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Development and quality evaluation of wheat-bael powder blended cookies

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Abstract
The goal of the present study was to develop cookies with mixed wheat-bael powder. The following ratios of bael powder to wheat flour were used: T_1 (100:0: WF: BP); T_2 (95:05: WF: BP); T_3 (90:10: WF: BP); T_4 (85:15: WF: BP); T_5 (80:20: WF: BP); T_6 (75:25: WF: BP); and T_7 (70:30: WF: BP). Fresh bael, its powder, and wheat flour undergo physico-chemical analysis. According to the findings, bael powder has a higher level of fibre, ash than wheat flour. The developed products undergone physico-chemical analysis at intervals of 30 days for a total of 90 days while being packed and stored at room temperature.
At the first day, treatment T_7 (70:30: WF: BP) had the highest moisture content (3.80%), crude fibre (2.90%), crude fat (21.34%), ash content (2.38%) while treatment T_1 (100:00: WF: BP) had the lowest moisture content (3.50%), crude fibre (2.15%), crude fat (20.85%), ash (1.45%). However, the highest levels of crude protein (7.25%) and carbohydrates (64.50%) were found in treatment T_1 (100:00: WF: BP). Increased trends in moisture content, crude fibre, crude fat, ash content were observed as storage progressed. During the 90 days of storage, a declining trend in crude protein and carbohydrates were seen. Among all the blends, the blend prepared with 85% wheat flour and 15% bael powder *viz*., treatment T_4 (85:15::WF:BP) was considered best on the basis of sensory evaluation. According to storage studies, all of the treatments could be stored for 90 days without losing any of their qualitative characteristics.

Keywords: Bael, blends, cookies, physicochemical analysis, storage

Introduction
One of the biggest global organised food sectors is the bakery sector. Due to their availability, readiness for consumption, and extended shelf life, biscuits and cookies are among the most popular items (Sindhuja *et al*. 2005) [78]. Due to their low moisture level, cookies are valued for their flavour, scent, convenience, and long shelf stability. Numerous bakery items are healthy and full of nutritional and antioxidant characteristics. As a result, they are admired by everyone in the world. India is the second largest producer of the cookies in the world.
One of the medicinal herbs in India is called bael (*Aegle marmelos* Corr.). Bengal quince and golden apple are some names for it. It is a medium-sized deciduous tree from the Rutaceae family. In India, bael is also known by the names maredu, bill, bill patra, balwa, vilwan, and kuvalam. Bael is native to northern India, yet it is prevalent across the entire Indian peninsula. High producing bael variety Goma Yashi is being grown commercially as orchards or border plantations in the states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Punjab, Tamil Nadu, and Gujarat. Bael fruits are regarded as a top diarrhoea treatment in the Ayurvedic medical system (Das & Das, 1995) [25]. It strengthens the stomach, aids in the prevention or treatment of scurvy, and also acts as chemo-preventive agent (Baliga *et al*. 2011) [14].
According to Dewettinck *et al*. (2008) [27], wheat (*Triticum aestivum* L.) is the third most frequently used and consumed food product in the world, behind rice and maize. According to estimates from Ferrari *et al*. (2014), among the wheat flour 55% of processed wheat flour is being used in the confectionary and baking industry, 17% is consumed at home, 15% is used to make dough, 11% is used to make cookies, and 2% is used to make pharmaceuticals, glue, and animal feed. The fact that cookies are ready to eat, inexpensive, nutritious, come in a broad variety of flavours, and have a long shelf life has led to their widespread acceptance and widespread consumption over the world.
The following objectives were achieved in the current investigation, which was carried out to manufacture the cookies with bael powder to satisfy the nutritional requirement of a growing population, taking into consideration the need and interest for nutritionally enhanced bakery

products: To standardize the methodology for preparation of wheat-bael powder blended cookies in different ratios and to assess the quality parameter of the processed product during storage.

