



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2020; 9(1): 341-344

© 2020 TPI

www.thepharmajournal.com

Received: 10-11-2019

Accepted: 14-12-2019

## Syed Majed Khateeb.

Assistant professor, Dept. of Food Processing Technology, Sau K.S.K College of Food Technology, Beed, Maharashtra, India

## Syed Zubair Hussaini

Assistant professor, Dept. of Food Microbiology and Safety, Sau K.S.K College of Food Technology, Beed, Maharashtra, India

## Assessment of microbial quality of wheat bran fortified bread

Syed Majed Khateeb and Syed Zubair Hussaini

### Abstract

The study was done on assessment of microbial quality of wheat bran fortified bread. The level of wheat flour and wheat bran was (0:100,5:95,10:90,15:85,20:80,25:75,30:70,35:65) percent in preparation of Breads. During shelf life study microbial analysis (y/m, SPC & Coliform) were done on all experimental samples result were found that 4 days of shelf life of all sample found little bit colonies were count SPC, y/m & Coliform during storage days of bread. T<sub>1</sub> was found to be most acceptable sample of all throughout the shelf life. When increases the wheat bran then shelf life of bread will be decreases. Wheat bran has the capacity, by its high fiber content, to absorb the cholesterol of the intestine and to expel it with feces to the outside before it is absorbed by the organism and also it prevent the constipation, colon cancer, breast cancer, and treatment of haemorrhoids, prevention of diverticulitis and also helps weight loss diets.

**Keywords:** Wheat bran bread, high fiber content, fat content

### Introduction

Bread and other wheat containing baked products are widely accepted and consumed throughout the world. Bread is an important staple food, the consumption of which is steady and increasing in Nigeria (Edema MO *et al.* 2005) [3]. It the consumption of bread and other bakery products has increased within the past decades. Next to bread, biscuit is one of the most commonly consumed baked products in our country. The urbanization has resulted in increasing demand for ready to eat food items at reasonable price. The bread as a good source of nutrients i.e. carbohydrate-52%, protein-9% and fat-1% and many micronutrients that are important for health (Oluwajoba *et al.* 2012) [10]. In several countries in the world, up to 50% of the total required calories are supplied by bread alone (Pomeranz Y *et al.* 1996 and Akobundu ENT *et al.* 2006) [11, 1]. Bread is a staple food prepared by cooking dough of flour and water & possibly more ingredients. The industrialization of bread baking was a formative step in the creation of the modern world whole grain bread becoming preferred as having superior nutritional value while white bread became associated with lower nutritional value. Today, bread occupies an important place in baking industry & constitutes over 50% to the total Indian market for bakery products. It is consumed by majority of population all over the world as a part of daily diet & is equally popular in Urban & rural regions. The per capita consumption of bread in India is only around 1.5kg to 1.75kg in various zones. (AIBMA). Brown or whole meal breads generally made in a similar way to white bread except that a higher level of fat is normally used, e.g. 1.5% of the flour weight as fat, compared with 1% for white bread. As whole meal flour has higher water absorption than white, a higher water addition can be used. Consumer acceptance studies have revealed that over 80 percent of the panelist rated the whole wheat flour bread as “good to excellent” (Neelam Khetrepaul, 2005) [6]. Bran is the hard outer layer of grain and consists of combined aleurone and pericarp. Along with germ, it is an integral part of whole grains. When bran is removed from grains, they loss a portion of their nutritional value. Bran is one of the excellent sources of dietary fiber. Bread can be enriched with dietary fiber, such as wheat bran (Sidhu *et al.* 1999) [14]. Bran is particularly rich in dietary fiber, and omegas and contains significant quantities of starch, protein, vitamins, and dietary minerals.. Dietary fiber is the edible part of plant and analogous carbohydrates which includes polysaccharides, oligosaccharides, lignin, and associated substances that are resistant to digestion and absorption in the human small intestines with complete or partial fermentation in the human large intestines. The positive image of dietary fiber has prompted health-conscious consumers to increase their purchases of Oods containing a wide range of fiber sources.

