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QUALITY EVALUATION OF GORGON NUT AND MILLETS SNACK BAR: A HEALTH-CONSCIOUS APPROACH

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Abstract: The interest in the development of gorgon nut and millets-based snack bar came due to their abundance nutritive qualities. The research study was undertaken for the standardization of ready-to-eat snack bars with effective utilization of gorgon nut and millets (pearl millet, finger millet, and amaranth). The four formulations of snack bars were developed with varying concentrations of gorgon nut as 0% (Control), 5% (MGB1), 10% (MGB2), and 15% (MGB3) with 10% composite millet blend. The results of sensory evaluation confirmed that the addition of gorgon nut powder at 5% in the snack bar was most acceptable by the sensory panellist on the 9-point hedonic scale. The addition of gorgon nut and millets showed an enhanced nutritional profile. The proximate analysis of the most accepted snack bar with a 5% gorgon nut and 10% millets blend revealed 8.31% protein, 0.75% ash, 76.77% carbohydrates, and 59.47% DPPH radical scavenging activity. Microbial studies revealed that it could be stored for up to 90 days without any microbial contamination with good overall acceptability. This study indicated that a developed functional snack bar enables the snack market to develop a novel and healthy alternative of snack bar with a unique combination of gorgon nut and millets.

***Keywords*: gorgon nut, millets, snack bar, sensory evaluation**

1. INTRODUCTION

Gorgon nut (*Euryale Ferox Salisb*) also referred as makhana, foxnut, lotus seeds, and black diamond belongs to the Nymphaeaceae family. It is an aquatic crop usually grown in stagnant water bodies like ponds (Bana *et al.,* 2015). One of the most popular dry fruits consumed by people is the popped gorgon nut, which has a low-fat content and high levels of protein, carbs, and minerals. According to nutritional studies, the edible part of seeds contains carbohydrates (76.9%), moisture (12.8%), protein (9.7%), phosphorous (0.9%), minerals (0.5%), and fat (0.1%). Essential amino acids are present in the raw and popped gorgon nut. The antioxidant activity of gorgon nuts is connected to medical conditions like diabetes, neuropathy, and proteinuria inhibition (Bana *et al.,* 2015). The body needs the free radicals and antioxidants found in gorgon nuts to function properly (Seyidoglu and Aydin, 2020).

Millets are highly nutritious staple foods, rich in protein, dietary fibers, B-vitamins, essential fatty acids, iron, calcium, potassium, zinc, and magnesium. They are low in calories, aids in weight reduction and provides sustained energy levels. Millets also contribute to improved immunity and have potential benefits in managing conditions like diabetes mellitus and hyperlipidemia (Veena, 2003). Pearl millet (*Pennisetum glaucum)* is commonly referred as "Bajari", is rich source of resistant starch, soluble and insoluble dietary fibers, and a low glycaemic index (Michaelraj and Shanmugam, 2013). It is a significant source of nutrients like potassium, magnesium, iron, zinc, copper, and manganese as well as proteins, vitamins, dietary fibers, and energy. Finger millet (*E. coracana L.)*, referred as ragi, are an important source of nutrients, including calcium, crude fiber, and other minerals (Giram *et.al*., 2015). Amaranth grain is about 90% digestible (Wang *et al.,* 2019). It shows properties like anti-inflammatory, antioxidant properties, and anthelmintic properties.

Snack bars, commonly known as granola bars, are lightweight meals providing an adequate daily intake of all nutrients. These bars are consumed by individuals seeking to maintain a balanced calorie intake. Snack bars have a high content of protein, fat, carbohydrates, and minerals, making them a sensory and nutritionally beneficial food option. There is an increasing market demand for innovative snack bar compositions with additional health benefits, aligning with current trends in the food industry to develop high-quality plant-based products with a rich nutritive profile. Millets, as whole grains, are gaining prominence in the modern world due to their inclusion in ready-to-eat food products and snack bars, thanks to their significant dietary fiber, antioxidant, vitamin, and mineral content.

Keeping in view the above considerations, the objective of the study was to develop an innovative product with underutilized gorgon nut and millets. The new product developed in the form of a snack bar was devoid of any artificial preservatives or sweeteners and was further evaluated for the various physicochemical and sensory properties to evaluate its consumer acceptance.

