



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(12): 1931-1933
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www.thepharmajournal.com

Received: 02-10-2023
Accepted: 08-11-2023

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Studies on physical parameters of finger millet cake and pearl millet cookies

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Abstract

Millets are one of the oldest foods known to humans and possibly the first cereal grains to be used for domestic purpose. Millets are highly nutritious, non-glutinous and not acid forming foods. Hence they are soothing and easy to digest. They are considered to be the least allergenic and most digestible grains available. This lowers the risk of diabetes, obesity, heart attacks and other complications. Finger millet (*Eleusine coracana*) and Pearl millet (*Pennisetum glaucum*) occupies significant position in India and in entire world in terms of production and utilization. The study was conducted on Finger millet cake using finger millet flour (40%) and wheat flour (60%) and good quality cookies prepared by substituting Bengal gram flour up to 40% with pearl millet flour upto 60% was found best. Moisture content was observed in the finger millets cake (21.88% w.b.) than control cake (15.99% w.b.) where as in the pearl millet cookies it was found that 1.93% w.b. Thickness of the finger millet cake with the sample T₃ was 4.65 cm and to the control sample (4.54 cm) and whereas the thickness of the pearl millet cookies in T₃ was 1.4 cm. Surface area of the cookies varies between the treatments, highest surface area has been found in the treatment T₃ (36.31 m²).

Keywords: Finger millet cake, pearl millet cookies, physical parameters

Introduction

Finger millet (*Eleusine coracana*) is an exceptional grain with high nutritive value, rich dietary fibre and phyto-chemicals. It is an important cereal because of its excellent storage properties and nutritive value, which is higher than that of rice and equal to that of wheat. Finger millet offers a great opportunity for value addition compared to other cereals because of its comparatively lower cost, higher nutritive value and easy availability. However, finger millet could not provide sufficient iron in the diet, as most of it is unavailable due to presence of tannins (0.04 to 3.47 percent catachin equivalent) and phytates (myo-inositol-6-phosphate) (Hallberg *et al.*, 1987 and Manjula and Visvanathan, 2014) ^[1, 2].

Finger millet cake is a nutritious food item that can be an important part of Indian cuisine. It is a traditional food item that is often consumed in rural areas of India and is known for its high nutritional value. Finger millet cake is a good source of protein, iron and calcium and is often consumed as breakfast food or as a snack. It is also a popular food item during festivals and other special occasions and is often served with other traditional Indian foods. Finger millet cake has become an important part of the food culture in India and is valued for its nutritional benefits and cultural significance.

Pearl millet cookies are a nutritious food item that has become increasingly popular in India in recent years, especially among health-conscious individuals. Pearl millet cookies are a healthy alternative to traditional cookies as they are gluten-free, high in fiber and rich in nutrients such as protein, calcium and iron. They are often consumed as a snack or as a dessert and are a good option for people who are looking for a healthy alternative to processed snacks. Pearl millet cookies have become an important part of the food culture in India, with many bakeries and cafes offering a wide range of healthy cookie options. They are also often used as a gift or to celebrate special occasions and have become a symbol of health and well-being in Indian culture.

Hence, it is the time to promote the millet products to the people and on the eve of year of millets, 2023. In view of this, we have been selected the project topic on process development of finger millet cake and pearl millet cookies.

Materials and Methods

The process development and physical properties of finger millet cake and pearl millet cookies was carried out at Department of Processing and Food Engineering, College of Agricultural Engineering, Madakasira.

Formulations of finger millet cake

The control sample was prepared by using the combination of maida flour, egg yolk, oil, milk, sugar, baking powder, vanilla essence and butter and similarly T₁, T₂ and T₃ were prepared as shown in the Table 1.

Table 1: Details of treatments for the finger millet cake

| Sl. No. | Ingredients | Control | T ₁ | T ₂ | T ₃ |
|---------|---------------------|---------|----------------|----------------|----------------|
| 1 | Finger millet flour | - | 50g | 100g | 100g |
| 2 | Wheat flour | - | 100g | 200g | 250g |
| 3 | Maida flour | 150g | - | - | - |

Table 2: Details of treatments for the pearl millet cookies

| Sl. No. | Ingredients | T ₁ | T ₂ | T ₃ |
|---------|--------------------|----------------|----------------|----------------|
| 1 | Pearl millet flour | 120g | 120g | 120g |
| 2 | Butter | 30g | 70g | 100g |
| 3 | Bengal gram flour | 80g | 80g | 80g |

Sample T₁

In the sample T₁, 120g of pearl millet flour with refined 30g Bengal gram flour, 30g butter, baking soda, fine sugar, milk powder vanilla essence, milk, and cocoa powder was added to the formulation as shown in the Table 2.