### Corresponding Author:

#### Syed Majed Khateeb.

Assistant professor, Dept. of Food Processing Technology, Sau K.S.K College of Food Technology, Beed, Maharashtra, India

Research indicated that dietary fiber from wheat bran as part of a low-fat diet reduced the risk of colon cancer. The potential colon anti-carcinogenic effect of wheat bran was partly, related to its low fermentability in the large intestine. The Academy of Nutrition and Dietetics (AND) recommends a dietary fiber intake of 25–35 g/day for a healthy adult depending on calorie intake. Researchers have worked on the addition of dietary fiber to baked products particularly breads and cookies in order to meet the consumer's health need (Nelson A. L *et al.* 2001 and Rodriguez-Ambriz, S. L *et al.* 2008) [8, 12]. Wheat bran has the capacity, by its high fiber content, to absorb the cholesterol of the intestine and to expel it with feces to the outside before it is absorbed by the organism. Fiber contained in wheat bran increases intestinal peristalsis and softens the fecal matter so that it can be expelled to the outside more easily. However, the fortification of bran fibers effect on the final quality of bread. Addition of high amount of fiber cause poor quality of bread in terms of texture, loaf volume, and appearance. (Gómez *et al.* 2003 and Wang *et al.* 2002) [15, 15]. High levels of fiber dilute gluten lowers gas retention thus causing a decrease in loaf volume. Addition of wheat bran plays a major role in dietetic purpose to solve many nutritional disorders. The diets rich in fiber such as cereals, nuts, fruits and vegetables causes positive effect on health as their consumption has been related to control the several diseases (Dhingra *et al.* 2012) [2]. the recommendation for the daily fiber intake is about 25 g but the average intake of fiber in the United States is about 10–15 g (Gelroth *et al.* and Ranhotra *et al.* 2011) [4]. Flour and breads are generally regarded as safe food from the microbiological point of view as they contain low water

activity (International Commission on Microbiological Specification of Food (ICMSF) 1998) [6]. Pathogenic microorganisms have been so far reported to contaminate a wide range of foods spreading the food borne infections or intoxications including the enteric complication, abdominal pain, fever, blood infection, meningitis, joint infection, kidney failure, paralysis, miscarriage, etc. (Sezanur Rahman, Alamgir Kobir *et al.* 2014, Noor *et al.* 2016) [13, 9].

### Materials and Methods

The details of the materials used and methods adopted during the present investigations were presented in this chapter under appropriate headings.

### Procurement of raw materials

Wheat Flour, Wheat Bran, Fat, Salt, Sugar, Yeast was purchase from local market of Allahabad.

### Method for development of Bread

Breads were prepared with varying levels of ingredients such as yeast, salt, sugar, fat, wheat bran, water. According in preliminary experiments breads were prepared with 5%, 10%, 15%, 20%, 25%, 30% and 35% of wheat bran baking at the temperature of 230 °C to 245 °C for 30 min.

### Formulations of Bread

Finally 8 formulations T<sub>0</sub> (control), T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub> and T<sub>7</sub> were prepared by using the proportion of wheat flour and wheat bran as 100:0, 95:5, 90:10, 85:15, 80:20, 75:25, 70:30 and 65:35 respectively.

**Table 1:** Formulation of samples

Samples	Wheat flour	Wheat bran	Fat	Salt	Sugar	Yeast	Water
T <sub>0</sub>	100g	--	4g	1.5g	1g	2g	60ml
T <sub>1</sub>	95g	5g	4g	1.5g	1g	2g	60ml
T <sub>2</sub>	90g	10g	4g	1.5g	1g	2g	60ml
T <sub>3</sub>	85g	15g	4g	1.5g	1g	2g	60ml
T <sub>4</sub>	80g	20g	4g	1.5g	1g	2g	60ml
T <sub>5</sub>	75g	25g	4g	1.5g	1g	2g	60ml
T <sub>6</sub>	70g	30g	4g	1.5g	1g	2g	60ml
T <sub>7</sub>	65g	35g	4g	1.5g	1g	2g	60ml

### Results and Discussions

The experiments were conducted to “Studies on Effect of different level of Wheat Bran on Quality of Bread”. Microbiological analysis of Wheat bran bread had been carried out.