2.MATERIALS AND METHOD

2.1 Materials

The raw materials such as gorgon nut, rice crispies, pearl millet, finger millet, amaranth, rolled oats, cocoa powder, skim milk powder, watermelon seeds, butter, jaggery, liquid glucose, honey were procured from the local market of Loni Kalbhor, Pune. The chemicals of analytical grade and required glassware were made available in the laboratories of MIT School of Food Technology, Pune.

2.2 Methods

2.2.1 Preparation of gorgon nut powder

The gorgon nut powder was prepared with the method followed by Jana *et. al*., 2019. The good quality gorgon nuts were selected and roasted in an open pan at 100°C for 2-3 min for removal of free moisture. Further, the gorgon nuts were cooled to ambient temperature and then gorgon nuts were further powdered with the grinder and then stored in an airtight container at ambient temperature conditions till further use.

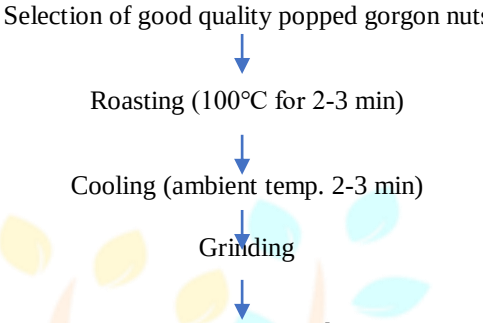

Fig.1 Flow sheet for preparation of gorgon nut powder

2.2.2 Preparation of snack bar with Gorgon nut and Millets

The four snack bar samples were made by blending various amounts of gorgon nut powder with a 10% millet blend. The snack bar formulated with rice crispies as a base material without gorgon nut and millet blend was treated as a control sample. Whereas rice crispies were substituted with a gorgon nut at 5% (MGB_1), 10% (MGB_2), and 15% (MGB_3) with 10 percent millets blend as depicted in Table 1. Other required ingredients like oats (10%), skim milk powder (3%), cocoa powder (3%), watermelon seeds (3%), honey (35%), butter (5%), jaggery (5%) and liquid glucose (1%) were used to each of these formulations. Butter and jaggery were melted in the pan at 100°C. Further liquid glucose and honey were added. All dry ingredients were then added and mixed manually in pan. The bar mixture was then molded into the pre-greased die and cooled. A total of five snack bar samples having dimensions 12 × 5 × 2 cm were prepared. Each bar was developed as a single serving and weighed approximately 50 g.

2.2.3 Sensory analysis

A nine-point hedonic scale was used to evaluate sensory aspects such as colour and appearance, flavour, taste, texture, and overall acceptability for all samples. The sensory analysis of snack bar samples was done by 10 trained panellists who filled their respective proformas. Each bite had a serving size of 3–4 g, which was similar for all bars. During the evaluation, water was offered to rinse the mouth before testing the next bar. The hedonic scale was in the following sequence: like extremely −9, like very much - 8, like moderately −7, like slightly - 6, neither like nor dislike −5, dislike slightly −4, dislike moderately −3, dislike very much −2, dislike extremely −1 (Gir & Mridula, 2016).

2.2.4 Proximate analysis

The snack bar was analyzed for proximate compositional parameters like moisture, protein, fat, crude fiber, ash, and carbohydrate with AOAC, 2000 standard methods (AOAC, 2000). A hot air oven was used to determine the moisture content. 5gm of the crushed sample was kept in a dry Petri dish at 100ºC for 4 h. Ash content was determined by using a muffle furnace, maintaining 600ºC for 4 h. Fat content was determined using the Soxhlet apparatus using N-hexane as a solvent. Kjeldahl apparatus was used to determine the protein content of the energy bars.