Materials and Methods

The Division of Food Sciences and Technology, SKUAST Jammu, conducted the current research, titled "Development and Quality Evaluation of Wheat-Bael Powder Blended Cookies" in various ratios, from 2019 to 2021.The following sections that provide descriptions of the methodology used:

Raw Materials

Fresh bael fruits of high quality and proper ripeness were procured from the IIIM Farm at the CSIR-Indian Institute of Integrated Medicine Field Station in Chatha-Jammu and transferred to the Division of FST at SKUAST-J for further processing.

Processing

Processing of Bael into pulp

Using a hammer and a hard item, ripe fruits were smashed after being rinsed with tap water. A stainless steel spoon was used to scrape up the fruit pulp, with its seeds and fibres. The pulp was manually blended with an equal amount of water to make it homogeneous, and removing of the seeds were done by passing the mixture through a stainless steel sieve. The pulp and water mixture was heated to 80 °C for one minute, allowed to cool, and then combined with sodium benzoate at 1g/kg of pulp. The pulp was put into glass jars that had already been sterilized and kept in a deep freezer.

Bael powder

Fresh bael pulp was spread out on trays and heated to between 60 and 65 °C for 18 hours to dry it to a moisture level of about 10%. With the aid of a grinder and a 150mm sieve, the dried pulp was ground into a powder that was then sealed in airtight jars and kept in a cool, dry location. The resulting powder was then subjected to several parameter analyses.

Development of cookies

In addition to other basic components like shortening (fat), sugar, baking powder, solution, salt, and water, cookies were made using a combination of wheat flour, bael powder, and other ingredients in various ratios. Using a flat beater, the powdered sugar and fat were creamed for five minutes before solution was added and a suspension was created. The ingredients were combined, and then cream and sieved flour were added and combined to produce a dough. Consistent thickness sheets of dough was made and cut into cookies using a mould that had a diameter of 51mm. Then, it was based on a greased tray for 15 minutes at 180 °C. After baking, cookies were allowed to cool completely before being perfectly wrapped in laminated pouches and stored at room temperature for 90 days.

Experimental detail

Preparation of wheat -bael powder blended cookies

The wheat flour and bael powder were blended with each other in different ratios as per the treatment given below:

Table 1: Details of treatment

Treatments	Wheat flour (%)	Bael powder (%)
T_1	100	00
T_2	95	05
T_3	90	10
T_4	85	15
T_5	80	20
T_6	75	25
T_7	70	30

Total treatments combinations:	7
Number of replications:	3
Storage duration:	90 days
Design:	Completely Randomized Design (CRD)

Storage

Cookies made with wheat-bael powder were kept in laminated pouches at room temperature for 90 days while being evaluated for physicochemical characteristics every 30 days.

Physico-chemical analysis

Moisture content

Using the standard AOAC (2012) [9] methodology, moisture content was determined. A pre-weighed petridish containing five grams of the macerated sample was placed in the hot-air oven at 70 °C to dry until a steady weight was obtained. After cooling, weight was determined using the dried sample that had been retained in a dessicator. The dried sample was maintained in a dessicator, and once it had cooled, its weight and final moisture content were determined.

$$\text{Moisture (\%)} = \frac{\text{Loss in weight on drying}}{\text{Initial weight of sample}} \times 100$$

Crude fat (AOAC, 2012)

To evaluate crude fat, the soxhlet extraction technique was performed. The sample's fat content was simply extracted into petroleum ether, an organic solvent, between 60 and 80 degrees Celsius, and then refluxed for six hours. By using the formula below proportion of the fat content was calculated.

$$\text{Crude fat percent} = \frac{\text{Ether extract amount (g)}}{\text{Weight of Sample (g)}} \times 100$$

$$= \frac{W2 - W1}{W} \times 100$$

Sample Weight = W (g)
Empty Beaker Weight = W_1 (g)
Empty Beaker weight+ content fat (ether extract) W2 (g)

Crude fiber (AOAC, 2012) [9]

Applying the AOAC (2012) [9] standard method, crude fibre was calculated. 200ml of 125 percent sulphuric acid was added to a two-gram sample that had been removed from moisture and fat. Beaker boiled for 30 minutes after being placed on a digestion apparatus with a previously controlled hot plate.

