The Pharma Innovation

Himani Nautiyal
M.Sc. Student, Department of
Food Technology, Warner
College of Dairy Technology,
SHUATS, Prayagraj, Uttar
Pradesh, India

Dr. Shanker Suwan Singh
Assistant Professor, Warner
College of Dairy Technology,
SHUATS, Prayagraj, Uttar
Pradesh, India

Ansari Altamash
M.Sc. Student, Department of
Food Technology, Warner
College of Dairy Technology,
SHUATS, Prayagraj, Uttar
Pradesh, India

Development and quality assessment of garlic small bread (Garlic Pav) prepared by using refined wheat flour, pearl millet flour, sago flour and garlic

Himani Nautiyal, Dr. Shanker Suwan Singh and Ansari Altamash

DOI: https://doi.org/10.22271/tpi.2022.v11.i2ab.10916

Abstract
Bread is a simple food that has been eaten throughout history. From the ancient Egyptians discovering it, to British peasants collectively bringing their dough to the local bakehouse, and even causing a national revolution in France. Bread is an important, yet delicious and healthy food that is well-loved. The aim of this research was to develop garlic small bread (garlic pav) using refined wheat flour, pearl millet flour, sago flour and garlic. The consumption of garlic small bread (garlic pav) can be beneficial to health in numerous and significant ways. The flour composition of refined wheat flour, pearl millet flour, sago flour and garlic were mixed at different proportion levels (T1) 95:2.5:2.5:15, (T2)85:7.5:7.5:15, (T3) 75:12.5:12.5:15 while the refined wheat flour bread (T0) 100:00:00:00 was served as control sample. The prepared breads were analysed through various Physico-chemical, microbiological and sensory attributes. All treatments were replicated three times and the data obtained during investigation were statistically analyzed by using analysis of variance (ANOVA) and critical difference (C.D.) techniques. The satisfactory result of bread was for T1 protein (8.32%), fat (2.50%), ash (1.94%), and carbohydrate (63.13%) as comparable to control without adversely affecting the sensory parameters which was high in T2 colour and appearance (7.8), Flavour and taste (8.4) and overall acceptability (7.9). based on the findings it can be concluded that beneficial ingredients like pearl millet flour, sago flour and garlic can be mixed together to prepared small bread (PAV). The nutrition parameters of prepared garlic small bread are beneficial for help in curing blood system and heart disease.

Keywords: Pearl millet flour, sago flour, garlic and small bread (PAV)

Introduction

Small bread is a derivative of the Portuguese word "pão" which means bread. Pav is also known as small bread or soft bread. Small bread or pav is a fermented bakery product, arranged in two contrasting colors. The upper area is creamy brown in color and the lower section is creamy white and less fluffy compared to the upper section. It tastes like sliced or loaf bread. The main ingredient is Maida or refined wheat flour. Other ingredients include salt, water, yeast, stabilizers (butter) and preservatives (calcium propionate). Sanjay (2020) [14] small bread is prepared by a series of process involving mixing, kneading, proofing, shaping, baking. Pav is one of the oldest and largest consumed foodstuffs and is consumed across the world by all age groups. Agarwal *et al.,* (2017) [1]. Small bread or pav is a common food item in Mumbai, Maharashtra and is used in many recipes, especially snacks like Vada pav, pav bhaji, misal pav, dabeli & masala pav. It comprises of three or four rows of pav or bread merged together, arranged in slabs or "ladi". Sanjay (2020) [14].

Table 1: Nutrient Content of 100 g of Small Bread (Pav)

Nutrients	Amount
Energy	250 Kcal
Protein	7.14 g
Total lipid (fat)	3.57 g
Carbohydrate	50 g
Calcium (Ca)	143 mg
Potassium (k)	71 mg
Sodium (Na)	482 mg
Vitamin B3 (Niacin)	3.929 mg
Vitamin B9 (Folic acid)	89 µg

Source: USDA Nutrient database

Corresponding Author:
Himani Nautiyal
M.Sc. Student, Department of
Food Technology, Warner
College of Dairy Technology,
SHUATS, Prayagraj, Uttar
Pradesh, India