2.2.5 Mineral analysis

1 g sample was put into 150 ml erlenmeyer, added 5 ml of HNO3 into Erlenmeyer flask and left for 1 hour. Continue heated over hotplate for ± 4 hours, and cooled. Added 0.4 ml of concentrated H2SO4, then reheated. After the color change from brown to yellow, the samples were added 3 ml of HCIO4 and HNO3 mixture, reheated for ± 15 minutes. Subsequently the sample was added 2 ml of aquadest and 0.6 ml of concentrated HCL, then reheated until dissolved and cooled. After dissolving, the sample is then diluted to 100 ml in the flask. The mineral content (iron, calcium, phosphorus, magnesium, and potassium) were analyzed with AOAC methods reported by Kumaravel and Alagusundaram (2014).

2.2.6 Antioxidants activity

Antioxidant activity was evaluated by 2, 2-diphenyl-1-picryl-hydrazyl (DPPH) assay as illustrated by Hendel, Larous, and Belbey (Hendel, Larous, & Belbey, 2016). Solution of snack bar concentration 10 mg/ml was made in methanol. 100 µl of that solution was mixed with 5 ml of 0.004% DPPH methanol solution followed by incubation period of 30 min at room temperature. Reading of absorbance (A_1) was noted using UV spectrophotometer at 517 nm. Similarly, control was also prepared by replacing the sample aliquot with 0.004% DPPH methanol solution and the absorbance A_0 was noted. The clearance rate (I%) of DPPH could be computed by the formula given below;

$$\text{Clearance Rate (I\%)} = \frac{A_0 - A_1}{A_0} \times 100$$

Where, A_0 is absorbance of control and A_1 is absorbance of sample.

2.2.7 Texture profile analysis

The AACC standard method was used to test the textural properties like hardness, cohesiveness, springiness and chewiness (AACC, 2000) with Texture Pro CT V1.3 Build 15 texture analyser. A cube of sample was taken from the centre snack bar and was put under the cylinder probe. A load cell weighing 10 kg, a test speed of 2 mm/s, two cylinders were used in the compression test. Textural analysis was performed once, just after 18 h of product formulation at temperature 22°C.

2.2.8 Theoretical energy value

The energy value of the snack bar was calculated using the proximate composition of the snack bar, carbohydrates (4 kcal), protein (4 kcal), and fat (9 kcal).

[Crude protein (g) × 4] + [Crude fat (g) × 9] + [Carbohydrate (g) × 4] = Energy (kcal).

2.2.9 Statistical analysis

The results were expressed as means± standard deviation of triplicate determinations. Statistical analysis was done through ANOVA (Analysis of variance) with Duncan's test using IBM SPSS statistics 28.0.0.0 trial version. The level of significance was set at $P < 0.05$ for all analysis of variance and means comparison tests.

3 RESULTS AND DISCUSSION

3.1 Proximate composition of selective raw materials

The proximate compositional parameters of raw materials play an important role in deciding the nutritional quality of the finished product. The results obtained are tabulated in Table 1.

Table 1: Proximate composition of selective raw materials

Raw materials	Proximate composition (%)					
	Moisture	Fat	Protein	Crude fiber	Ash	Carbohydrates
Gorgon nut	11.33±0.33^{a}	0.95±0.06^{e}	9.92±1.11^{c}	0.85±0.36^{e}	0.53±0.10^{e}	76.47±0.22^{a}
Pearl millet	8.43±0.28^{d}	3.42±0.15^{c}	7.75±0.70^{e}	2.35±0.22^{d}	1.90±0.05^{c}	76.20±0.11^{b}
Amaranth	10.42±0.11^{c}	4.83±0.26^{b}	12.08±0.55^{b}	2.98±0.55^{b}	2.89±0.06^{a}	66.80±0.66^{d}
Finger millet	11.20±0.20^{b}	1.50±0.16^{d}	9.80±1.12^{d}	2.93±0.22^{c}	2.50±0.24^{b}	72.10±0.13^{c}
Rolled oats	6.80±0.20^{e}	11.11±0.51^{a}	13.50±1.31^{a}	3.50±0.51^{a}	1.80±0.07^{d}	63.29±0.43^{e}

Mean values with different superscript within each column indicates significant differences using a Duncan's test ($p < 0.05$).