### Microbial analysis of wheat bran bread

#### Yeast/Mold count for wheat bran bread

During the microbiological study of Wheat bran bread for 96 hrs shelf life of five samples were prepared for yeast/mold analysis, treatment samples i.e. (T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub>). In first 24 hrs in T<sub>1</sub> sample 2 colonies were found and in T<sub>2</sub>

sample 2 colonies of yeast/mold were found. T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> found minimum growth of yeast/mold in first 24 hrs but after 48 hrs of shelf life study of five samples slightly increase in their colony count as compare to 24 hrs result. In next 72 and 96 hrs of yeast/mold count there was increase in control sample and treatment samples but the sample T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> found more acceptable after 96 hrs of shelf life. It is presented in table 2 and fig. 1 T<sub>7</sub> sample found more yeast/mold growth as compared to other samples. T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> sample was found to be most acceptable sample of all throughout the shelf life.

**Table 2:** Yeast/ Mould count for Wheat bran bread

Sample	Dilution Qty.	1gm/9ml	Yeast/mold count				
			During storage days				
			0 hrs	24 hrs	48 hrs	72 hrs	96 hrs
T <sub>0</sub>	1 ml	10 <sup>-3</sup>	Nil	2	4	5	10
T <sub>1</sub>	1ml	10 <sup>-3</sup>	Nil	2	3	6	11
T <sub>2</sub>	1 ml	10 <sup>-3</sup>	Nil	2	4	7	10
T <sub>3</sub>	1 ml	10 <sup>-3</sup>	Nil	3	5	7	15

T <sub>4</sub>	1 ml	10 <sup>-3</sup>	Nil	4	5	9	15
T <sub>5</sub>	1 ml	10 <sup>-3</sup>	Nil	3	6	9	17
T <sub>6</sub>	1 ml	10 <sup>-3</sup>	Nil	5	7	10	17
T <sub>7</sub>	1 ml	10 <sup>-3</sup>	Nil	6	8	13	19

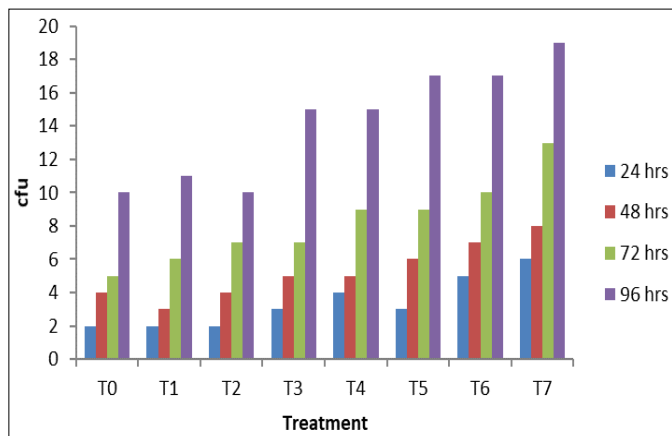


Fig 1: Yeast/ Mould count for Wheat bran bread

**Coliform count for wheat bran bread**

During the microbiological study of Wheat bran bread for 96 hrs shelf life of eight samples were prepared for coliform analysis, treatment samples i.e. (T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub>). In first 24 hrs in T<sub>1</sub> sample 2 colonies of coliform were found and in T<sub>2</sub> sample 3 of coliform were found. T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> found minimum growth of coliform after 24 hrs but after 48 hrs of shelf life study of 8 treatment samples slightly increase in their colony count as compare to 24 hrs result. In next 72 and 96 hrs of coliform count there was increase in control sample and treatment samples but the sample T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> found more acceptable after 96 hrs of shelf life. It is presented in table 3 and fig. 2 T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> samples found more Coliform bacterial growth as compared to others samples after 96 hrs of study. T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was found to be most acceptable sample of all throughout the shelf life.