Refined wheat flour: Flour is also called as refined flour, white flour or *maida* from the Indian subcontinent is obtained from wheat. Patel *et al.,* (2021) [13] It is the basic structural component of most bakery products. Wheat flour contains two proteins-gliadin and glutenin which form gluten by addition of water. No other cereal flours form gluten. Maida is finely milled without any bran, refined, and bleached, it closely resembles cake flour. *Maida* is used extensively in Central Asian cuisine and cuisine from the Indian subcontinent, such as Flatbreads (naan), tandoori roti, Bhatoora, fast foods, baked goods such as pastries, bread, pav, several varieties of sweets, and traditional flatbreads. Srilakshmi, (2003) [16].

Table 2: Nutritional Value of Refined Wheat Flour Per 100g

Nutrients	Amount
Energy	383 kcal
Moisture (%)	13
Protein	10
Total lipid (fat)	3.33
Carbohydrate	72
Dietary fiber	3.3
Iron (mg)	3.6
Sodium (mg)	23

Source: USDA Nutrient Database

Sago Flour: Sago (Tapioca) is a type of starch extracted from the core of certain tropical palm stems, especially those of *Metroxylon sagu*. It is a major staple food for the lowland peoples of New Guinea and the Moluccas, where it is called *saksak*, *rabia* and *sagu*. The largest supply of sago comes from Southeast Asia, particularly Indonesia and Malaysia. It is traditionally cooked and eaten in various forms, such as rolled into balls, mixed with boiling water to form a glue-like paste (papeda), or as a pancake. Kumari *et al.,* (2019) [10] Sago has low calorie and fat content, which are good for diet. Its protein content is very low and free from casein and gluten. In addition, sago is safe to be consumed by diabetic people because it does not raise blood glucose level immediately (low glycaemic index) Ashotosh (2017) [4]. As a resistant starch, sago can prevent the risk of constipation and colon cancer. Sago even can substitute wheat flour in producing white bread, biscuit and cookie. The substitution in the range of 30%-40% will not give any effect related to the quality of product. Karim (2008) [8].

Table 3: Nutrient Composition of Sago per 100 g

Nutrients	Amount
Energy	375 kcal
Moisture (%)	14
Protein	3.21
Fat	0.65
Carbohydrate	81.55
Dietary fiber	3.1
Calcium (mg)	62
Iron (mg)	0.31
Sodium (mg)	31

Source: USDA Nutrient Database

Pearl millet flour: Pearl millet (*Cenchrus americanus*) is the most widely grown type of millet. Pearl millet also known as Grano (Spanish), bajra (Hindi). The pearl millet, is known for its culinary uses as well as health benefits. It is cultivated in countries of Africa and the Indian subcontinent since prehistoric times. Manning *et al.,* (2010) [11] Pearl millet contains substantial amount of minerals such as iron, calcium, zinc and high level of fat. It is nutritionally comparable and even superior to major cereals due to high energy and protein value Fasasi (2009) [6]. It is also a rich source of dietary fiber and micronutrients while starch is the major constituent of pearl millet Sehgal *et al., (*2007) [15]. As a food source, it is non-glutinous and non-acid forming, so as soothing and easy to digest Amit *et al.,* (2018) [3]. Pearl millet is a superior cereal with regard to nutritional quality and presents several health benefits Krishnan *et al.,* (2011) [9]. Moreover, Pearl millet is a potent source of antioxidants, due to its phenolic content and is a staple food substitute for celiac patients. Udaybeer *et al.,* (2017) [17].

