 kcal and 66.6g of carbs per 100g of grain. 2.6% minerals and 1.4% fat are also present. Kodo millet has an iron concentration ranging from 25.86 ppm to 39.60 ppm (Chandel et al., 2014). There have been reports of a decline in millets consumed in Indian families. Between

1962 and 2010, the amount of millets consumed per person declined precipitously from 32.9 kg to 4.2 kg (Source: Assessing Millets and Sorghum Consumption Behaviour in Urban India: A Large-Scale Survey, 2021). Because of their soft texture and pleasant taste, muffins are baked goods that are sweet and high in calories. Numerous studies have been carried out in recent years to increase the nutritional content of muffins, such as fiber-rich, sugar-free, antioxidant-rich, and fat-free varieties (Nidoni U., 2015). Across all age groups, baked goods like cakes, muffins, and the like have become increasingly popular. Worldwide, because to their unique qualities and evolving eating patterns, consumers need easy foods like cake and muffins from childhood to maturity. According to Baixauli R. et al. (2007), ingredients for a typical muffin batter include sugar, fat or oil, flour, eggs, milk, and baking powder. (1; 1)

Muffins are not only delicious, but their functionality can be developed enabling people with various ailments to consume them for medicinal purposes. By preparing the mixture for muffins and cakes with a different kind of fat and adding useful additives. According to McGuire B. et al. (2001), an ideal muffin product has a symmetrical shape, a round top that is golden-brown, a creamy white or slightly yellow interior that is free of streaks, uniform cells that are moderate in size, sweet flavour, pleasant aroma, and is moist and delicate. (2)

RESEARCH METHODOLOGY

Raw resources: The local market was the source of all raw materials. The ingredients for making the multi-millet muffins included millet flour, which we prepared by grinding and dyeing the millet, milk powder, sugar, water, fat baking soda, and baking powder.

List of Equipment's and uses:

1. Sieves: To achieve consistent particle size flour and eliminate all foreign particles from various flours, sieves were utilised.
2. Weighing Balance: A weighing balance was utilised to precisely weigh each ingredient.
3. Whisk: To thoroughly combine the components and add air to the mixture
4. Mixer grinder: To grind the millets used to a fine flour.
5. Microwave oven: To bake the muffins.
6. Hot Air Oven: One kind of dry heat sterilisation is the hot air oven. It was applied to ascertain the moisture content of the cake premix and raw ingredients. The sample was maintained at 105 °C for three to four hours, or until a steady weight was reached.
7. Muffle Furnace: Muffle furnaces are employed in high-temperature testing scenarios, such as ashing or loss on ignition. It was applied to the estimation of the finished product's and raw materials' ash content.

Method

Chemical Analysis :

Moisture content:

The hot air oven drying method was used to determine the moisture content. Each material was sampled at 5 g in an empty petri plate that had been preweighed. The samples were dried in a hot air oven at 105ºC until a constant weight was achieved, which took 6 to 7 hours. Desiccators were used to cool the plates. A formula was used to determine the moisture content (Ranganna, 1986). (3)

% Moisture Content = (initial weight of sample – final weight of sample) Initial weight of sample * 100

Ash content:

After weighing a 5 g sample into a crucible, the material was burned over a low flame until it was totally charred, and then it was cooled. After that, it was maintained at 550 C for almost 4 hours in a muffle furnace. It was weighed after cooling in a desiccator once more, and the process was continued until two successive weights were consistent. The percentage of ash was determined by subtracting the starting weight from the finished weight (A.O.A.C., 1990).

% Ash = Weight of (crucible + ash) – Weight of empty crucible Weight of Sample * 100 (4)

Sensory evaluation:

Evaluation of the multi-millet muffin samples according to their sensory qualities: ten semi-trained panel members, including departmental faculty and postgraduate students, assessed the samples according to their appearance, taste, texture, sweetness, and

general acceptability. The panellists were instructed to use a 9-point hedonic scale to record their observations on the sensory sheet. (5)

The following were the numerical scores assigned:

9 – Like extremely
8 – Like very much
7 – like moderately
6 – Like slightly
5 – Neither like for dislike
4 – Dislike slightly
3-Dislike moderately
2– Dislike very much
1-Dislike extremely

