

Formulation and Organoleptic Evaluation of Millets Recipes

SHWETA SAINI

Assistant Professor (Head)

Department of Home Science, Dayanand Mahila Mahavidyalaya, Kurukshetra (Haryana) India

ABSTRACT

Millet is the ancient crop of India. Millet is a group of small seeded grains that are rich in nutrients and having several health benefits. They are good source of complex carbohydrates, providing sustained energy. Millets are primarily categorized as major and minor millets. India is the topmost producer of millets followed by Nigeria for the years 2000 and 2009. Millet is good source of dietary fiber, having low glycemic index, rich source of vitamin, minerals and antioxidants and naturally gluten free. They are helpful in weight management, prevent constipation, diabetes, blood pressure, CVD, certain cancers and celiac disease etc. Keeping the above in view there is need to explore millet preparation in day to day that's why the present study was undertaken with the main objective to formulate millet recipes from commonly available millets at retail shops of Kurukshetra. Sorghum (Jowar), Pearl millet (Bajra), Finger millet (Ragi) with other food stuffs were used to prepare the recipes. The recipes were evolved using the locally and commonly consumed millets. The recipes were evaluated thrice by the panel of 10 judges selected at random among the faculty and students of Dayanand Mahila Mahavidyalaya, Kurukshetra. The recipes were evaluated for color, appearance, aroma, texture, taste and overall acceptability. Quality characteristics of each sample was recorded on nine point Hedonic Rating Scale ranging between 1-9. Taste of Finger Millet Cold Coffee (8.7 ± 0.483) got the highest grading followed by Pearl millet mathri (8.6 ± 0.516), Pearl millet appe (8.6 ± 0.516), Finger millet burfi (8.2 ± 0.632), Pearl Millet kheer (8.2 ± 0.4) and Sorghum spring rolls (7.9 ± 0.568), respectively. Millet is a super food having great nutritional importance, low water requirement, low carbon emission, insects and pest resilient, farmer's friend and best suitable for changing environment and global warming. Due to lack of awareness about the locally available millet and their uses in common man make them less popular which adversely affect their production and demand in India. So, the present study is a step to evolve some interesting recipes with the millet in order to popularize them among the common public. The recipes formulated not only popularize millet but also provide a healthy option to the common man over wheat and rice.

Keywords : Millet, Recipes, Organoleptic evaluation

INTRODUCTION

Millet is a group of small seeded grains that are rich in nutrients and having several health benefits. They are good source of complex carbohydrates, providing sustained energy. Millets are categorized into two groups namely major and minor millets. Major millet crops include Jowar or Sorghum, Bajra or Pearl millet, Mandua/Ragi or Finger millet, and small millets including of Kangni or Foxtail millet, Kutki or Sama or Little millet, Kodo millet, Jhangora or Sawan or Barnyard millet, Cheena or Proso

millet and Korale or Brown top millet. In 2000 and 2009 India is the topmost producer of millets followed by Nigeria among all the nations. According to Dayakar Rao *et al.* (2017) millets contribute 10 per cent to the country's food grain basket with an annual production of 13.7 million tones, grown in about 12 million hectares, respectively. Asmat Ullah (2017) reported that millets are having a unique quality as they are the only crop that can grow in arid regions that require only 300–400 mm of water compared to rice (1400–1500 mm).

Millets are carbon neutral crop as they absorb and

emit equal amount of carbon from the environment. Millets need only sixty–ninety days to mature while fine cereals take hundred–one forty days; in a way help small farmers in crop rotation as many. The unique features of the millets are the hardiest, resilient and climate adaptable crops in harsh, hot (up to 64 degrees Celsius) and drought environments made it the most secure crops to small farmers. Vadez *et al.* (2012), Schill (2012), World Bank (2013) revealed that millets are often the last standing crops in drought seasons that is sustainable for future food source amidst worsening climatic conditions.

Millet is good source of dietary fiber which helps in digestion and absorption of food and keep our digestive system healthy. Its fiber content can promote a feeling of fullness, potentially aiding in weight management. In comparison to wheat and rice millets are having Low Glycemic index, which can help to regulate blood glucose level in diabetic patients. Millet contains vitamins and minerals like B-complex Vitamin (B3 & B6), Iron, Calcium, Magnesium and Phosphorus. The magnesium content in millet may contribute to healthy heart by regulating blood pressure and reducing risk of heart disease (Samtiya *et al.*, 2023). High calcium and phosphorus content making millets important for bone health. Millets are naturally gluten free and that's why suitable for people with gluten sensitivity or celiac disease. Many antioxidants like phenolic compounds are found in millet which can protect our cells from oxidative stress and keep our internal body clean (Dayakar *et al.*, 2018).