Table 4: Nutrient Content of Pearl Millet Flour Per 100 g

Nutrients	Amount
Energy (kcal)	378
Protein	11.6
Carbohydrate	67.1
Dietary fiber	1.2
Fat	5.0
Vitamin A (mcg)	132.0
Folic acid (mcg)	45.5
Vitamin E (µg)	23
Calcium (mg)	42.0
Magnesium (mg)	97.0
Phosphorus (mg)	360
Sodium (mg)	10.9

Source: USDA Nutrient database

Garlic: Garlic (*Allium sativum*) is a species in the onion genus, Allium. Garlic is widely used around the world for its pungent flavour as a seasoning or condiment. Garlic cloves are used for consumption (raw or cooked) or for medicinal purposes. They have a characteristic pungent, spicy flavour that mellows and sweetens considerably with cooking. katzer, Gernot (2009) [7]. The distinctive aroma is mainly due to organosulfur compounds including allicin present in fresh garlic clove. Ahmad *et al*., (1984) [2] Garlic is loaded with good source of vitamins and minerals like manganese, selenium, vitamin C, vitamin B6, and other antioxidants, including allicin as well as enzyme, saponins, flavonoids. Garlic may be applied to different kinds of bread, usually in a medium of butter or oil, to create a variety of classic dishes, such as garlic bread, garlic toast. Clark & Melissa (2008) [5].

Table 5: Nutritional value of Garlic per 100 g

Nutrients	Amount
Energy (kcal)	149
Moisture	59
Carbohydrates	33.06
Dietary fiber	2.1
Fat	0.5
Protein	6.36
Vitamin B6 (mg)	1.2350
Folate (µg)	3
Choline (mg)	23.2
Vitamin C (mg)	31.2
Selenium (µg)	14.2

Source: USDA Nutrient Database

Materials and Methods
The present investigation entitled "Development and Quality

Assessment of Garlic Small Bread (Garlic Pav) prepared by using Refined Wheat Flour, Pearl Millet Flour, Sago Flour and Garlic" had been conducted for the preparation of Garlic Small Bread (garlic Pav) using Pearl millet flour, sago flour and garlic in different proportions in Food Technology Lab of "Warner Collage of Dairy Technology" Sam Higginbottom University of Agriculture Technology and Science, Prayagraj, U.P. (211007).

Plan of work
Treatment combination
T0: Control prepared from refined wheat flour (100:00:00:00)
T1: Experimental sample prepared from refined wheat flour, Pearl millet flour, Sago flour and Garlic (95:2.5:2.5:15)
T2: Experimental sample prepared from refined wheat flour, Pearl millet flour, Sago flour and Garlic (85:7.5:7.5:15)
T3: Experimental sample prepared from refined wheat flour, Pearl millet flour, Sago flour and Garlic (75:12.5:12.5:15)

Table 6: Treatment combination for control and experimental garlic small bread (garlic pav)

Treatments				
	T0	**T1**	**T2**	**T3**
Refined wheat flour (%)	100	95	85	75
Pearl millet flour (%)	-	2.5	7.5	12.5
Sago flour (%)	-	2.5	7.5	12.5
Garlic (%)	-	15	15	15

Receiving of millet
⇩
Cleaning
⇩
Sorting
⇩
Washing
⇩
Sun drying (for 8 hrs.)
⇩
Grinding
⇩
Sieving
⇩
Pearl millet flour
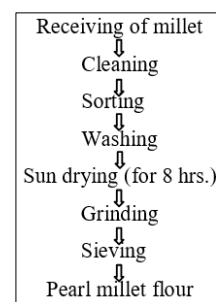
Fig 1: Flow diagram of Pearl millet flour

Receiving of sago pearl
⇩
Cleaning
⇩
Sorting
⇩
Grinding
⇩
Sieving
⇩
Sago flour
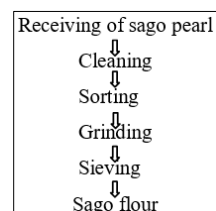
Fig 2: Flow diagram of Sago flour

Receiving of garlic
⇩
Separation of cloves
⇩
Removal of outer cover
⇩
Grinding
⇩
Garlic paste
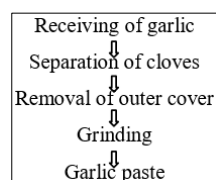
Fig 3: Flow diagram of Garlic paste

Receiving of raw materials
⇩

Control (100 g)   Experimental flour (100g)

Refined Wheat flour (100%) composite flour and garlic (wheat flour, pearl millet, sago flour)

T₀ (100:00:00)

(RWF: PMF: SF: G)   (RWF: PMF:SF: G)   (RWF: PMF:SF: G)

