

# Sensory Analysis of Value-Added Cookies Made Using Pearl Millet Flour and Pumpkin Seed Powder

Nidhee Sachan<sup>1</sup>, Dr.Purnima Shah<sup>2</sup>

<sup>1,2</sup>*Department of Food Science and Nutrition, Jiwaji, University, Gwalior (M.P.) India*

**Abstract** Pearl millet (Bajra) is one of the oldest and healthy millet which was included in the regular diet by our ancestors. The study will emphasize the use of millets and agro-waste seeds which are nutritionally rich and beneficial for our body in many ways. Generally, cookies are made up of refined wheat flour/white flour, hydrogenated fat and sugar as the major ingredient that are crucial for digestion with no health benefits due to lack of nutrients. The aim of the present study is to develop healthy cookies using nutritious ingredients which are easily available, cheap in cost, less known and under-utilized. These cookies will be high nutritional value and beneficial to malnourished children and it will be beneficial effect on various health issues like diabetes, cardiovascular, celiac disease, cholesterol, immunity and constipation. To evaluate the acceptability of the cookies, sensory data obtained from the consumer panel using a 9-point hedonic test were statistically examined. The cookies' sensory properties, such as appearance, texture, flavor, aftertaste, and overall acceptability, were assessed. The results revealed that pearl millet cookies were more acceptable in terms of appearance, aftertaste, and flavor and were chosen as the best formulation. Overall acceptability was showed that maximum T3 (30%) value added cookies compared to control cookies whereas T1 (10%) and T4 (40%) value added cookies. there was showed significant change. Overall acceptability of value-added cookies was T3 (30%) pearl millet flour and pumpkin seed powder highly acceptable cookies.

## I INTRODUCTION

The development of cookies will improve utilization of pearl millet flour and pumpkin seed powder to produce a nutritionally superior product for nutritionally vulnerable groups in the society. It is easy to cultivate these two food crops since they do well in arid and Semi-arid lands. Cookies are one of the most popular foods that can be consumed by people of each age group and are gaining popularity because of their availability, ready to eat convenience and good shelf life. Cookies are available in market in different unit

packages of various flavours, shapes, sizes and with excellent organoleptic characteristics. In India, consumers make cookies popular because of convenience in handling during use, transport, availability at affordable prices and due to its good shelf life at normal conditions. Owing to their popularity and ubiquitous presence in Indian markets, cookies if modified suitably are probably the best vehicles to carry the nutrients to meet the nutritional demand of consumers.

## II IMPLEMENTATION

### • PUMPKIN SEEDS

The seeds of cucurbita maxima (pumpkin seeds) commonly recognized as agro-waste, discarded despite of having high nutritional value and therapeutic values. Seeds may be tiny but each one is packed with all nutrition. The term agro-waste seeds refer to nutrient-dense edible seeds which are discarded. These agro-waste seeds can be used instead of throwing because they contain nutrients along with phytochemicals. In this study we are taking agro-waste seeds like pumpkin seeds. Pumpkin seeds are rich in minerals, antioxidants and other nutrients that are helpful in enhancing and balancing nutritional value of pearl millet flour and pumpkin seeds powder. Pumpkin seeds are rich source of protein, fatty acids and have enough amounts of micronutrients like phosphorous, potassium, magnesium and calcium. It also contains choline that is an essential component for the development of brain, pumpkin seeds still, are not very common to be used in foods. The conversion of this agro-waste into value added ingredients is likely to be a big step towards healthier lifestyle. Pumpkin seeds are also have shown beneficial effects on various health issues like diabetes, cholesterol, liver, prostate gland, bladder, immunity, depression, learning disabilities (Patel, 2013).

• PEARL MILLET

Pearl millet (Bajra) is one of the oldest and healthy millet which was included in the regular diet by our ancestors. Now a days it is gaining its importance back.it is in low demand by the people for food.it has high level of dietary fiber, calcium, iron, zinc, lipids and amino acids such as lysine, tryptophan, threonine and fatty acids like omega-6 and omega-3. These contain major phytochemicals like tannins, phytates, diabetes, cardiovascular, celiac disease and cancer. It is considered as anti-inflammatory and it also acts as probiotic food (Vanisha *et. al*; 2011). (onyango *et.al*; 2013).it has low glycemic index, small amount of flavonoids are present and most importantly, it is gluten free millet. Priyanka *et al.*, (2015) reported that pumpkin seed are excellent nutrient source filled with minerals mainly zinc, phosphorous, magnesium, potassium and selenium responsible for fighting diseases and acts as weapon for fighting diseases such as arthritis, inflammation, prostate cancer etc. Pearl millet helps in increasing haemoglobin due to higher iron content among millets and also due to high zinc content. It also promotes bone growth and repair because pearl millet contains large amount of phosphorous content which is a key component for development of bones (Malik, 2015).it may have therapeutic effects in treating health problems like constipation, diarrhoea.