The data presented in Table 1 indicates that the gorgon nut was found to contain 11.33% moisture and 0.95% fat. The protein content in gorgon nuts was 9.92 %. Gorgon nut was found to contain 0.85% crude fiber, 0.53% ash, and 76.47% carbohydrate. The values obtained were discovered to be quite similar to the outcomes reported by Francis (2018). Minor variations were observed in the different parameters which may be because of environmental differences like water, soil, and air. From this data, it could be stated that gorgon nut is a superior source of nutrients and can be effectively used as an ideal ingredient to enhance nutritional profile of food products.

Pearl millet, also known as bajra is a well-recognized millet owing to its excellent nutritional profile. The moisture and fat content of pearl millet were found to be 8.43% respectively. The availability of protein in pearl millet was found to be 7.75% and ash content ranged about 1.90% which indicates the good presence of minerals. The carbohydrate content in pearl millet was found to be 76.20% which revealed that it could serve as a good source of energy. These findings are consistent with the findings of Dayakar Rao *et al.,* (2017).

Amaranth was found to contain 10.42% moisture, 4.83% fat, and 12.08 % protein. Amaranth could therefore be used as an alternative source of protein. Amaranth has a significantly greater ash percentage (2.89%) than the values recorded for several varieties of millets. The carbohydrate content of Amaranth was 66.80%. From this data, it could be stated that gorgon nut is good source of nutrients and can be used as an ideal raw ingredient to enhance nutritional profile of food products.

Finger millet popularly known as ragi is a significant millet due to its excellent nutritional value. Moisture, crude fat, and protein content found in finger millet were 11.20%, 1.50%, and 9.80 % respectively. The crude fiber content in finger millet was observed as 2.93% which shows its ability to provide additional dietary fiber diet. The ash content was found to be 2.50% indicating an excellent source of essential minerals. The carbohydrate content in finger millet was recorded as 72.10%. Rolled oats seemed to have 6.80% moisture, 11.11% fat, 13.50% protein, 1.80% ash, and 63.29% total carbohydrate. From the data, it could be stated that rolled oats have the immense nutritional potential for human health promotion. These recorded observations are well-aligned with the findings of Suzauddula Md. *et al.,* (2021).

3.2 Sensory evaluation of snack bar formulated with gorgon nut and millets

Sensory evaluation is an essential criterion to determine the consumer acceptability of developed food products. The snack bar control and developed with gorgon nut and millets were analyzed to assess consumer acceptability based on sensory parameters like colour and appearance, flavour, taste, texture, and overall acceptability using a 9-point hedonic scale. The scores reported by the panellists for sensory preferences of the product are presented in Fig.1.