(95:2.5:2.5:15)   (85:7.5: 7.5:15)   (75:12.5:12.5:15)

Addition of ingredients
⇩
(yeast 3g, salt 1.2g, sugar 20g, GMS 0.5g, Calcium propionate 0.4 g, gluten powder 0.3 g)
⇩
Addition of Pasteurized milk (60 ml)
⇩
Kneading
⇩
Fermentation (24- 28 ˚C for 60 min)
⇩
Punching
⇩
Greasing of molder with butter
⇩
Proofing (21-30 ℃ for 1hr.)
⇩
Baking (230- 250 ˚C for 25-30 min)
⇩
Cooling (room temperature)
⇩
Brushing with butter
⇩
Packaging
⇩
Storage at room temperature (25 ℃)

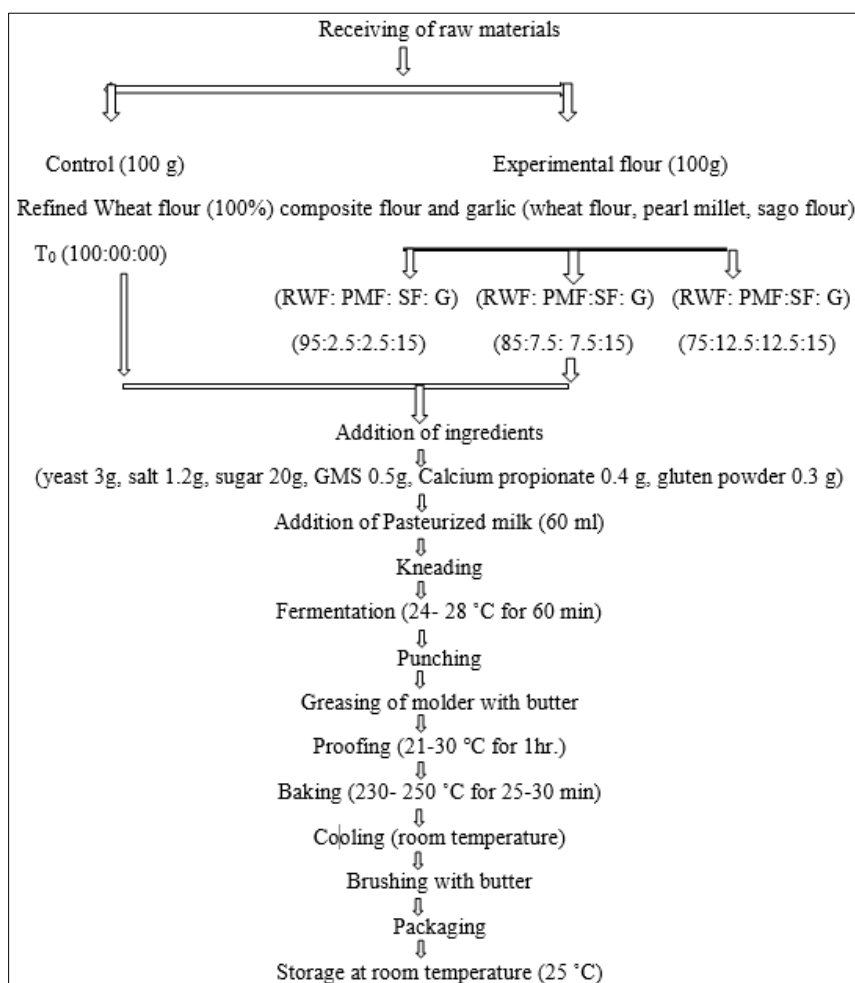**Fig 4:** Flow Diagram for Manufacturing of Control and Experimental Garlic Small Bread (Pav)

Result and Discussion

The data collected and tabulated under the study are presented with appropriate illustration and discussed in this chapter.