Table 1.The recipe of the *cookies* with most acceptable level has been given below:

Ingredients	CC 0%	T1 10%	T2 20%	T3 30%	T4 40%
1.Wheat flour	100	90	80	70	60
2.Pumpkin Seed Powder	-	10	15	20	25
3.Pearl millet flour	-	10	15	20	25
4.Powdered sugar	40	40	40	40	40
5.Fat	45	45	45	45	45
6.Milk(ml)	13	13	13	13	13
7.Baking powder	1/4 tsp	1/4 tsp	1/4tsp	1/4tsp	1/4 tsp

IV. SENSORY EVALUATION

Sensory Evaluation of the Developed products  
Value added cookies were prepared. One control sample was prepared using basic ingredients and four treatments were prepared with pearl millet flour and pumpkin seed powder cookies at different proportion levels. The developed products were organoleptically evaluated by a semi-trained panel of 15 judges from the Department of Food and Nutrition by using 9 point

III.METHODOLOGY

The present study was carried out on development and Quality evaluation of pearl millet flour and pumpkin seed powder incorporated cookies. For this study, four types of cookies were developed using different proportion of pearl millet flour and pumpkin seed powder cookies. Type T1 of cookies was produced from 5% pearl millet flour and 5% pumpkin seed powder, type T2 of cookies produced from 10% pearl millet flour and 10% pumpkin seed powder. Type T3 of cookies was produced from 15% pearl millet flour and 15% pumpkin seed powder. Type T4 of cookies was produced from 20% pearl millet flour and 20% pumpkin seed powder. The other ingredients were similar for all four cookies such as vegetable oil, vanilla essence, baking soda, sugar and milk. The steps and the composition of ingredients are similar for all four types of cookies.

• Procedure

Take a bowl. And mix Fat was rubbed on a clean surface till it becomes light. Sugar was added to fat and rubbed again. Flours were sifted and baking powder was added gradually. Smooth dough was made by using milk and then adds the vanilla essence. Dough was rolled to ¼ inch thickness. Round shapes were cut and baked at 150° C for 20 minutes. This is the primary step for all four types of cookies.

hedonic rating scale to judge the acceptability of the products. Appearance, colour, flavour, texture, taste and overall acceptability of different attributes were considered for evaluation.

4.1.1 Sensory scores for *Cookies* supplemented with pearl millet flour and pumpkin seed powder four sample of cookies were prepared using refined wheat flour as a control and for the test samples, refined wheat flour was supplemented with pumpkin seed powder and pearl millet flour at 10%, 20% 30% 40%

levels. The mean score of organoleptic evaluation of cookies by semi trained panel of judges using nine-point hedonic scale rating scale is presented in table 4.1.1 and fig 1. The data revealed that the highest scores for all the sensory parameters were obtained by T3 treatment (30%) with an overall acceptability score of 8.02 and was liked very much followed by Whereas

the score for acceptability of control sample was significantly higher i.e. 7.82 than the test samples (T1, T2 and T4). Thus indicating that value added cookies supplementation pumpkin seed powder and pearl millet flour up to 30% was better accepted as compared to cookies made from refined wheat flour.

Table 2. Mean value of the Sensory Score

Treatments \ Sensory attributes	CC 0%	T1 10%	T2 20%	T3 30%	T4 40%
Appearance	8.0	7.6	7.6	8.0	7.8
Colour	7.6	7.6	7.9	7.9	7.6
Texture	7.9	7.5	7.5	8.1	7.8
Flavor	7.7	7.6	7.7	7.9	7.6
After taste	7.9	7.5	7.9	8.2	7.5
Overall acceptability	7.82	7.56	7.72	8.02	7.66