Crude protein

The micro-Kjeldahl procedure was used which is used to convert nitrogen content to crude protein at a ratio of 6.25.In a Kjeldahl digestion flask, combined sulphuric acid (20 ml) and digestion mixture (10.0 g) are used to break down a 1.0 gram weighted sample. Before being transferred to a 250 mL volumetric flask, the ingredients were chilled. With distilled water, the volume was raised to the required level and then mixed. A predetermined amount was put into a distillation flask, and then 40.0 percent sodium hydroxide was added to it. A condenser was used to obtain ammonium borate, which was then placed in a flask with 10 ml of a 4 percent boric acid solution. A 0.1 N sulfuric acid titration was performed on the distillate. Along with the sample, a blank sample was also collected.

$$\text{Nitrogen\%} = \frac{\text{Titre value X 0.00014 X volume made}}{\text{Aliquot taken (g) X Weight of sample (g)}} \times 100$$

Ash content (AOAC, 2012) [9]

Ash content was calculated using the AOAC (2012) [9] standard methodology. A silica crucible that had already been weighted received a sample of about 5 gram that was moisture-free. Initial ashing was performed using slow flame heating to allow fat to burn off without smoking. The sample was burned at 600 °C–10 °C for 8 hours in a muffle furnace after the smoke ceased emanating from it. The crucibles were taken out, dried out, and weighed. The following equation was used to determine the amount of ash.

$$\text{Percent ash} = \frac{\text{Weight of ash (g)}}{\text{Weight of sample (g)}}$$

Carbohydrate (AOAC, 2012)

The difference approach has been used to determine the carbohydrate content. It was calculated by taking 100 out of the total of the percentages of ash, moisture, fat, protein, and fibre.

Carbohydrate (%) = 100- (moisture % + fat %+ protein % + ash%+ fiber %)

Economics of the products

The cost for manufacturing the goods was calculated by considering in costs such as the cost of the chemicals, raw materials, and packaging materials and used in their production.

Statistical analysis

The data were statistically evaluated using a completely randomised design (OP stat software) in order to interpret the results through analysis of variance (Gomez and Gomez, 1984) [32].

Results and Discussion

In the investigation at hand, an effort was made to develop a value-added product from cookies manufactured with a wheat-bael powder blend. By taking periodic samples over the course of a three-month ambient storage period, the chemical composition quality of created items was kept under observation. Sensory analysis was used to further determine the products' quality. The following topics are covered in this chapter in relation to the results:

Chemical Composition of raw materials

The total soluble solids, moisture content, and titratable acidity of fresh bael pulp were found to be 350 Brix, 60.86%, and 0.360% respectively in Table 2's proximate analysis, which are in line with the findings of Sharma *et al*. (2014) [76], Singh *et al*. (2017) [80], and Thukral (2017) [91]. The percentages of crude fibre, and ash were 2.29%, 2.52% respectively. According to Kaur and Kalia's (2017) [41].

The moisture content, crude protein, crude fat, total carbohydrates, crude fibre, ash content of bael powder were found to be 3.25 percent, 3.64 percent, 1.54 percent, 74.31 percent, 4.25 percent, 3.42 percent respectively, according to Table 3's proximate analysis. The outcomes were closely compared to those of Sagar and Kumar (2012) [98].

Table 3's proximate analysis of wheat flour revealed a moisture content of 10.56%. These outcomes correspond to those of Salehifar and Shahedi (2007) [70]. The percentages of crude protein, crude fat, crude fibre, ash and total carbohydrate content were found to be 10.5%, 1.18%, 1.03%, 1.50% and 78.30%, respectively. These chemical composition values were closely comparable to those obtained by Alviola *et al*. (2017) [7].