Table 7: Average data for different parameters of control and experiments (in percent)

Parameters	Treatments			
	T0	T1	T2	T3
Chemical analysis				
Fat	2.97	2.50	2.20	2.05
Protein	8.51	8.32	8.06	7.89
Carbohydrate	62.43	63.13	63.21	63.62
Acidity	0.39	0.38	0.36	0.34
Ash	1.92	1.94	1.64	1.57
Moisture	24.17	24.11	24.89	24.87
Antioxidant (TBHQ) (mg/kg)	(BLQ)10.0	(BLQ)10.0	(BLQ)10.0	(BLQ)10.0
Microbiological analysis ($\times 10^{-3}$ cfu/ g)				
Yeast & Mould count	577.33	235.66	230.66	174.33
SPC	957.33	886.66	884.66	777.66
Coliform	Nil	Nil	Nil	Nil
Organoleptic scores (9-point Hedonic scale)				
Colour and Appearance	7.4	7.4	7.8	7.0
Body and Texture	8.2	7.8	7.7	7.4
Flavour and Taste	8.0	7.8	8.4	7.9
Overall acceptability	7.8	7.6	7.9	7.4

Physico-Chemical Analysis of Garlic Small Bread (Garlic Pav): The main findings of the experiment are being summarized here
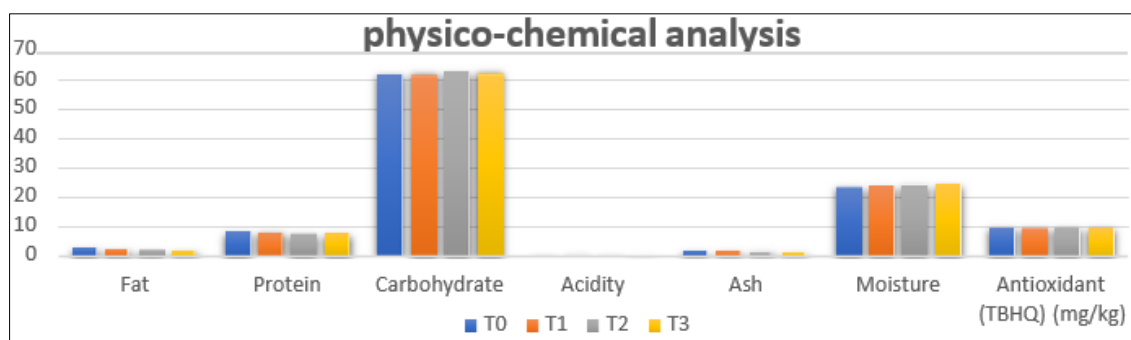

Fig 5: Physico-Chemical Analysis

Fat percentage
There was significant difference in fat percentage of different treatment combinations. Maximum fat percentage was recorded in the sample of T0 (2.97) followed by T1 (2.50), T2 (2.20) and T3 (2.05).

Protein percentage
There was significant difference in protein percentage of different treatment combinations. Maximum protein percentage was recorded in the sample of T0 (8.51) followed by T1 (8.32), T2(8.06) and T3 (7.89).

Carbohydrate percentage
There was significant difference in carbohydrate percentage of different treatment combinations. Maximum carbohydrate percentage was recorded in the sample of T3 (63.62) followed by T2 (63.21), T1 (63.13) and T0 (62.43).

Acidity percentage
There was significant difference in acidity percentage of different treatment combinations. Maximum acidity percentage was recorded in the sample of T0 (0.39) followed by T1 (0.38), T2 (0.36) and T3 (0.34).

Ash percentage
There was significant difference in ash percentage of different treatment combinations. Maximum ash percentage was recorded in the sample of T1 (1.94) followed by T0 (1.92), T2 (1.64) and T3 (1.57).

Moisture percentage
There was significant difference in moisture percentage of different treatment combinations. Maximum moisture percentage was recorded in the sample of T2 (24.89) followed by T3 (24.87), T0 (24.17) and T1 (24.11).