CC – Control sample

T1-10% (5%+5%) of pearl millet flour and pumpkin seed powder

T2-20% (10%+10%) of pearl millet flour and pumpkin seed powder

T3-30 % (15%+15%) of pearl millet flour and pumpkin seed powder

T4-40 % (20%+20%) of pearl millet flour and pumpkin seed powder

### V RESULT AND DISCUSSION

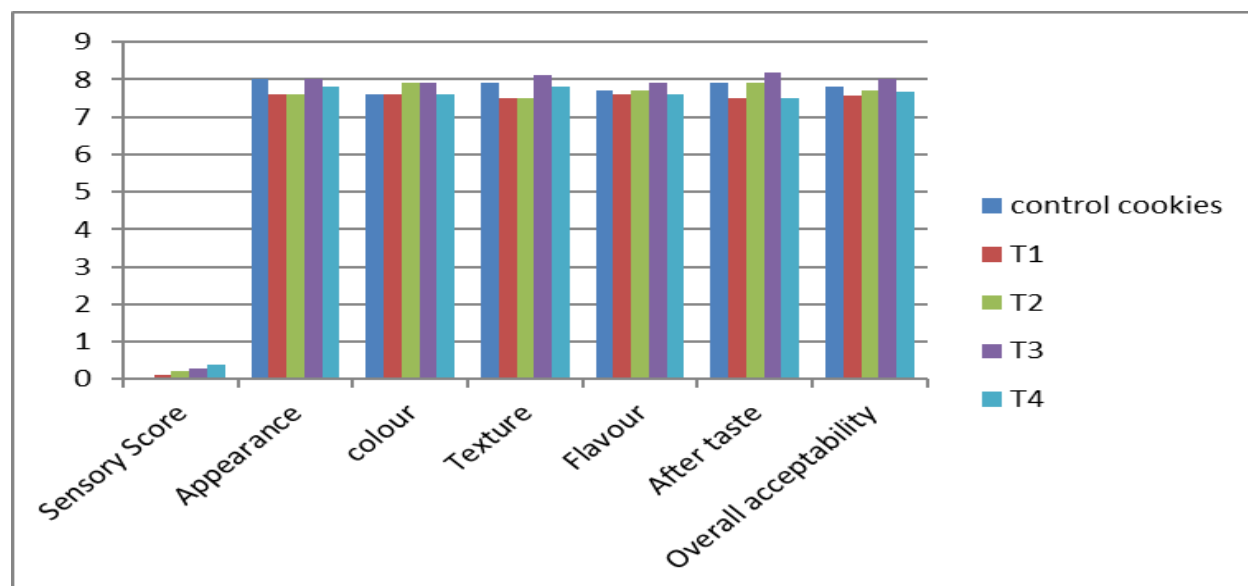


Fig.1. Sensory characteristics scores for all types of cookies

The mean scores varied from 7.6 to 8.0 (Table 2). In terms of appearance, control cookies and T3 (Pearl millet flour and pumpkin seed powder) cookies were preferred the most with 8.0 out of 9 followed by T1

and T2 cookies with 7.6 and T4 cookies with 7.8. T1 and T2 cookies had a hard texture (7.5), whereas T3 cookies had a good texture (8.1) and control cookies had a second-best texture (7.9). In terms of flavour, T3

cookies received the highest rating of 7.9. T1 and T4 cookies received the lowest rating of 7.6 and T2 and control cookies received the second-highest rating of 7.7. T3 cookies had the best aftertaste (8.20), followed by T2 cookies (7.9). It was observed that T1 cookies were the least desired and enjoyed with 8.02, whilst T3 cookies were the most preferred and loved with 8.02, followed by control cookies with 7.82. The texture and general acceptance factors received the lowest scores, while the appearance parameters received the best. Furthermore, there was no appreciable change in sensory qualities such as texture, overall acceptability, or appearance across three different varieties of cookies made with different millet flour variations. Interestingly, the sensory ratings of T3 cookies were higher in all parameters when compared to the other two types of cookies, and it was judged to be extremely acceptable. Likewise, control cookies were found to be the less acceptable compared to T3 cookies. In conclusion, T3 cookies received the highest acceptability in all of the sensory characteristics. Therefore, according to these findings, control cookies and T2 (20%) value added cookies score same. There was no significant change in after taste. Overall acceptability was showed that maximum T3 (30%) value added cookies compared to control cookies whereas T1 (10%) and T4 (40%) value added cookies. there was showed significant change. Overall acceptability of value-added cookies was T3 (30%) pearl millet flour and pumpkin seed powder highly acceptable cookies.

## VI. CONCLUSION

From our study, it is clear that pearl millets cookies were highly acceptable than the other two cookies. This study further illustrated that the quality of cookies, in terms of texture and flavor, could be improved with finger millet flour. The use of millet flour in cookie making and other products used would greatly enhance the nutritional profile.

