

EXTRACTION OF MILK FROM THE MILLETS

Akshaya A C¹, Maivli C T², Vinothaa L³, Ramya K⁴

^{1,2,3}Undergraduate Student, Agriculture Engineering, Bannari Amman Institute of Technology, Sathyamangalam.

⁴Assistant Professor, Agriculture Engineering, Bannari Amman Institute of Technology, Sathyamangalam.

Abstract - The aim of this project is to extract the milk from the millets thus providing the nutrients in whole amount. It increases the immunity as it comprises of iron and calcium. Millets are digestible and they are protein free. Millets help to strengthen the human immune system, reducing blood pressure, and also reduce the heart diseases. The antioxidants present in millet prevents cancer, cardiovascular diseases, diabetes and tumor. The extraction of milk from millet was experimented in five different ways to find the accurate proportion for consumption. We have used different millets such as Kodo millet, Barnyard millet, Proso millet and Foxtail millet in different composition for the analysis. The taste of the millet milk was enhanced by adding different flavors such as honey, lemon, cardamom, cocoa powder. In this project the product is analyzed for microbial growth, sensory parameters, nutritional analysis and physical properties like pH, color, brix and moisture content. As a result, in the nutritional analysis, the energy parameter is 240.18 k Cal. The microbial test results showed the shelf life of the product sample. The sensory evaluation was done to determine the consumer likeliness of different age groups.

Key Words: Millet milk, Microbial, Nutritional, Physical properties, Sensory analysis

1. INTRODUCTION

The major and minor millets are one of the healthiest food source among the cereals. It is considered as the healthiest food in the world. Millets contain 73% carbohydrates, 11% protein, 9% water, 4% fat. It increases the immunity as it comprises of iron and calcium. It contains phytonutrients which acts as antioxidants. They are digestible and they are protein free and has more fiber. It acts as a substitute for rice and wheat. The aim of our project is to develop nutritional rich millet milk which could be consumed by consumers of all age groups.

1.1 Literature Review

Preparation of serial dilution, examination of culture methods, sterilization were done from the prepared samples. From the plate count, the total viable count was found (Richter et al., 1992). At 37°C incubation of the plate was done for 24 hours. Using MacConkey agar (S. Alterkruse et al., 1994). Using potato dextrose agar the count of fungus was determined. At 25°C, the incubation of plates were done for about 5 days. The growth of colonies were examined with the naked eyes.

2 MATERIALS AND METHODS

2.1. Materials

The millet drink contains materials such as kodo millet, barnyard millet, proso millet, foxtail millet, honey, lemon, organic jaggery, cardamom, dry fruits, cocoa powder which has very good nutritional values. For the preparation of the milk the following things like muslin cloth, mixer, induction, vessels were used. The equipments and instruments like pH meter, hunters calorimeter, tray dryer, refractometer, laminar hood, L rod, petri plates, autoclave, nutrient agar, potash dextrose agar were used.

2.2. Methodology

The process is initiated using proso millet, barnyard millet, Sugar, vanilla essence. The millet was soaked for about half-an-hour and then grinded for extraction of milk. The second analysis is done using kodo millet and barnyard millet separately by adding Honey and Lemon. The 3rd experiment is initiated by analysing the moisture content of the millets by placing it in the tray dryer at 65°C for 3 hours. The millets were soaked for a whole day and we found that it got fermented. Then the 4th experiment was done under reduced soaking time by adding flavors such as Cardamom, jaggery, and dry fruits. Color and the pH of the raw sample and the Cardamom flavored sample were found. In the 5th step we took each 1kg of kodo millet, foxtail millet and barnyard millet. The total milk yield was 375ml, from which 75ml milk was added with 1.85g of jaggery and 0.97g of cocoa powder and dry fruits.

3. RESULT AND DISCUSSION

3.1. Nutritional Analysis

The nutritional values of different parameters such as energy, total fat, protein, carbohydrate, dietary fiber, vitamin B, calcium and iron were found. The following parameters were mentioned below:

Table -1: Nutritional Analysis

PARAMETERS	UNITS	RESULT	% DAILY VALUES
Energy	Kcal/100g	240.18	-
Total fat	g/100g	0.02	0.03
Protein	g/100g	9.7	19.4

Carbohydrate	g/100g	50.3	16.8
Dietary Fiber	g/100g	4.8	19.2
Vitamin B	mg/100g	2.8	-
Calcium	mg/100g	16.3	-
Iron	mg/100g	7.1	-

3.2. pH analysis:

- The pH of the cardamom flavored millet milk was found to be 6.13.
- The pH of unflavored millet milk on 0th and 10th day was found to be 6.56 and 6.68 respectively.

3.3. Color Analysis

Table-2: Color Analysis

COLOUR	RAW MILLET MILK	CARDAMOM LAVORED MILLET MILK
L	63.17	54.63
a	0.23	1.55
b	12.49	13.87
L*	69.38	62.54
a*	0.26	1.66
b*	16.34	19.98

3.4. Sensory analysis:

In this evaluation the millet milk was given to some members of various groups of people to evaluate the product based on their color, taste, texture, mouth feel, flavor and overall acceptability. The analysis was done based on Hedonic scale values. The values are given below, 9-Extremely liked, 8-Very much liked, 7- moderately liked, 6-slightly liked, 5-Neither liked nor disliked it, 4-Slightly disliked, 3-Moderately disliked, 2- Very much disliked, 1-Disliked it extremely.

Table-3: Score table for unflavored millet milk

SENSE	NO OF PERSONS		
	1	2	3
Appearance	7	8	8
Color	8	6	7
Odour	5	4	5
Taste	3	5	4
Texture	9	8	8
Overall Acceptability	6	6	5

Table-4: Score table for Cardamom flavored millet milk

SENSE	NO OF PERSONS		
	1	2	3
Appearance	7	8	8
Color	6	6	7
Odour	8	7	6
Taste	6	8	7
Texture	8	7	8
Overall Acceptability	8	6	7

Table-5: Score table for flavored cocoa Millet milk

SENSE	NO OF PERSONS		
	1	2	3
Appearance	8	9	8
Color	8	7	8
Odour	8	7	7
Taste	9	8	9
Texture	9	8	9
Overall Acceptability	9	9	8

4. CONCLUSIONS

The millets have high nutritional contents, but it is less preferred due to its taste and lack of awareness. We have prepared an energy rich multi millet milk which will act as a substitute for other soft drinks. We received better results by providing the samples which is been discussed in above tabulation. The shelf life has been found to be 5 days without any preservatives. Later, we found microbial activities. We are further exploring to increase the shelf life by addid natural preservatives.

REFERENCES

[1] Issoufou Amadou et al- Millets: Nutritional composition, some health benefits and processing - A Review.

[2] Manvesh Kumar Sihag, Vivek Sharma, Sumit Arora, A K Singh, Ankit Goyal and Darshan La- Effect of storage conditions on sensory and microbial characteristics of developed pearl millet based weaning food.

[3] M.Pushpa Devi*1 and Narayanasamy Sangeetha2- Extraction and dehydration of millet milk powder for formulation of extruded product.