Processing of Millet Muffins

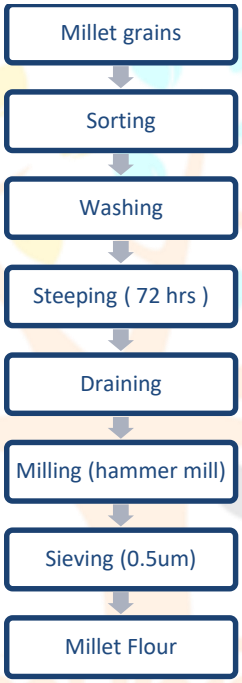

Fig.1. Flow sheet for making Millet Flour

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Fig.2. Flow Chart of preparation of muffins

Description:

1. Mixing: First, the dry components are combined with liquids such as oil or shortening. Next, the liquids are added to the dry ingredients and mixed again until the dry ingredients are wet. At the conclusion of the mixing cycle, or frequently before the muffin batter is deposited, additional ingredients are added.
2. Depositing: The moulds are filled with the prepared batter.
3. Baking: Heat causes a number of physical and chemical transformations that turn a liquid batter into a finished cooked muffin. For the muffins to turn out perfectly, baking temperature and duration are crucial. Muffins should be baked at roughly 180°C for 15 to 20 minutes.
4. Cooling: Before packaging, the product needs to chill. This facilitates setting and lessens the likelihood that moisture condensation may occur inside the container. Condensed moisture produces an unfavourable medium that encourages the growth of bacteria, mould, yeast, and spoiling.
5. Packaging: Each muffin was wrapped separately and placed on a baking tray before baking. The muffins were packaged with appropriate materials. Baked muffins have a shelf life of around 3-5 days when wrapped, and 4-7 days when wrapped in foil or plastic wrap. (6)

Optimization:

Development and optimization of control and developed muffins.

Ingredients	Control	MF1	MF2	MF3	MF4
Wheat flour	40	35	25	20	15
Kodo millet flour	-	20	16	14	12
Barnyard millet flour	-	-	14	12	08
Finger millet flour	-	-	-	14	12

Sugar powder	35	35	35	35	35
Milk powder	6	6	6	6	6
Whey protein	8	-	-	-	-
Emulsifier	6	6	6	6	6
Baking soda	1.5	1.5	1.5	1.5	1.5
Baking powder	1.5	1.5	1.5	1.5	1.5
Vanilla essence	0.5ml	0.5ml	0.5ml	0.5ml	0.5 ml
Salt	0.5gm	0.5 gm	0.5gm	0.5gm	0.5gm
Oil	5ml	5ml	5ml	5ml	5ml

Table No 1: Optimization of flour for the development of muffins.

Table No. 1 shows how the amounts of wheat flour, Barnyard flour, Kodo flour, and Finger flour were adjusted to optimise the control muffins. Sample MF1 has 20 grammes of kodo flour and 5 grammes of wheat flour, while the control sample has 40 grammes of wheat flour. Sample MF2 has 14g of Barnyard flour, 16g of Kodo flour, and 25g of wheat flour. 20g of wheat flour, 14g of Kodo flour, 12g of Barnyard flour, and 12g of finger millet flour are included in Sample MF3. Sample MF4 includes 12 grammes of Kodo flour, 8 grammes of Barnyard flour, 12 grammes of Finger millet flour, and 15 grammes of Wheat flour.

Ingredients	**S1**	**S2**	**S3**
Wheat flour	15	15	15
Kodo millet flour	12	12	12
Barnyard millet flour	8	8	8
Finger millet flour	12	12	12
Sugar powder	30	35	38
Milk powder	6	6	6
Emulsifier	6	6	6
Baking soda	1.5	1.5	1.5
Baking powder	1.5	1.5	1.5

Vanilla essence	0.5ml	0.5ml	0.5ml
Salt	0.5 gm	0.5gm	0.5gm
Oil	5ml	5ml	5ml

Table No .2 : Optimization of sugar powder for the development of muffins

Table No. 2 shows how the amount of sugar was changed to optimise the control millet muffins. Sample SP3 had the highest sugar content, 38 grammes. Sample SP1, on the other hand, has the least amount of sugar—30 grammes.Sample SP2 has 35 grammes of sugar. The remaining goods' ingredients stay the same.