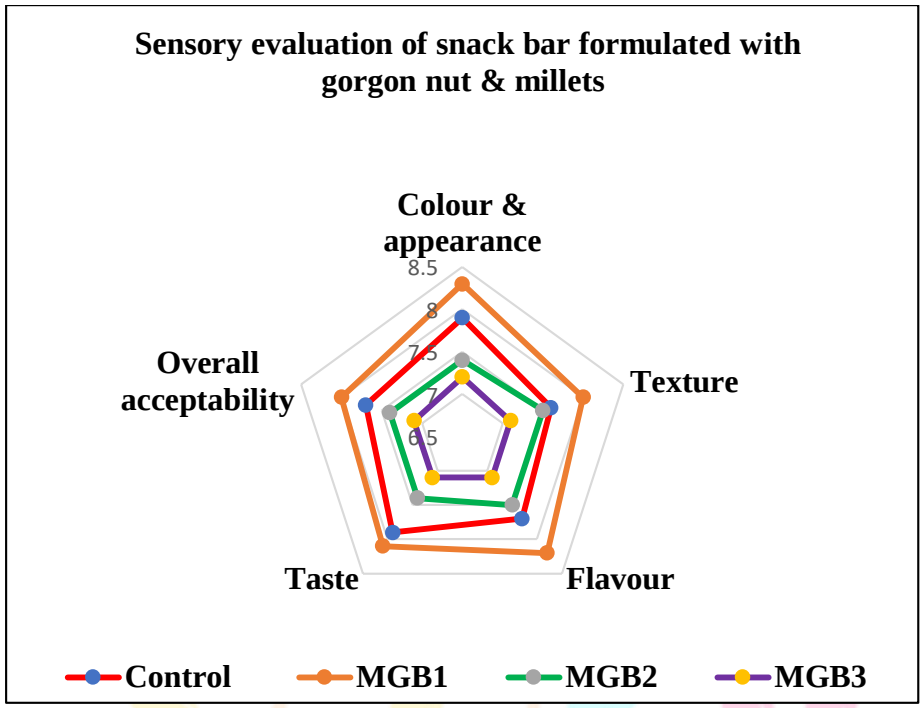

Fig 1: Sensory evaluation of snack bar with gorgon nut and millets

The sensory score for the colour and appearance of the snack was decreased significantly with an increasing percentage of gorgon nut addition. The maximum score for colour and appearance was received by sample MGB_1 (8.32) while the lowest score was obtained by MGB_3 (7.26). The probable cause for these findings could be the direct relation of the amount of gorgon nut added to the snack bar. When compared with other treatments, the texture of the MGB_1 product was found to be excellent (8.05) whereas the lowest score for texture was recorded by the MGB_3 sample as (7.15). The addition of gorgon nut powder above 5% significantly decreases the score for texture due to the slightly sticky appearance of the snack bar.

The sensory scores for flavour and taste were highest in the snack bar developed with the substitution of rice crispies with 5% gorgon nut and 10% millets. The scores were even higher than the scores given to control (rice crispies) snack bar. The highest score for flavour was obtained for MGB_1 (8.22) whereas the lowest score was received by MGB_3 (7.16). The highest mean score for taste was obtained for MGB_1 (8.19) and the lowest for MGB_3 (7.14). The overall acceptability of product MGB_1 was found to be the highest (8.05) among all other treatments indicating the formulation was liked very much by panelists. According to tabulated statistics, the addition of more than 5% gorgon nut powder to snack bar has reduced the scores for sensory parameters.

The partial substitution of rice crispies with 5% gorgon nut and 10% millets (MGB_1) improved the sensory acceptability of the snack bar and received the maximum score for the sensorial characteristics. The aforementioned findings lead to the conclusion that fortification with 5% gorgon nut and 10% millets would be perfectly acceptable for the development of snack bars. These findings collaborated with the result reported by Jana *et al.,* (2019).

3.3 Proximate composition of a snack bar with gorgon nut and millets

The formulated snack bar was further analyzed for proximate compositional parameters and obtained results are summarized in Table 2.

Treatments	Proximate Composition (%)						
	Moisture	Fat	Protein	Crude Fiber	Ash	Carbohydrate	Energy (kcal)
Control	8.45 ± 0.56^{a}	5.25 ± 0.26^{d}	5.91 ± 0.23^{d}	0.98 ± 0.50^{d}	0.55 ± 0.23^{d}	78.86 ± 0.37^{a}	386.85 ± 0.42^{c}
MGB_1	7.98 ± 0.62^{b}	5.27 ± 0.28^{c}	8.31 ± 0.25^{c}	1.11 ± 0.52^{c}	0.75 ± 0.22^{c}	76.77 ± 0.30^{b}	387.57 ± 0.44^{a}
MGB_2	7.91 ± 0.69^{c}	5.29 ± 0.26^{b}	8.46 ± 0.28^{b}	1.16 ± 0.55^{b}	0.79 ± 0.30^{b}	76.44 ± 0.35^{c}	386.94 ± 0.49^{b}
MGB_3	7.81 ± 0.73^{d}	5.30 ± 0.27^{a}	8.59 ± 0.30^{a}	1.21 ± 0.58^{a}	0.82 ± 0.39^{a}	76.17 ± 0.39^{d}	386.38 ± 0.47^{d}

Table 2: Proximate composition of a snack bar with gorgon nut and millets

* Each value indicates mean ± SD, n=3. Mean values with different superscript within each column indicates significant differences using a Duncan's test ($p < 0.05$).

The moisture content in MGB_1 was highest (7.98%) which was decreased in MGB_3 at 7.81%. Based on the research conducted and the literature available, it can be concluded that an increased gorgon nut powder incorporation causes a decrease in the snack bar's moisture content. The addition of 10% and 15% gorgon nut in MGB_2 and MGB_3 showed decreasing trend in the moisture content at 7.91% and 7.81% respectively. The snack bar has a longer shelf life and is microbiologically safe due to its low moisture levels. This may be caused by gorgon nut powder's high water absorption capacity (Jana *et al.,* 2019).