Pumpkin seeds are rich in minerals, antioxidants and other nutrients that are helpful in enhancing and balancing nutritional value of pearl millet flour and pumpkin seeds powder. Pumpkin seeds are rich source of protein, fatty acids and have enough amounts of micronutrients like phosphorous, potassium, magnesium and calcium. It also contains choline that is an essential component for the development of brain,

pumpkin seeds still, are not very common to be used in foods. The conversion of this agro waste into value added ingredients is likely to be a big step towards healthier lifestyle. Pumpkin seeds are also have shown beneficial effects on various health issues like diabetes, cholesterol, liver, prostate gland, bladder, immunity, depression, learning disabilities (Patel, 2013). Pearl millets are recommended because they are gluten-free, enriched with vital nutrients, and the best plant-based protein source. Finger millets, on the other hand, are considered to be one of the most nutritious cereals because they are high in protein and minerals, particularly calcium, and they are a strong source of iron. According to experts, jowar is high in protein, carbohydrates, dietary fiber, calcium, iron, phosphorus, potassium, and sodium. All of these millets help to promote development and growth. It has been reported to decrease cholesterol, improve gastrointestinal health, and prevent cancer due to its high fiber content. It also aids in the reduction of blood pressure and the risk of diabetes. It is believed that substituting hundred percent millet flour for refined wheat flour in the preparation of cookies is a healthy option for improving its nutritional quality and characteristics. It may be concluded that the millet-based cookies are moderately acceptable in terms of all the sensory metrics and are commercially viable. Thus, they can be employed in the formulation and development of a variety of nutritionally enriched value-added healthier products to combat malnutrition.

## REFERENCE

- [1] Adebisi, J.A., Obadina, A.O., Adebo, O.A. and Kayitesi, E. (2017). "Comparison of nutritional quality and sensory acceptability of biscuits obtained from native, fermented, and malted pearl millet (*Pennisetum glaucum*) flour", *Food Chemistry*, Vol. 232, pp. 210-217.
- [2] A Kulthe, Suresh S Thorat and Amol P Khapre ISSN (E): 2277- 7695 ISSN (P):23498242 [https://www.researchgate.net/publication/324991305\\_Nutritional\\_and\\_sensory\\_characteristics\\_of\\_cookies\\_prepared\\_from\\_pearl\\_millet\\_flour](https://www.researchgate.net/publication/324991305_Nutritional_and_sensory_characteristics_of_cookies_prepared_from_pearl_millet_flour).
- [3] Bornare, DT and Khan, Shafiya; (2015) Physical and Sensory Evaluation of Cookies Incorporated with Oats and Honey. *International Journal of*

- Engineering Research & Technology*. Vol. 4(8) ISSN: 2278-0181.
- [4] Chauhan, Neha Antarkar, Surbhi., Aditya Solanki, Pooja Kushwah, Priya Kumari, Rishav Gupta, Sayanti Halder, Surupa Sarkar (2019). Nutritional and Phytochemical evaluation of high fibre cookies using beet root and Pumpkin seeds powder. *International Journal of Food Science and Nutrition*, 4(6):38-41.
- [5] Devi, Manda N., Prasad R.V and Sagarika Nukasani (2018). A review on health benefits and nutritional composition of pumpkin seeds. *International Journal of Chemical Studies*; 6(3): 1154-1157.
- [6] Goyal, preeti and chugh L.K (2017). Shelf-life determinants and enzyme activities of pearl millet: a comparison of changes in stored flour of hybrids, CMS lines, inbreeds and composites. *Journal of food science and technology*, 54(10): 3161–3169.
- [7] <https://www.healthline.com/nutrition/what-is-millet#downsides>
- [8] [https://millets.res.in/m\\_recipes/Nutritional\\_health\\_benefits\\_millets.pdf](https://millets.res.in/m_recipes/Nutritional_health_benefits_millets.pdf)
- [9] Malik, S; Pearl Millet; (2015). Nutritional value and medicinal uses. *International journal of advance research and innovation ideas education*, 1(3):414-417.
- [10] NIN (2003). A manual of laboratory techniques. Hyderabad, National Institute of Nutrition, *Indian council of Medical Research*.
- [11] Onyango; CA; Ochanda SO; Mwasaru MA; Ochieng JK; Mathooka FM; and Kinyuru JN; (2013). Effect of malting and fermentation on anti-nutrient reduction and protein digestibility of Red Sorghum and pearl millet. *Journal of food research*, 2(1):41-49.
- [12] Patel, S. (2013). Pumpkin seeds as nutraceutical: a review on status quo and scopus. *Medicinal journal nutrition metabolism*, 1(4):50–51.
- [13] Shweta, Malik; (2015) Pearl millet-nutritional value and medicinal uses. *www.ijariie.com*, 1(3): 2395-4396.
- [14] Sandhya, Akula; Esther and Kavita, Waghray (2018) Development of sorghum biscuits incorporated with spices. *International Journal of Food Science and Nutrition*, 3(2):120-128.
- [15] Vanisha, S., Nambiar, Dhaduk JJ., Sareen N., Shahu T., Desai R., (2011). Potential functional implications of pearl millet (*pennisetum glaucum*) in health and disease. *Journal applied pharmaceutical science*, 1(10):62-67.