Ingredients	**MP1**	**MP2**	**MP3**
Wheat flour	15	15	15
Kodo millet flour	12	12	12
Barnyard millet flour	8	8	8
Finger millet flour	12	12	12
Sugar powder	35	35	35
Milk powder	6	8	**10**
Emulsifier	6	6	6
Baking soda	1.5	1.5	1.5
Baking powder	1.5	1.5	1.5
Vanilla essence	0.5ml	0.5ml	0.5ml
Salt	0.5 gm	0.5gm	0.5gm
Oil	5ml	5ml	5ml

Table No .3 Optimization of milk powder for the development of muffins

Table No. 3 shows how the amount of milk powder was changed to optimise the control millet muffins. Sample MP3 has the highest concentration of milk powder (10 grammes). The least amount of milk powder, 6 grammes, is seen in Sample MP1. There are 8 grammes of milk powder in Sample MP2. The remaining goods' ingredients stay the same.

Ingredients	B1	B2	B3
Wheat flour	15	15	15
Kodo millet flour	12	12	12
Barnyard millet flour	8	8	8
Finger millet flour	12	12	12
Sugar powder	35	35	35
Milk powder	10	10	10
Emulsifier	6	6	6
Baking soda	**0.5**	1.0	1.5
Baking powder	**0.5**	1.0	1.5
Vanilla essence	0.5ml	0.5ml	0.5 ml
Salt	0.5 gm	0.5gm	0.5gm
Oil	5ml	5ml	5ml

Table No .4 : Optimization of baking powder and baking soda for the development of muffins .

Table No. 4 shows how the ratios of baking soda and powder were changed to optimise the control millet muffins. Sample B3 has the highest concentration of baking powder and soda, 1.5 grammes. Sample B1 has the least amount of baking powder and soda—0.5 gramme. One gramme each of baking powder and soda is present in Sample B2. The remaining goods' ingredients stay the same.

Ingredients	Final formulation (gm)
Wheat flour	15
Kodo millet flour	12
Barnyard millet flour	8
Finger millet flour	12
Sugar powder	35
Milk powder	10
Emulsifier	6
Baking soda	0.5
Baking powder	0.5
Vanilla essence	0.5 ml
Salt	0.5
Oil	5ml

Table No. 5: Final formulation for preparation of millet muffins.

The final recipe for the multi-millet muffins included 12 grammes of kodo millet flour, 8 grammes of barnyard millet flour, and 12 grammes of finger millet flour. We optimised 40 grammes of wheat flour to 15 grammes. Other ingredients included in it include 10 grammes of milk powder, 35 grammes of sugar powder, 12 grammes of emulsifier, 0.5 grammes of baking powder, 0.5 grammes of baking soda, 0.5 grammes of salt, 0.5 millilitres of vanilla essence, and 5 millilitres of oil.

RESULTSANDDISCUSSION

Raw material	Moisture	Ash	Protein	Fat	Carbohydrates
Barnyard millet flour	12.35	1.5	8.5	4.1	57.50
Kodo millet flour	11.2	1.8	8.1	1.5	64.3
Whole wheat flour	11.48	1.97	7.95	1.87	65.19
Finger millet flour	10.70	1.84	7.61	3.85	78.80

Table No 6. FSSAI parameters of raw materials

Raw material	Moisture content			Ash content		
	S1	S2	S3	S1	S2	S3
Wheat flour	10.13	10.57	10.87	1.16	1.16	1.73
Finger millet flour	10.10	10.38	10.68	1.66	1.66	1.91
Barnyard millet flour	10.45	11.50	11.80	1.54	1.97	2.4
Kodo millet flour	10.45	10.90	11.68	1.23	1.46	1.66

Table No. 7 Physicochemical analysis of Raw materials

Sensory characteristics	MF1	MF2	MF3	MF4
Colour	6	5	6	8
Flavour	6	7	8	8
Aroma	5	7	6	7
Texture	8	8	7	8
Overall acceptability	6.5	6.7	6.7	7.5

Table No. 8 Optimization of flour for the development of muffins

Sensory characteristics	S1	S2	S3
Colour	7	8	7
Flavour	7	8	6
Aroma	7	8	7
Texture	6	7	6
Overall acceptability	6.5	7.5	6.5

Table No. 9 Optimization of sugar powder for the development of muffins

Sensory characteristics	MP1	MP1	MP3
Colour	6	8	8
Flavour	7	6	9
Aroma	7	6	7
Texture	7	7	8
Overall acceptability	6.7	6.7	8

Table No. 10 Optimization of milk powder for the development of muffins

Sensory characteristics	B1	B2	B3
Colour	8	7	7
Flavour	8	6	8
Aroma	8	7	7
Texture	8	8	7
Overall acceptability	8	7	7.5

Table No.11 Optimization of baking powder and baking soda for the development of muffins.