The fat content of the control sample was 5.25% whereas Gorgon nut powder incorporated snack bars MGB_1, MGB_2, and MGB_3 and was found as 5.27, 5.29, and 5.30% respectively. These results showed that fat content was non-significant. The protein content of the snack bar

increased slightly with the increase in supplementation from 5 percent to 15 percent of popped makhana flour. The protein content of the control snack bar developed from rice crispies was found to be 5.91%. The mean value of protein content of the composite gorgon nut flour added snack bar ranged from 8.31% to 8.59 %. This might be because of the increase in the incorporation percentage of gorgon nut powder. The maximum crude fiber content was found in MGB_3 as 1.21 among all other treatments was due to the increased addition of gorgon nut and millets than other samples. The ash value denotes the availability of minerals in food. The ash content in the snack bar containing popped makhana flour and millets was higher than that of the control sample. The ash concentration of the snack bar ranged from 0.55% in the control sample to 0.82% in the formulated snack bar. from 0.75% to 0.82%. The carbohydrate content depends on the all-proximate composition of the snack bar. The difference in the result was due to the other proximate compositions of the snack bar. The snack bars had high carbohydrate content due to the presence of gorgon nut and millets. The theoretical energy value was highest for MGB_1 (387.57 kcal/100gm) and lowest for MGB_3 (386.38 kcal/100gm).

The result of this study showed that the inclusion of gorgon nut and millets in the snack bar helped enhance nutritional value with respect to a gradual rise in crude fiber, protein, ash, and carbohydrate as compared to the control sample. The findings are in line with those of previous researchers who used plant-based raw ingredients to improve the nutritional profile and health advantages of snack bars (Jana *et al.,* 2019).

3.4 Antioxidants activity of snack bar with gorgon nut and millets

The DPPH assay is used to determine the antioxidant activity of the control and functional snack bar (MGB_1) formulations based on an electron transfer reaction; the DPPH assay evaluates an antioxidant's capacity to reduce DPPH radicals. The results are expressed as percent inhibition in Table 3.

Table 3: Antioxidants activity of snack bar with gorgon nut and millets

Treatments	%DPPH Inhibition
Control	52.13 ± 1.30^{b}
MGB_1	59.47 ± 1.28^{a}

* Each value indicates mean ± SD, n=3. Mean values with different superscript within each column indicates significant differences using a Duncan's test ($p < 0.05$).

DPPH radical scavenging activity indicated that the antioxidant activity of MGB_1 is significantly higher than the control sample due to the addition of gorgon nuts and millets. The antioxidant activity in the control sample was 52.13% where as it was increased to 59.47% in the MGB_1 sample. The radical scavenging ability of the developed functional snack bar is dramatically impacted by fortification with gorgon nut powder and a millets blend. Gorgon nut and millets when added together possess a high free radical scavenging activity due to the presence of high antioxidant content. The antioxidant activity appears to be directly correlated with the antioxidant content of gorgon nut powder and millets. The identical results were also documented by Himaja and Meera (2020) where the DPPH radical scavenging activity of the Nut bar incorporated with sorghum millet was higher than the control bar.

3.5 Mineral composition of a snack bar with gorgon nut and millets

Essential minerals help for maintaining good health. The mineral content (iron, calcium, phosphorus, magnesium, and potassium) of the control and most preferred functional snack bar (by a sensory evaluation) was estimated. The obtained findings are summarized in Table 4.

Table 4: Mineral composition of a snack bar with gorgon nut and millets

Treatments	Mineral composition (mg/100gm)				
	Iron	**Calcium**	**Phosphorus**	**Magnesium**	**Potassium**
Control	2.80 ± 0.05^{b}	69.99 ± 0.10^{b}	141.83 ± 0.07^{b}	58.65 ± 0.05^{b}	219.69 ± 0.08^{b}
MGB_1	3.75 ± 0.06^{a}	76.25 ± 0.09^{a}	167.97 ± 0.09^{a}	69.82 ± 0.11^{a}	234.87 ± 0.10^{a}

* Each value indicates mean ± SD, n=3. Mean values with different superscript within each column indicates significant differences using a Duncan's test ($p < 0.05$).