Antioxidant
There was no significant difference in antioxidant of different treatment combinations. T0 (10.0), T1 (10.0), T2 (10.0) and T3 (10.0).
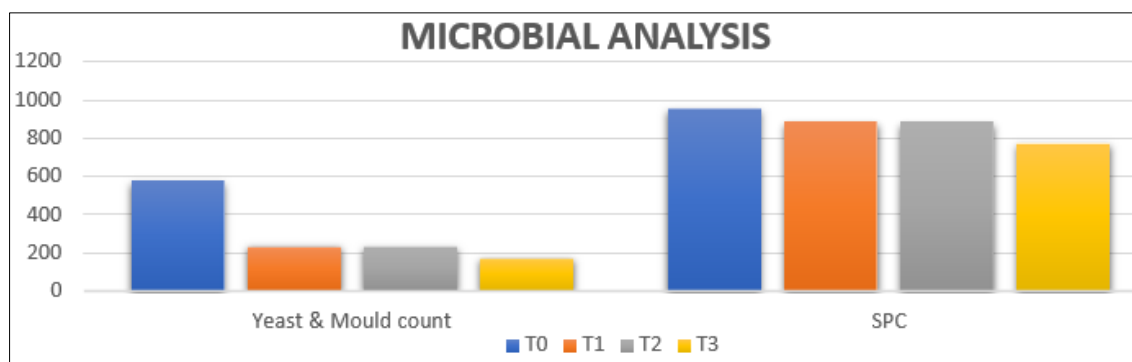
Fig 6: Microbiological Analysis of Garlic Small Bread (Garlic Pav)

Yeast and Mould Count (×10-3 cfu/ g): There was significant difference in yeast and mould count of different treatment combinations. Maximum yeast and mould percentage was recorded in the sample of T0 (557.33) followed by T1 (253.66), T2 (230.66) and T3 (174.33).

Standard Plate Count (×10-3 cfu/ g): There was significant difference in standard plate count of different treatment combinations. Maximum standard plate count was recorded in the sample of T0 (957.33) followed by T1(886.66), T2 (884.66) and T3 (777.66).

Coli form Count: It is evident from the experiment that the coli form count of control and experimental sample was Nil

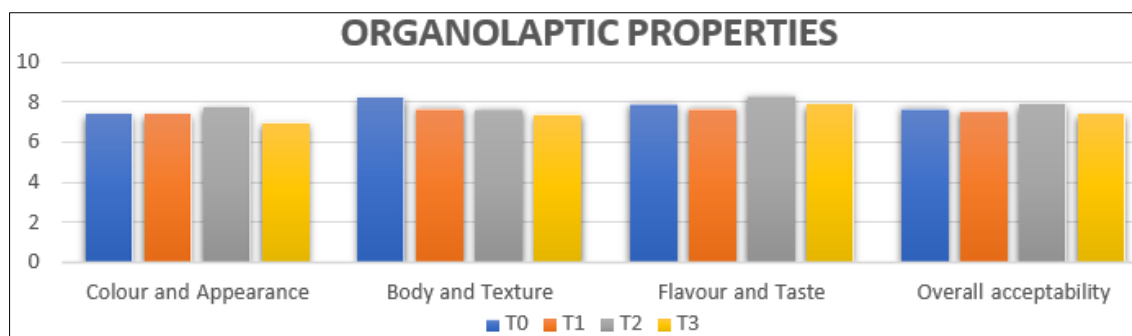**Sensory attributes of Garlic Small Bread (Garlic Pav)**

Fig 7: Organoleptic properties

Colour and appearance: There was significant difference in colour and appearance of different treatment combinations. Maximum colour and appearance was recorded in the sample of T2 (7.8) followed by T1 and T2 (7.4) and T3 (7.0).

Body and Texture: There was significant difference in body and texture percentage of different treatment combinations. Maximum body and texture were recorded in the sample of T0 (8.2) followed by T1 (7.8), T2 (7.7) and T3 (7.4).

Flavour and Taste: There was significant difference in flavour and taste percentage of different treatment combinations. Maximum flavour and taste percentage was recorded in the sample of T2 (8.4) followed by T0 (8.0), T3 (7.9) and T1 (7.8).

Overall Acceptability: There was significant difference in overall acceptability of different treatment combinations. Maximum overall acceptability was recorded in the sample of T2 (7.9) followed by T0 (7.8), T1 (7.6) and T3 (7.4).