Storage studies of wheat-bael powder blended cookies:
Moisture content

The values for moisture content in Table 4 showed a noticeable decline in all treatments. The treatment T_1 (100:00: WF: BP) had the highest moisture content (3.80%) while the treatment T_7 (70:30: WF: BP) had the lowest (3.50%). There was a decline in moisture content after bael powder was added, which may have been caused by the powder's low protein concentration. Similar trends were reported by Hussain *et al*. (2018) [36] in the creation of multigrain biscuits. Similar results were obtained in the cookies made with wheat and red kidney bean flour by Noah and Adedeji (2020) [59].

The moisture content increased over the course of the storage period. After 90 days of storage, treatment T_1 (100:00: WF: BP) had the highest moisture content (4.02%) while treatment T_7 (70:30: WF: BP) had the lowest (3.65%). After 90 days of storage, the mean moisture content of all cookies considerably increased from 3.63 percent to 3.83 percent. According to Nagi *et al*. (2012) [58], the justification for an increase in moisture content in cookies during storage may be due to the product's increasing hygroscopicity and the storage environment (temperature and relative humidity). Similar results were reported by Choudhary (2018) [99], who utilised mango peel powder to manufacture fiber-rich oat-wheat flour blend biscuits, and Waheed *et al*. (2010) [96], who studied the effect of palm oil blends and cottonseed on the quality of cookies.

Crude protein

Table 5's data on crude protein for various treatments showed a noticeable decline in all of the treatments. On the first day, treatment T_1 (100:00: WF: BP) had the highest protein content (7.25%) while treatment T_7 (70:30: WF: BP) had the lowest (6.90%).Because of the high gluten content, control T_1 (100:00: WF: BP) may have the highest protein concentration. Following 90 days of storage, treatment T_1 (100:00: WF: BP) recorded the greatest value of 6.95 percent while treatment T_7 (70:30: WF: BP) recorded the lowest value of 6.72 percent. According to Baljeet *et al*. (2010) [15], protein level decreased similarly in biscuits made with buckwheat flour. Additionally, whole wheat and date palm fruit pulp cookies had less crude protein overall, according to Peter *et al*. (2017) [100].

The mean values of crude protein exhibited a decrease from their initial value of 7.07% to 6.85% after 90 days of storage. Protein content may have decreased during storage due to the hydrolysis of peptide bonds by the protease enzyme, which causes the breaking of protein molecules. Sujirtha and Mahendran (2011) [88] noted a similar pattern of behaviour for crude protein in biscuits made with wheat-defatted coconut flour after storage. Similar findings in the production and evaluation of multigrain biscuits during storage were also reported by Hussain *et al*. (2018) [36].

Crude fibre

The crude fibre content of cookies increased significantly across all treatments, as shown in Table 6. The treatment T_7 (70:30: WF: BP) had the highest fibre content at 2.90 percent while the treatment T_1 (100:0: WF: BP) had the lowest at 2.15 percent. In addition, Kaur *et al*. (2011) [42] observed an increase in the amount of crude fibre in cookies made with cereal bran. Similar results were found by Ikuomola *et al*. (2017) [37] in cookies made with wheat flour and malted barley.

Crude fat

The data presented in Table 7 demonstrated that all treatments considerably increased the fat content of cookies. The treatment T_7 (70:30: WF: BP) had the highest crude fat level (21.34%), while the treatment T_1 (100:0: WF: BP) had the lowest crude fat content (20.85%). The results dropped to 21.16 percent in treatment T_7 (70:30: WF: BP) and 20.72 percent in treatment T_1 (100:0: WF: BP) after 90 days of storage, respectively. In every study, Hood and Jood (2005) [35] found that adding more fenugreek flour to wheat flour increased the amount of fat in biscuits. The results are in agreement with those of Omeire and Ohambele (2010) [61] and Gerneh *et al*. (2010) [31] for cookies made from mixtures of wheat-defatted cashew nut and, in the case of the wheat-brewers spent flour blends respectively. Hussain *et al*. (2018) [36] reported similar trends in development of multigrain biscuits.