Sample T₂

In the sample T₂, 70g of butter was added to the formulation and other ingredients.

Sample T₃

In the sample T₃, 100g of butter was added to the formulation and other ingredients.

Sensory evaluation: The panel members were selected for the sensory evaluation and their concerns were sought and their demographic information was collected using sample survey form. The panel members were presented with coded samples and with water to rinse their mouth after tasting each sample. The sensory evaluation is conducted in a well-lighted room without any disturbances. Each panel member was allowed to evaluate five cake samples for colour, appearance, texture, aroma, taste and overall acceptability of the developed cakes using 9-point hedonic scale.

Cost economics: The cost economics of finger millet cake and pearl millet cookies was calculated for examining the relative profitability of sample T₃.

Results and Discussion

Results of different physical and sensory properties were discussed during the present study. The obtained results were represented in suitable forms and discussed.

Moisture content: The highest moisture content was observed in the Finger millets cake (21.88% w.b.) than control cake (15.99% w.b.) where as in the pearl millet cookies it was found that 1.93% w.b. (Fig.1). Low moisture content may be attributed to the roasting of pearl millet prior to making of cookies. Cookies are low moisture baked

products and high moisture could results in a soggy and soft texture that leads to lower consumer acceptability (Florence *et al.*, 2014)^[4]. Also, it is because of more pore spaces present in the pearl millet cookies and whereas in the cake it is moistened product.

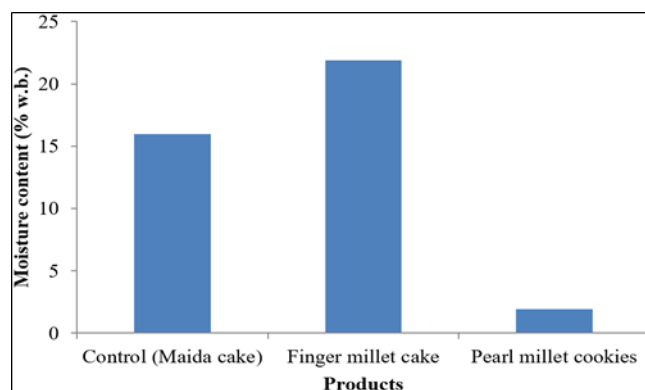


Fig 1: Moisture content of control (maida cake), finger millet cake and pearl millet cookies

Physical parameters of control (maida cake) and finger millet cake:

The physical parameters represented in the Table 3 that the thickness of the sample T₃ (4.65 cm) has found to be higher compared to T₁ (4.33 cm) and T₂ (4.24 cm) and on par with control sample (4.54 cm) because the control sample has contained the complete refined maida flour which has high gluten content which reacts with yeast results in high puffing and the remaining cake are almost equal due to presence of millets to refined wheat flour ratios. Which leads to difference in gluten content.

Table 3: Physical parameters of control (maida cake) and finger millet cake

| Physical parameters | Control | T ₁ | T ₂ | T ₃ |
|--|---------|----------------|----------------|----------------|
| Shape | Round | | | |
| Diameter (d), cm | 15 | 15 | 15 | 15 |
| Thickness (h), cm | 4.54 | 4.33 | 4.24 | 4.65 |
| Volume (v), cm ³ | 802.28 | 765.17 | 749.26 | 821.72 |
| Weight (m), g | 425.6 | 420.2 | 429.5 | 437.75 |
| Surface area of the cake (m ²) | 176.71 | | | |
| Sphericity | 2.36 | 2.28 | 2.25 | 2.40 |
| Density (ρ), g/cm ³ | 0.53 | 0.54 | 0.57 | 0.53 |

Physical parameters of pearl millet cookies

The physical parameters represented in the Table 4, the thickness of the sample T₃ (1.4 cm) has found to be higher compared to T₁ (1 cm) and T₂ (1.2 cm). Surface area of the cookies varies between the treatments, highest surface area has been found in the treatment T₃ (36.31 m²) compared with the other treatments such as T₁ (27.33 m²) and T₂ (33.18 m²) it may be because of the increased quantity of butter.