Keeping the above in view there is need to explore millet preparation in day to day life arouses that is why the present study was undertaken with the main objective to formulate millet recipes from commonly available millets at retail shops of Kurukshetra for popularizing millet consumption among common people.

METHODOLOGY

Material:

Sorghum (Jowar), Pearl millet (Bajra), Finger millet (Ragi), Milk, Curd, Coffee Power, Sugar, Wheat flour, Refined wheat Flour, Semolina (Suji), Corn Flour, Onion, Ginger, Garlic, Capsicum, Carrot, Cabbage, Chili, Spices, Salt, Ghee, oil and dry fruits etc. were used to prepare these recipes.

Processing of samples:

All the ingredients of the recipes were procured from the local market of district Kurukshetra. The ingredients

were sorted out first and then only edible portions were selected to prepare the recipes.

Development of recipes:

The recipes were evolved using the locally and commonly consumed millets. The method adopted was similar to the one used by local north Indian families. Results are shown in Table 1.

Organoleptic evaluation:

The recipes were evaluated thrice by the panel of 10 judges selected at random among the faculty and students of Dayanand Mahila Mahavidyalaya, Kurukshetra. The recipes were evaluated for color, appearance, aroma, texture, taste and overall acceptability. The judges were instructed to sip water before and after testing each product. Quality characteristics of each sample was recorded on nine point Hedonic Rating Scale ranging between 1-9. The scale represented extremely liked, liked very much, liked moderately, liked slightly, neither liked nor disliked, disliked slightly, disliked moderately, disliked very much, disliked extremely, respectively. Results are shown in Table 2.

Statistical Analysis :

The data obtained was analyzed statistically. Mean and standard deviation were calculated for each studied variable.

RESULTS AND DISCUSSION

The ingredients, method of preparation, weight of the ingredients is indicated in Table 1.

The Table 2 and Fig. 1 revealed the sensory evaluation score of various millet preparations. The products developed were organoleptically acceptable. The scores of appearance, color, texture, taste and aroma of all the recipes were quite good according to the panel of judges. The overall acceptability of Finger millet cold coffee and Pearl millet Mathari was found to be maximum *i.e.* 8.6±0.516 each, respectively. Taste of Finger Millet Cold Coffee (8.7±0.483) got the highest grading followed by Pearl millet mathri (8.6±0.516), Pearl millet appe (8.6±0.516), Finger millet burfi (8.2±0.632), Pearl Millet kheer (8.2±0.4) and Sorghum spring rolls (7.9±0.568), respectively. Appearance and colour of Finger Millet burfi scores (8.5±0.527 each, respectively) highest among all preparations. However, texture and aroma of Pearl millet mathri (8.4±0.516 each, respectively) surpassed

Table 1 : Ingredients, Method used in Formulation of the Millets Recipes				
Name of the recipe	Method	Ingredients used	Weight of the ingredient (g/ml)	No. of serving
Finger Millet Cold Coffee (Ragi)	Soak Finger millet overnight in little water and grind it in the morning by addition of little more water, strain it to get pure millet milk. After that pour millet milk, cow milk, sugar, coffee powder in the grinder with ice cubes to mix all ingredients well. Transfer the coffee in coffee mug and embellish it with dark liquid chocolate.	Finger Millet Milk Milk Coffee Powder Dark liquid Chocolate Sugar	60 50 5 10 10	1
Pearl Millet Mathri (Bajra)	Take a bowl add pearl millet flour, whole wheat flour, red chilli flakes, omam and salt and make the dough by adding water in it. Knead the dough well and kept aside for half hour. Take oil in frying pan and heat it well. Take small portions of the dough roll it in desired shape and fry them in heated oil.	Pearl millet flour Whole wheat flour Red chilli flakes Crushed Black pepper Omam (Ajwain) Salt Oil	100 100 10 5 5 10 For frying	4
Finger Millet Burfi (Ragi)	Heat the ghee in a pan and roast finger millet flour and suji till brown. Add little water and sugar in roasted flour and reduce it to the thick consistency. Pour the reduced mixture and spread it greased plate. Put the plate in refrigerator for one Hour and then cut mixture in desired shape. Garnish the burfi with chopped dry fruits.	Finger millet flour Sugi Sugar Ghee Cardamom Powder Water Dry Fruits	60 10 40 20 5 30 10	2
Pearl Millet Appe (Bajra)	Take all the ingredients (Pearl millet flour, onion, carrot, chilli, ginger, pepper, salt curd, water) in a bowl and mix them well to make a thick paste. Add baking soda and lemon juice in the paste and mix it well to. Transfer the paste in appe maker pan and cover the lid. After 5-10 minutes open the cover and change the side of appe to cook it from another side. Open the pan after 10 minutes and serve appe with desired sauce or chutney.	Pearl millet flour Finely chopped onion Grated carrot Finely chopped green chilli Grated ginger Black pepper Salt Curd Water Baking soda Lemon juice	100 15 15 5 5 3 5 40 40 5 5	4
Sorghum Spring rolls (Jowar)	Take a bowl add sorghum flour, refined wheat flour, semolina, red chilli flakes, ginger garlic paste and salt and make the dough by adding water in it. Knead the dough well and kept aside for half hour. In another bowl mix all the rest ingredients (onion, cabbage, carrot, capsicum) with corn flour. Take oil in frying pan and heat it well. Take small portions of the dough, roll in thin sheet and fill the mixer evenly over the sheet. Now roll the dough with mixture very carefully and close the ends by applying little water. Fry the rolls in heated oil. Serve hot Spring rolls with chutney.	Sorghum flour Refined wheat flour Semolina Grated onion Grated cabbage Grated carrot Grated capsicum Ginger garlic paste Red chilli powder Corn Flour Salt	60 20 20 15 15 15 10 5 10 15 10	2
Pearl Millet Kheer (Bajra)	Heat a pan and add ghee in it to roast the pearl millet. Add the milk in it and left it to reduce up to half quantity. After that add sugar in the hot mixture and mix well. Pour hot kheer in serving bowl and garnish it with Chopped dry fruits.	Pearl Millet Milk Ghee Sugar Chopped dry fruits Cardamom Powder	50 500 10 40 15 2	2