Table 3: Coliform Count for Wheat bran bread

Treatment Sample	Dilution Qty.	1gm/9ml	Coliform count				
			During storage days				
			0 hrs	24 hrs	48 hrs	72 hrs	96 hrs
T <sub>0</sub>	1ml	10 <sup>-3</sup>	Nil	2	4	7	11
T <sub>1</sub>	1 ml	10 <sup>-3</sup>	Nil	2	4	7	11
T <sub>2</sub>	1 ml	10 <sup>-3</sup>	Nil	3	5	8	13
T <sub>3</sub>	1 ml	10 <sup>-3</sup>	Nil	4	6	10	14
T <sub>4</sub>	1 ml	10 <sup>-3</sup>	Nil	5	7	10	13
T <sub>5</sub>	1ml	10 <sup>-3</sup>	Nil	5	9	12	14
T <sub>6</sub>	1ml	10 <sup>-3</sup>	Nil	6	11	14	16
T <sub>7</sub>	1ml	10 <sup>-3</sup>	Nil	7	11	17	19

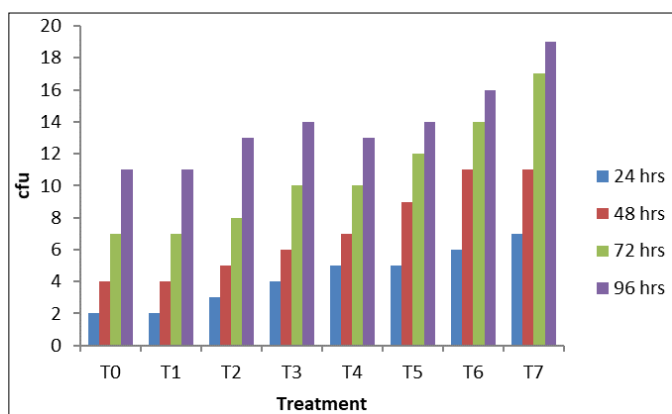


Fig 2: Coliform Count for Wheat bran bread

**SPC count for wheat bran bread**

During the microbiological study of Wheat bran bread for 96 hrs shelf life of eight samples were prepared for SPC analysis, treatment samples i.e. (T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub>). In First 24 hrs in T<sub>1</sub> sample 4 colonies were found and in T<sub>2</sub> sample 5 SPC colonies were found. T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> found minimum growth of SPC in first 24 hrs but after 48 hrs of shelf life study of five samples slightly increase in their colony count as compare to 24 hrs result. In next 72 and 96 hrs of SPC count there was increase in control sample and treatment samples, but the sample T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> found more acceptable after 96 hrs of shelf life. It is presented in table 4 and fig. 3 T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> sample found more SPC growth as compared to other samples. T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub> was found to be most acceptable sample of all throughout the shelf life.

Table 4: SPC Count for Wheat bran bread

Treatment Sample	Dilution Qty.	1gm /9ml	SPC count				
			During storage days				
			0 hrs	24 hrs	48 hrs	72 hrs	96 hrs
T <sub>0</sub>	1ml	10 <sup>-3</sup>	Nil	4	6	10	13
T <sub>1</sub>	1 ml	10 <sup>-3</sup>	Nil	4	7	11	15
T <sub>2</sub>	1 ml	10 <sup>-3</sup>	Nil	5	7	11	15
T <sub>3</sub>	1 ml	10 <sup>-3</sup>	Nil	5	9	13	18
T <sub>4</sub>	1 ml	10 <sup>-3</sup>	Nil	5	8	14	16
T <sub>5</sub>	1 ml	10 <sup>-3</sup>	Nil	6	7	15	19
T <sub>6</sub>	1 ml	10 <sup>-3</sup>	Nil	6	9	15	21
T <sub>7</sub>	1 ml	10 <sup>-3</sup>	Nil	8	10	17	23