Final Products Analysis

Raw material	Moisture content	Ash content
Sample 1	28.4	1.5
Sample 2	29.3	1.8
Sample 3	29.7	1.94

Table No.12 Physicochemical analysis of developed muffins.

Discussion

- It was determined that millets could replace refined flour in baked goods like muffins and be widely used if millets were developed and standardised.
- The muffins' physical qualities flavor, texture, colour, and taste as well as their nutritional qualities fat, fibre, iron, and calcium have all improved with the addition of millet flour.
- Those who are intolerant to gluten can benefit from these Muflins. A significant portion of commercial items' raw materials are millets. Panellists found Product S2 (Proso millet muffin) to be quite satisfactory, and the general public can eat it.
- Adding millets to baked goods enhanced their nutritious value. One of the delicious and appetising products created by baking batter is the muffin. A popular baked good in the fast food sector, muffins are the focal point of numerous festivities.
- The demand for millet flour's ability to reduce chronic disease risk beyond nutritional function has increased since it was added to muffins. (7)

Cost estimation of multi millet muffins

Ingredients	Rate	Quantity(gm)	Cost
Wheat flour	25/500gm	15	0.75
Kodo millet flour	135/500gm	12	3.24
Barnyard millet flour	110/500gm	8	1.76
Finger millet flour	30/500gm	12	0.72
Sugar powder	56/1000gm	35	1.96
Milk powder		10	4.2
Emulsifier	100/50gm	6	12
Baking soda	28/50gm	0.5	0.28
Baking powder	28/50gm	0.5	0.14
Vanilla essence		0.5ml	2
Salt	5/200gm	0.5	0.0125
Oil	121/1000ml	5ml	0.605
Total	-	105 gm	25.66

Table No.13 Cost estimation of multi millet muffins

Conclusion

- It is clear from the current study that millets have good nutritional and functional qualities. Among all the flours, finger millet had the highest calcium content. Millet contains more micronutrients than wheat. Of all the millets, pearl millet had the greatest fat content—4.5%.After analysing the crude fibre content of each flour, it was discovered that the barnyard millet had the highest fibre content when compared to finger millet and kodo millet.
- Muffin batter made with refined wheat flour, kodo millet, finger millet, and barnyard millet When flour is added in the right amounts, a product becomes more nutritive and more palatable overall. The flour mixtures can be used to make multigrain muffins of a high calibre and pleasing texture. In addition to being a good source of fibre, carbohydrates, protein, energy, and fats, multigrain muffins also contain finger millet, which is high in tryptophan, threonine, valine, isoleucine, and methionine and suitable for those with celiac disease and gluten sensitivity. (8)
- These findings suggest that finger millet flour refined wheat flour muffins, combined with kodo millet flour and barnyard millet flour, are healthier than the typical muffins seen in stores, which are produced with refined wheat flour.

- Use this recipe to make muffins. When added in the proper amounts, finger millet flour, Kodo millet flour, barnyard millet flour, and refined wheat flour enhance a food's nutritional value and acceptability as a whole. These flour blends could be utilised to create delicious multigrain muffins with superior sensory qualities. The nutrients fibre, carbohydrate, protein, energy, and iron found in multigrain muffins are all essential for overall health and have special advantages. (9)
- Nutrient-focused foods like millets and other cereals are becoming more and more popular in a society where being healthy and happy has become the ultimate lifestyle. The extraordinary advantages that millet has for human health are acknowledged by every dietician and nutritionist. In addition to being low in gluten and gluten-free, they can improve your health and help you lose weight. (10) One of the best dietary choices to reduce the risk of lifestyle-related diseases is to include millet in your diet. Therefore, eating these nutrient-rich millets can lower your chance of developing diseases linked to a certain way of life, such as cancer, type II diabetes, cardiovascular disease, and gastrointestinal disorders.
- Additionally abundant in phenolic compounds and antioxidants, such as ferulic acid, gallic acid, vanillic acid, and tannins, are kodo millets. In a 2017 review, Vinoth et al. suggested that kodo millets could aid in the treatment of malnutrition linked to vitamin deficiencies. Kodo millets may therefore have a beneficial effect on malnutrition.
- Since muffins are a product that people of all ages like, it is simple to expose everyone to these healthful muffins.

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