The snack bar prepared with the addition of gorgon nut and millets (MGB_1) showed an increase in mineral content than the control sample. The iron content of the formulated snack bar was found to be 3.75 mg/100 g whereas 2.80 mg/100 g in the control snack bar. The presence of gorgon nut and millets, which were absent from the control snack bar, contributed to MGB_1's higher level of iron content.

The calcium in formulated snack bar and control snack bar was reported as 76.25 and 69.99 mg/100gm. The phosphorus content was estimated higher for MGB_1 as 167.97 mg/100gm than the control sample at 141.83 mg/100gm. The functional snack bar showed higher magnesium content of 69.82 mg/100gm than that of the control sample as 58.65 mg/100gm. The potassium content was recorded as 234.87 mg/100gm and 219.69 mg/100gm for MGB_1 and the control sample respectively. The availability of high mineral content in gorgon nut and millets was the cause of the pattern of high mineral content in the formulated snack bar (MGB_1). These results are in good alignment with the findings of Singh *et al.,* (2021).

3.6 Texture profile analysis of snack bar with gorgon nut and millets

The control and functional snack bar were further analyzed for textural parameters like hardness, springiness, cohesiveness, chewiness, and gumminess. The recorded values are presented in Table 5.

Table 5: Texture profile analysis of samples

Treatments	Hardness (gm)	Cohesiveness	Springiness (mm)	Gumminess (gm)	Chewiness (Kg/mm)
Control	1121±0.22	0.579±0.30	0.612±0.17	649.059±0.22	3.972±0.25
MGB_1	1341±0.35	0.745±0.25	0.842±0.11	999.045±0.18	8.411±0.21

The textural quality of the snack bar was affected due to the addition of gorgon nut and millets. The hardness (g) peak force during the first compression represents the maximal force necessary to compress the snack bar. The hardness of the control sample was recorded as 1121g whereas the MGB_1 sample has showed a hardness of 1341g. It was found that adding gorgon nut and millets to MGB_1 boosted the snack bar's hardness relative to the control sample. Due to the fiber found in gorgon nuts and millets, the functional snack bar's hardness was increased. Arshaya *et al*., (2022) also documented the same findings of the increased hardness of snack bar using banana peel powder due to high fiber content.

The cohesion of the internal linkages that make up the product's body is referred to as cohesiveness. The pace at which a material recovers to its original state once a deforming force is removed is known as springiness. The cohesiveness and springiness of the control and MGB_1 are 0.579 and 0.612, respectively, which are increased to 0.745 and 0.842 in the formulated functional snack bar. Gumminess was also found to decreased due to the utilization of gorgon nut and millets in the MGB_1 sample. The maximum gumminess was 649.059g for the MGB_1 sample whereas the minimum gumminess was 999.045g for the control sample.

The efforts needed to chew a solid food product until it is ready to be swallowed are referred to as chewiness. Chewiness is calculated as the product between (hardness × springiness × cohesiveness) and is thus usually influenced by the change in any one of these characteristics. The chewiness of the functional snack bar MGB_1 (8.411 mJ) is more than the control sample (3.972mJ). Thus above table indicates that the addition of gorgon nut and millets in the development of a snack bar improves the textural characteristics of the snack bar.

4. CONCLUSION

The study revealed that snack bar fortified with 5% gorgon and 10% millet along with other nutritious ingredients were found to have good consumer acceptability with a high amount of energy and convenient snack for all age groups. Researchers have identified gorgon nuts as a valuable and sustainable source of dietary iron. Their exceptional iron-rich profile, combined with their natural goodness, makes them a healthy choice for individuals seeking to enhance their iron intake and maintain a balanced and nutritious diet. The use of gorgon nut and millets in formulating snack bars could confer a novel approach in formulation and providing modifications in the nutritional characteristics. Incorporation of gorgon nut with millets enhanced the nutrient profile of snack bars and thus could be used as a functional ingredient for health promotion.

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