Conclusion
The results obtained from physico-chemical, microbiological and organoleptic analysis concluded that garlic small bread (garlic pav) can be prepared satisfactory by the addition of pearl millet flour, sago flour and garlic. From the above findings T2 (85:7.5:7.5:15) was found to be most favourable

treatment in terms of organoleptic properties (colour & appearance, flavour & taste and overall acceptability) and it obtained maximum score. In terms of nutritional properties T0 (100:00:00:00) and T1(95:2.5:2.5:15) found to be most satisfactory treatment and it obtained maximum score (protein, fat, ash, and acidity). Hence as a result, it can be stated that utilising refined wheat flour, pearl millet flour, sago flour, and garlic, can be successfully used for the preparation of garlic small bread (garlic pav).

References
1. Agarwal M, Singh Shanker Suwan, Ashotosh K. Development and quality assessment of multigrain bread prepared by using wheat flour, buck wheat flour and pearl millet flour. The Pharma Innovation. 2017;6(6, Part A):40.
2. Ahmad S, Jain MK, Crecely RW, Apitz-Castro R, Block E, Cruz MR. The chemistry of alkyl thiosulfate esters. 8.(E, Z)-Ajoene: a potent antithrombotic agent from garlic. Journal of the American Chemical Society. 1984;106(26):8295-8296.
3. Amit, AK, Suresh, ST, Amol, PK. Nutritional and sensory characteristics of cookies prepared from pearl millet flour. The Pharma Innovation Journal. 2018, 908-913.
4. Ashotosh K, Singh Shanker Suwan, Nath N. Preparation and quality assessment of bread prepared by using wheat

flour, tapioca sago flour (Sabudana) and oat meal (Daliya). The Pharma Innovation. 2017;6(8, Part F):399.
5. Clark, Melissa. A Garlic Festival without a Single Clove. The New York Times. 2008. https://www.nytimes.com/2008/06/18/travel/18iht-18appe.13802149.html
6. Fasasi O. Proximate, antinutritional factors and functional properties of processed pearl millet (*Pennisetum glaucum*). J Food Tech. 2009, 92-97.
7. Gernot Katzer. Garlic (*Allium sativum* L.). 2009. Retrieved December 2, 2012 http://gernot-katzers-spice-pages.com/engl/Alli_sat.html
8. Karim AA. Starch from the Sago (*Metroxylon sagu*) Palm Tree-Properties, Prospects, and Challenges as a New Industrial Source for Food and Other Uses. Comprehensive Reviews in Food Science and Food Safety. 2008;7(3):215-228.
9. Krishnan R, Dharmaraj U, Sai MR, Malleshi NG. Quality characteristics of cookies prepared from finger millet-seed coat based composite flour. Food Chem. 2011, 499-506.
10. Kumari Surabhi, Singh Shanker Suwan, Yadav Komal, Bhavya. Development and quality assessment of Gluten-free Bread prepared by using Rice flour, Corn starch and Sago flour. 2019.
11. Manning Katie, Ruth Pelling, Tom Higham, Jean-Luc Schwenniger, Dorian Fuller Q. 4500-year-old domesticated pearl millet (*Pennisetum glaucum*). Journal of Archaeological Science. 2010;38(2):312-322.
12. Nwanekezi EC. Composite flours for baked products and possible challenges–A review. Nigerian Food Journal. 2013;31(2):8-17.
13. Patel G, Singh Shanker Suwan. Preparation and Quality Assessment of Sattu Bread Prepared by Using Refined Wheat Flour, Sattu (Gram & Barley) and Sago Flour (Tapioca). International Journal of Research in Engineering, Science and Management. 2021;4(12):20-22.
14. Sanjay. What is ladi pav, pav bun pav. Article of tarladalal. 2020. https//www.tarladalal.com/glossary-ladi-pav-pav-bun-pav-228i
15. Sehgal A, Kawatra A. Use of pearl millet and green gram flours in biscuits and their sensory and nutritional quality. J Food Sci. Techno. 2007, 312-313.
16. Srilakshmi B. Food science. 7th edition, New Age International publication. 2003.
17. Udaybeer MA, Kahan, Surendra, P, Shiriram G. Development of low gluten cookies from pearl millet. Agriculture update, 2017, 857-861.