The mean values of fat content decreased from 21.11 to 20.93% after 90 days of storage. The lipolytic activity of the enzymes, such as lipase and lipoxidase, may be the cause of the decrease in fat content during storage. Singh *et al*. (2008) [84] also noted that biscuits treated with varying amounts of jaggery showed a reduction in crude fat during storage. Cookies made with defatted wheat and coconut flour had a similar decline in fat content, according to Sujirtha and Mahendra (2015) [88].

Ash content

The amount of minerals in a product are indicated by its ash content. Table 8's data on the ash content of various treatments showed an upward trend. The treatment T_1 (100:0: WF: BP) had the lowest ash content at 1.45% and treatment T_7 (70:30: WF: BP) had the greatest ash content at 2.38% on the first day of storage. The rising trend in ash concentration may be brought on by the higher mineral content of bael powder than wheat flour. According to Bertagnolli *et al*. (2014) [19], adding more Guava peel flour to the cookies caused the ash level to rise. In cookies made using wheat and red kidney flour, Noah and Adedeji (2020) [59] obtained similar results.

The period of storage had a substantial impact on ash content. Due to its interaction with other ingredients including proteins and carbs, the mean ash content of wheat-bael powder blended cookies dramatically decreased from 2.09 to 1.86 percent during storage. Nwabueze and Atuonwu (2007) [60] observed similar findings in wheat biscuits enhanced with African bread fruit seed flour. In biscuits fortified with fenugreek flour, Hood and Jood (2005) [35] similarly showed similar results.

Carbohydrate

Table 9 contains the data. In both treatments, it was demonstrated in 2.6 that carbohydrates dropped significantly. Treatment T_1 (100:0: WF: BP) had the highest maximum carbs content of 64.50 percent while Treatment T_7 (70:30: WF: BP) had the lowest minimum of 62.98 percent. The fact that wheat's primary component, endosperm, is a rich source of carbs may be the cause of the therapy T_1 (100:0: WF: BP)'s greatest value of carbohydrates. After 90 days of storage, treatment T_1 (100:0: WF: BP) had the highest carbohydrate content of 65.06 and treatment T_7 (70:30: WF: BP) had the lowest carbohydrate content of 63.72. According to Bertagnolli *et al*. (2014) [19], when guava peel flour was used in place of wheat flour, the amount of carbohydrates was reduced. The same pattern was noticed by Jan *et al*. (2015) [49] in biscuits made with buckwheat flour.

The mean values of the carbs content significantly increased from initial levels of 63.53 percent to 64.16 percent after 90 days of storage. It's likely that the increase in the results' carbohydrate content was brought on by the breakdown of insoluble polysaccharides into simple sugars. In wheat cookies with soy protein substitution by Mohsen *et al*. (2009) [56] and in deffated peanut biscuits by Varshney *et al*. (2008) [95], similar outcomes were attained. According to Man *et al*. (2021) [52], the roasted flaxseed flour-based biscuits showed the similar pattern.

Overall Acceptability

Table 10 pertaining to score of overall acceptability revealed that at initial day the highest score of 8.52 was recorded in Treatment T_4 (85:15: WF: BP) and the lowest of 7.45 in treatment T_1 (100:0: WF: BP). During storage

During storage the mean scores decreased significantly from 7.95 to 7.56 in wheat- bael powder blended cookies. The decrease in overall acceptability scores in cookies may be due to change in chemical composition of the product and loss of colour and flavour during storage period of 90 days. Noah and Adedeji (2020) [59] have also reported a decreasing trend in overall acceptability in wheat and red kidney bean flour cookies. Similar findings have been reported by Akbar and Ayub (2018) [5] in wheat and maize based cookies.