Table 4: Physical parameters of pearl millet cookies

| Physical parameters | T ₁ | T ₂ | T ₃ |
|---|----------------|----------------|----------------|
| Shape | Round | | |
| Diameter (d) | 5.9 | 6.5 | 6.8 |
| Thickness (h) | 1 | 1.2 | 1.4 |
| Volume (v) | 27.33 | 39.81 | 50.84 |
| Weight (g) | 425.48 | 520.54 | 567.84 |
| Surface area of cookies (m ²) | 27.33 | 33.18 | 36.31 |
| Sphericity | 1.6 | 1.69 | 1.82 |
| Density (g/cm ³) | 15.56 | 15.68 | 15.63 |

Sensory evaluation

Research findings from a study on the influence of flour mixes on the quality of gluten-free finger millet cake Fig.2 and pearl millet cookies selected based on sensory data. On the other hand, pearl millet cookies had closely matching sensory profile Fig.3 which differed significantly from control in key attributes such as color, vanilla-like aroma, baked cereal aroma and sweet taste. Higher perceived intensities of these desirable sensory parameters significantly and positively impacted the overall quality of pearl millet cookies rated at (9.0) and for finger millet cake (9.0), respectively as compared to control (8.0). In addition, crisp and crumbly texture was perceived in these finger millet cake and pearl millet cookies which further enhanced their sensory appeal making them highly palatable.

High acceptability for finger millet cake and pearl millet cookies cooking in a similar study was reported (Archana *et al.*, 2004 and Florence *et al.*, 2014)^[3, 4] where depigmentation of pearl millet was carried out. Results showed that native or pigmented pearl millet cookies were rated slightly less for the stated sensory attributes compared to depigmented variety of cookies. However, in the present study, it was found that dark color of the finger millet cake and pearl millet cookies did not adversely affect the acceptability of the samples. Instead, it provided an interesting visual appeal.

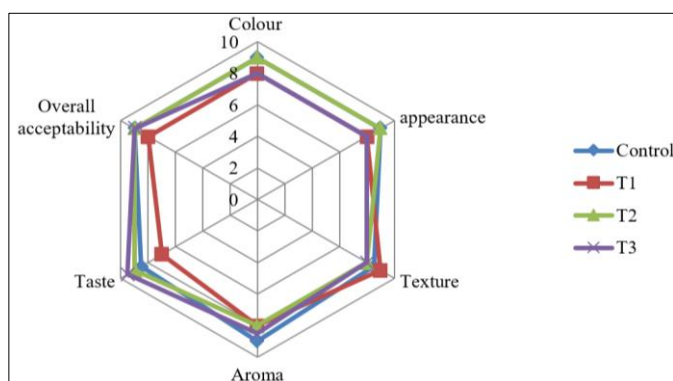


Fig 2: Sensory parameters of control (maida cake) and finger millet cake

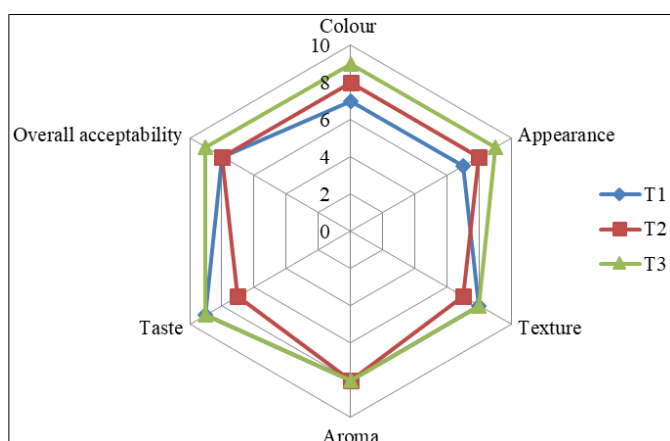


Fig 3: Sensory parameters of Pearl millet cookies

Cost economics

Cost economics of finger millet cake and pearl millet cookies was analysed for T₃ sample. One kg cost of finger millet cake was obtained (Rs. 268.42/-) and for pearl millet cookies was obtained as Rs. 384.85/-.

Acknowledgement

The authors are gratefully acknowledges to the College of Agricultural Engineering, Madakasira, College of Food Science and Technology, Pulivendula, Acharya N.G. Ranga Agricultural University for providing financial and technical support to complete this research work.

References

- Hallberg L, Rossander L, Skanberg AB. Phytates and the inhibitory effect of bran on iron absorption in man. *American Journal of Clinical Nutrition*. 1987;45:988-996.
- Manjula B, Visvanathan R. Process Optimisation of Extruded Breakfast Cereal from Rice Mill Broken - Finger Millet - Maize Flour Blends. *International Journal of Food and Nutritional Sciences*. 2014;3(4):66-71.
- Archana R, Asna K, Salil S, Byron H. Influence of depigmentation of pearl millet (*Pennisetum glaucum* L) on sensory attributes, nutrient composition and in vitro digestion of biscuits. *LWT*. 2004;37:184-192.
- Florence Suma P, Urooj A, Asha MR, Rajiv J. Sensory, Physical and Nutritional Qualities of Cookies Prepared from Pearl Millet (*Pennisetum typhoides*). *J Food Process Technol*. 2014;5(10):1-6.