Food preparation	Appearance	Color	Texture	Taste	Aroma	Overall acceptability
Finger Millet Cold Coffee (Ragi)	8.3±0.675	8.2±0.789	7.6±0.516	8.7±0.483	8.3±0.483	8.6±0.516
Pearl Millet Mathri (Bajra)	8.3±0.675	8.2±0.632	8.4±0.516	8.6±0.516	8.4±0.516	8.6±0.516
Finger Millet Burfi (Ragi)	8.5±0.527	8.5±0.527	7.9±0.738	8.2±0.632	8.3±0.675	8.5±0.527
Pearl Millet Appe (Bajra)	8.3±0.675	7.8±0.789	7.9±0.738	8.6±0.516	7.5±0.527	8.5 ±0.527
Sorghum Spring rolls (Jowar)	7.7±0.675	7.4±0.516	7.4±0.516	7.9±0.568	8±0.667	7.8±0.632
Pearl Millet Kheer (Bajra)	7.9±0.7	7.1±0.7	7.5±0.806	8.2±0.4	7.4±0.489	8.1±0.538

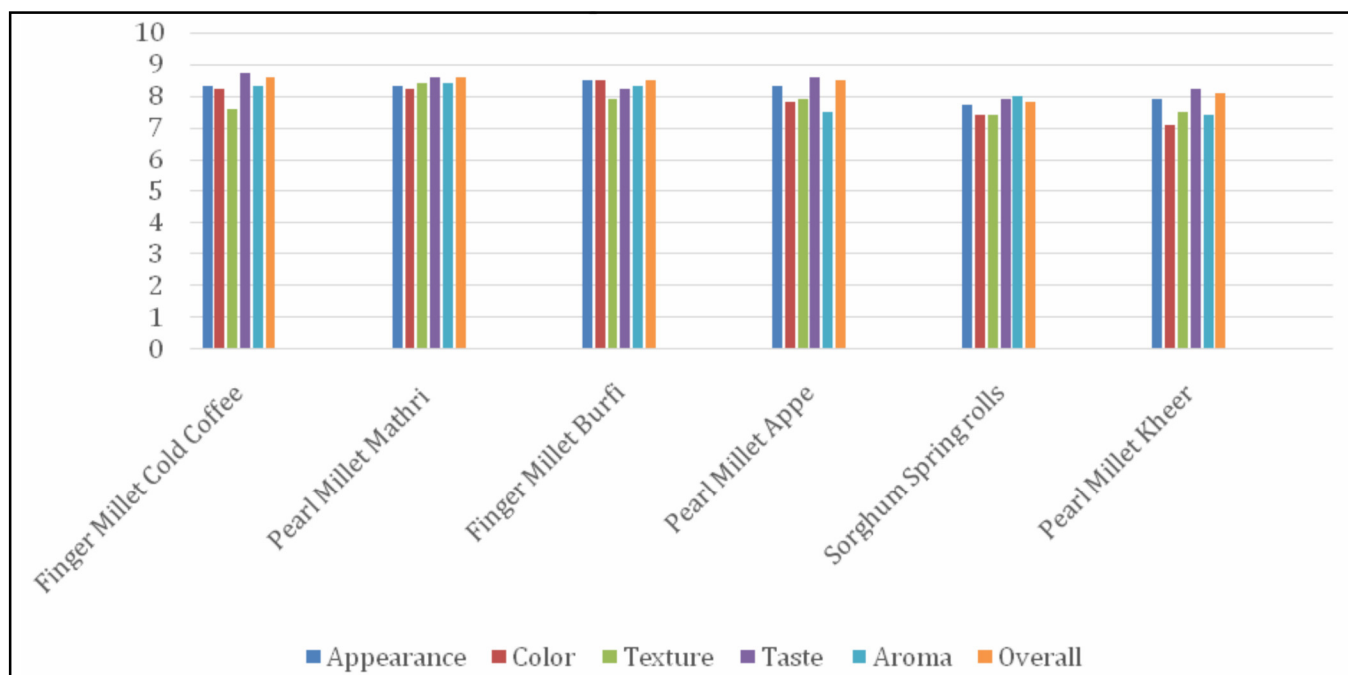


Fig. 1 : Scores of Sensory Evaluation of Different Millet Preparations

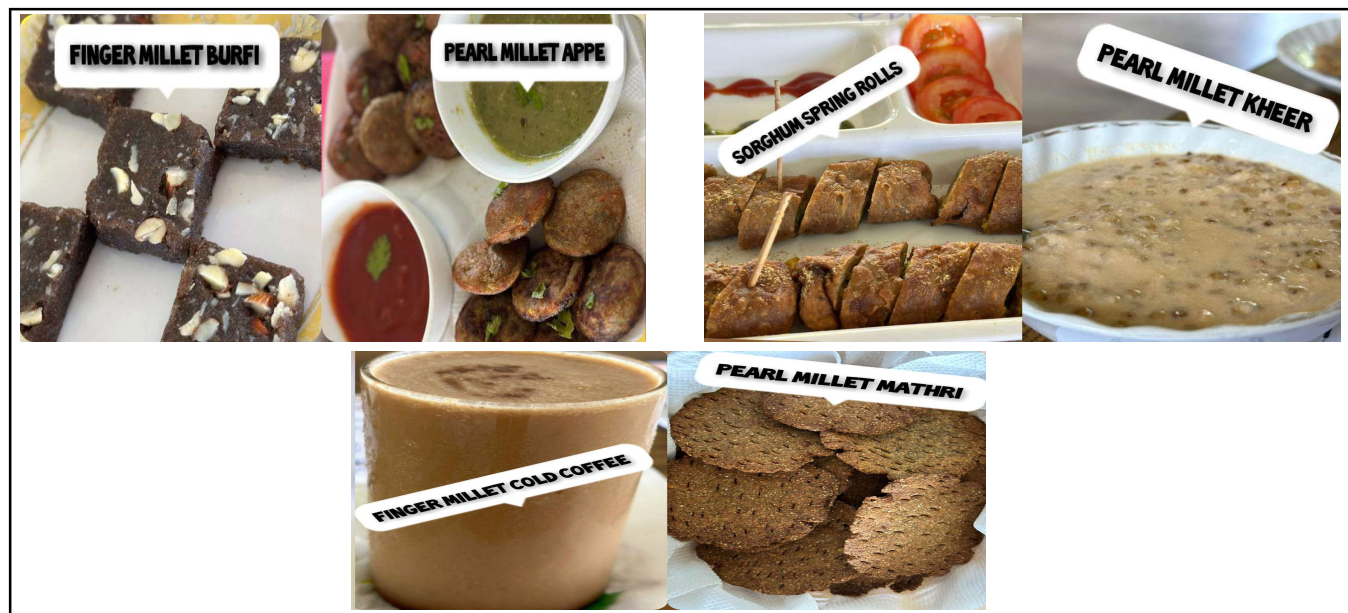


Plate 1 : Different type of recipe

the other preparations (Plate 1).

Conclusion

Millet is a super food having great nutritional importance, low water requirement, low carbon emission, insects and pest resilient, farmer's friend and best suitable for changing environment and global warming. Due to lack of awareness about the locally available millet and their uses in common man make them less popular which adversely affect their production in India. So, the present study is a step to evolve some interesting recipes with the millet in order to popularize them among the common public. The recipes formulated not only popularize millet but also provide a healthy option to the common man over wheat and rice.

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