Cost of production

The cost of raw materials, labour costs, power/fuel costs, and other expenses were all considered into the price for developing the cookies for treatment T_4 (85:15::WF:BP), as indicated in Table 5. In comparison to commercially available cookies, which typically cost Rs. 20/100 g, the cost of cookies was determined to be Rs. 15.69/100 g.

Table 2: Physico-chemical characterstics of fresh bael pulp

Characteristics	Bael pulp
TSS (°Brix)	35.00
Moisture content (%)	60.86
Crude protein (%)	1.52
Crude fibre (%)	2.29
Ash (%)	2.52

Table 3: Physico-chemical characterstics of bael powder and wheat flour

Characteristics	Bael powder	Wheat flour
Moisture content (%)	3.25	10.56
Crude protein (%)	3.64	10.05
Crude Fat (%)	1.54	1.18
Crude fiSbre (%)	4.25	1.03
Ash (%)	3.42	1.50
Total Carbohydrates (%)	74.31	78.80

Table 4: Impact of treatments and storage period on moisture (%) content of wheat- bael powder blended cookies

Treatments	Storage period (days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	3.80	3.92	3.98	4.02	3.93
T_2 (95:05::WF:BP)	3.72	3.81	3.90	3.95	3.84
T_3 (90:10::WF:BP)	3.67	3.75	3.85	3.88	3.78
T_4 (85:15::WF:BP)	3.62	3.70	3.77	3.83	3.73
T_5 (80:20::WF:BP)	3.57	3.63	3.71	3.77	3.67
T_6 (75:25::WF:BP)	3.54	3.60	3.68	3.73	3.63
T_7 (70:30::WF: BP)	3.50	3.55	3.60	3.65	3.57
Mean (Storage)	3.63	3.70	3.78	3.83	

WF: Wheat Flour, BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.01
Storage (S) 0.01
Treatment× Storage (T×S) 0.02

Table 5: Impact of treatments and storage period on crude protein (%) of wheat –bael powder blended cookies

Treatments	Storage period (days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	7.25	7.16	7.06	6.95	7.10
T_2 (95:05::WF:BP)	7.19	7.13	7.04	6.93	7.07
T_3 (90:10::WF:BP)	7.12	7.05	6.97	6.90	7.01
T_4 (85:15::WF:BP)	7.06	6.98	6.92	6.87	6.96
T_5 (80:20::WF:BP)	7.01	6.95	6.89	6.82	6.92
T_6 (75:25::WF:BP)	6.95	6.90	6.83	6.74	6.86
T_7 (70:30::WF: BP)	6.90	6.85	6.79	6.72	6.81
Mean (Storage)	7.07	7.00	6.93	6.85	

WF: Wheat Flour. BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.02
Storage (S) 0.02
Treatment× Storage (T×S) 0.04

Table 6: Impact of treatments and storage period on crude fibre (%) of wheat- bael powder blended cookies

Treatments	Storage period (days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	2.15	2.12	2.05	1.94	2.06
T_2 (95:05::WF:BP)	2.35	2.30	2.22	2.18	2.26
T_3 (90:10::WF:BP)	2.47	2.40	2.35	2.28	2.37
T_4 (85:15::WF:BP)	2.53	2.48	2.40	2.32	2.43
T_5 (80:20::WF:BP)	2.69	2.62	2.54	2.49	2.58
T_6 (75:25::WF:BP)	2.78	2.72	2.65	2.60	2.68
T_7 (70:30::WF: BP)	2.90	2.83	2.77	2.70	2.80
Mean (Storage)z	2.55	2.49	2.42	2.35	

WF: Wheat Flour. BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.01
Storage (S) 0.01
Treatment × Storage (T×S) 0.02

Table 7: Impact of treatments and storage period on crude fat content (%) of wheat- bael powder blended cookies.