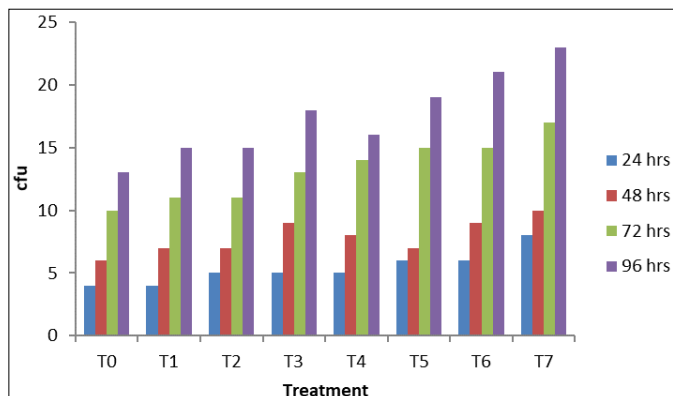


Fig 3: SPC Count for Wheat bran bread

### Conclusion

The studies were conducted for entitled “Effect of different level of Wheat bran on quality of bread”. Eight samples were developed i.e. (0%, 5%, 10%, 15%, 20%, 15%, 20%, 25%, 30%, 35%) the 15% wheat bran sample was satisfactory after sensory analysis and in case of physicochemical analysis it was observed that 35% wheat bran sample was more acceptable, during shelf life study it was observed that 5%, 10%, 15% wheat bran sample were more acceptable.

It can be concluded that the colour was slightly dark with increasing wheat bran and at the 15% level it was more acceptable. There was not much effect at 5% addition. It is revealed that the colour, texture, structure and sheen by adding 5% wheat bran in wheat flour there was slightly increased in the above characteristics. At 0% level there was not much more effect. The bran having good medicinal and nutritional value it contains rich in ash, fat, and dietary fibers.

### References

1. Akobundu ENT. Bread making technology and ingredients for bread making. A paper presented at a training workshop on the use of cassava/wheat composite flour and non-bromated additives for making bread and other confectioneries. Held at Michael Okpara University of Agriculture, Umudike, All India bread manufacturers association, 2006.
2. Dhingra D, Michael M, Rajput H, Patil RT. Dietary fiber in foods: a review. *Journal of Food Science and Technology*. 2012; 49:255-266.
3. Edema MO, Sanni LO, Sanni AI. Evaluation of maize-soybean flour blends for sour maize bread production in Nigeria. *Afr. Jour. of Biotechnology*. 2005; 4:911-918.
4. Gelroth J, Ranhotra GR. Food uses of fiber. In: *Handbook of Dietary Fiber*, Cho and Dreher, eds. Marcel Dekker: New York, 2011.
5. Gómez M, Ronda F, Blanco CA, Caballero PA, Apuesteguía A. Effect of dietary fibre on dough rheology and bread quality. *European Food Research and Technology*. 2003; 216:51-56.
6. International Commission on Microbiological Specification of Food (ICMSF). 1998.
7. *Microorganisms in foods: Microbial ecology of food commodities*. Blackie Academic and Professional, London. Neelam Khetrapaul, 2005.
8. Nelson AL. *High fibre ingredients* Eagan press handbook series. St Paul, MN, Eagan Press. 2001.
9. Noor R. Microbiological quality of commonly consumed

street foods in Bangladesh. *Nutrition & Food Science*. 2016; 46(1):130-141.

10. Oluwajoba SO, Malomo O, Ogunmoyela OAB, Dudu OEO, Oideyemi A. Microbiological and nutritional quality of warankashi enriched bread, *Journal of microbiology, bio-technology and food science*. 2012; 2(1):42-68.
11. Pomeranz Y, Clifton EM. *Food analysis: Theory and practice*, 3rd ed. CBS Publishers and Distributors, India, 1996.
12. Rodriguez-Ambriz SL, Islas-Hernandez JJ, Agama-Acevedo E, Tovar J, Bello-Perez LA. Characterization of a fibre rich powder prepared by liquefaction of unripe banana flour. *Food Chemistry*. 2008; 107:1515-1521.
13. Sezanur Rahman *et al.* A Review on Impact of Agrochemicals on Human Health and Ecosystem: Bangladesh Perspective. *Plant Environment Development*. 2014; 3(2):31-35.
14. Sidhu JS, Al-Hooti SN, Al-Saqer JM. Effect of adding wheat bran and germ fractions on the chemical composition of high-fiber toast bread. *Food Chemistry*. 1999; 67:365-371.
15. Wang J, Rosell CM, Benedito Barber C. Effect of the addition of different fibres on wheat dough performance and bread quality. *Food Chemistry*. 2002; 79:221-226.