Treatments	Storage period(days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	20.85	20.80	20.76	20.72	20.78
T_2(95:05::WF:BP)	20.95	20.90	20.84	20.78	20.86
T_3(90:10::WF:BP)	21.02	20.93	20.87	20.82	20.91
T_4(85:15::WF:BP)	21.13	21.08	21.02	20.95	21.45
T_5(80:20::WF:BP)	21.20	21.14	21.08	21.01	21.10
T_6(75:25::WF:BP)	21.28	21.22	21.14	21.08	21.18
T_7(70:30::WF:BP)	21.34	21.29	21.21	21.16	21.25
Mean (Storage)	21.11	21.05	20.98	20.93	

WF: Wheat Flour. BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.01
Storage (S) 0.01
Treatment× Storage (T×S) 0.02

Table 8: Impact of treatments and storage period on ash content (%) of wheat- bael powder blended cookies

Treatments	Storage period(days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	1.45	1.43	1.39	1.31	1.39
T_2(95:05::WF:BP)	2.05	1.98	1.92	1.85	1.95
T_3(90:10::WF:BP)	2.10	2.07	2.01	1.91	2.02
T_4(85:15::WF:BP)	2.16	2.12	2.03	1.95	2.03
T_5(80:20::WF:BP)	2.25	2.22	2.11	1.98	2.14
T_6(75:25::WF:BP)	2.32	2.27	2.18	2.00	2.19
T_7(70:30::WF:BP)	2.38	2.32	2.20	2.05	2.23
Mean (Storage)	2.09	2.05	1.97	1.86	

WF: Wheat Flour. BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.02
Storage (S) 0.01
Treatment× Storage (T×S) 0.03

Table 9: Impact of treatments and storage period on carbohydrates (%) of wheat- bael powder blended cookies

Treatments	Storage period (days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	64.50	64.57	66.15	65.06	65.07
T_2 (95:05::WF:BP)	63.74	63.88	64.08	64.31	64.00
T_3 (90:10::WF:BP)	63.62	63.80	63.95	64.21	63.89
T_4 (85:15::WF:BP)	63.50	63.61	63.86	64.08	63.76
T_5 (80:20::WF:BP)	63.28	63.44	63.67	63.93	63.58
T_6 (75:25::WF:BP)	63.13	63.29	63.52	63.85	63.44
T_7 (70:30::WF: BP)	62.98	63.16	63.43	63.72	63.32
Mean (Storage)	63.53	63.67	64.09	64.16	

WF: Wheat Flour. BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.02
Storage (S) 0.01
Treatment × Storage (T×S) 0.03

Table 10: Effect of treatments and storage period on overall acceptability score of wheat- bael powder blended cookies

Treatments	Storage period (days)				
	0	30	60	90	Mean (Treatment)
T_1 (100:0::WF:BP)	7.45	7.20	7.08	6.91	7.16
T_2 (95:05::WF:BP)	7.91	7.64	7.52	7.39	7.61
T_3 (90:10::WF:BP)	7.98	7.71	7.63	7.51	7.70
T_4 (85:15::WF:BP)	8.52	8.38	8.23	8.19	8.33
T_5 (80:20::WF:BP)	8.11	8.07	7.98	7.87	8.00
T_6 (75:25::WF:BP)	7.95	7.85	7.70	7.60	7.77
T_7 (70:30::WF: BP)	7.76	7.67	7.60	7.47	7.62
Mean (Storage)	7.95	7.78	7.67	7.56	

WF: Wheat Flour. BP: Bael Powder
Effects C.D ($p \leq 0.05$)
Treatment (T) 0.02
Storage (S) 0.01
Treatment× Storage (T×S) 0.03

Conclusion
According to the results of the current study, bael powder can be used to produce a nutritious product by combining it with wheat flour. Additionally, this product has related bioactive components that make it a great source of dietary fibre. According to storage trials, all of the treatments could be stored for at least 90 days without losing any of their quality characteristics. Wheat-bael powder blended cookies can be produced at a cost that is economically viable. Therefore, increasing their use and improving the financial situation of farmers can be accomplished by creating new products from underutilised fruit crops like bael.

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Competing Interests
No competing interests exist among authors

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