Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(4): 2008-2010
Received: 14-05-2018
Accepted: 18-06-2018

G Bharamappa
Department of agricultural microbiology UAS GKVK, Bangalore, Karnataka, India

Suvarna VC
Department of agricultural microbiology UAS GKVK, Bangalore, Karnataka, India

Harish K
Department of agricultural microbiology UAS GKVK, Bangalore, Karnataka, India

Prasad HJ
Department of agricultural microbiology UAS GKVK, Bangalore, Karnataka, India

Correspondence
G Bharamappa
Department of agricultural microbiology UAS GKVK, Bangalore, Karnataka, India

Effect of number of washes on microbial population of homemade horse gram Sprouts

G Bharamappa, Suvarna VC, Harish K and Prasad HJ

Abstract
Sprouts provide a good supply of vitamins *viz.*, A, E, C and B complex vitamins (Shipard, 2005). The vitamin content of some seeds can increase by 20 times their original value within several days of sprouting. Mung Bean sprouts have increased B vitamin compared to the dry seeds, of - B_1 up by 285 per cent B_2 up by 515 per cent B_3 up by 256 per cent. Even, soaking seeds overnight in water yields greatly increased amounts of B and C. Sprouts contain 30 times more vitamin compared to matured plants. An experiment was conducted to see the microbial population of home made horse gram sprouts as influenced by varying number of washes at Department of Agricultural Microbiology, University of Agricultural Sciences, G. K. V. K., Bengaluru during the year 2009-2011. The results of the experiments showed that microbial population of bacteria and fungi decreases as the number of washes increases, and comparatively bacteria shows highest population.

Keywords: number, washes, microbial population, homemade horse, sprouts

Introduction
The whole seeds of horse gram are generally utilized as cattle feed. However, it is consumed as a whole seed, as sprouts, or as whole meal by a large population in rural areas of southern India. It is mostly used in South Indian states.
The chemical composition Horse Gram is comparable with more commonly cultivated legumes. Like other legumes, these are deficient in methionine and tryptophan, though horse gram is an excellent source of iron molybdenum. Comparatively, horse gram seeds have higher trypsin inhibitor and haemoagglutinin activities and polyphenols than most bean seeds. Natural phenols are mostly phenolic acids, namely, 3, 4-dihydroxy benzoic, P-hydroxy benzoic, vanillic, caffeic, P-coumaric, ferulic, syringic and sinapic acids. Dehusking, germination, cooking, and roasting have been shown to produce beneficial effects on nutritional quality of both the legumes. Though both require prolonged cooking, a soak solution has been shown to reduce cooking time and improve protein quality. Moth bean is mostly consumed as dhal or sprouts.

Material and Methods
Production of sprouts of horse gram sprouts
The collected seed samples were washed and soaked in water for eight hours at room temperature. Water was drained out and seeds were placed in muslin cloth and tide for sprouting. (Three days for horse gram).

Enumeration and isolation of bacteria and fungi from homemade horse gram sprout samples at different intervals
The home made sprout samples were colleted. Sprouts were prepared by washing the legume seeds for varying number of washes *viz.*, 1, 2, 3, and 4. These samples were subjected for enumeration and isolation of bacteria and fungi by employing standard plate count method. Observations pertaining to colony forming units, colony characteristics, pigmentation and sporulation were recorded.

Results and Discussion
Enumeration of micro flora associated with homemade horse gram sprouts samples
The bacterial population in homemade horse gram sprout samples with different number of washes is presented in the Table 1.
The highest bacterial population (31.66×10^5cfu/g,) (31.33×10^5 cfu/g) and (33.33×10^5cfu/g,) was recorded in samples one, two and three respectively on the third day of storage with one wash given.

Samples subjected to four washes showed the lowest bacterial population (20.66×10^5cfu/g), (25.00×10^5cfu/g) and (23.00×10^5cfu/g) and were observed in samples one, two and three samples respectively. The similar trend was observed on fifth and seventh day in samples one, two and three.

There was significant difference between T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes) of sample one on the third day. But, there was no significant difference between the T_3 (three washes) and T_4 (four washes). They were on par with each other. A similar trend was observed on fifth and seventh day. Sample two also had the same trend except on seventh day. There was a significant difference between T_3 (three washes) and T_4 (four washes). On fifth and seventh day of sample three, there was a significant difference between T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes). But, on third day there was no significant difference between the T_3 (three washes) and T_4 (four washes), they were on par with each other with reference to bacterial population (Table 1). (Plate No.1).

Fungal population of homemade horse gram sprout samples with different number of washes, at different time intervals is presented in the Table 2.

The fungal population in homemade horse gram sprout samples with different number of washes is presented in Table 2. There was no visible fungal growth on first day of storage

The highest fungal population (7.33×10^3 cfu/g), (8.66×10^3 cfu/g), and (7.3×10^3 cfu/g) in samples one, two and three respectively, on third day with one wash. The lowest fungal population of 4×10^3 cfu/g, 4×10^3 cfu/g and 3×10^3 cfu/g were observed with sample one, two and three respectively on third day with four washes. Similar observations (the highest and the lowest fungal population) were observed on 5th and 7th day in sample one, two and three, with one wash and four washes respectively.

There was a significant difference between T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes), T_3 (three washes) and T_4 (four washes) with reference to fungal population of sample-one on third day. But, with fifth and seventh day, there were a significant differences between T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes). But, T_3 (three washes) and T_4 (four washes) were on par with each other. There is a significant difference between the T_1 (one wash) and T_4 (four washes), T_2 (Two washes) and T_4 (four washes), T_3 (Three washes) and T_4 (four washes). On third, fifth and seventh day of sample two and three, but, except on seventh day for sample three, there was a significant difference between T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes). T_3 (three washes) and T_4 (four washes) were on par with each other.

Table 1: Bacterial population of homemade horse gram sprout samples as influenced by varying number of washes during storage.

Treatments (No. of washes)	Bacterial population ($\times10^5$cfu/g)											
	Sample1 (days)				Sample 2 (days)				Sample 3 (days)			
	1st	3rd	5th	7th	1st	3rd	5th	7th	1st	3rd	5th	7th
1	-	31.66	46.66	53.66	-	31.33	38.00	42.00	-	33.33	35.00	40.00
2	-	25.00	31.00	33.33	-	29.00	34.00	40.00	-	27.00	32.00	37.00
3	-	23.00	29.00	32.00	-	27.00	31.00	37.00	-	25.00	30.00	33.00
4	-	20.66	27.00	31.00	-	25.00	29.00	34.00	-	23.00	27.00	29.00
SEm±	-	01.26	00.88	00.99	-	00.76	01.08	00.86	-	00.96	00.85	0.81
CD @ 5%	-	04.12	02.89	03.24	-	02.51	03.52	02.82	-	03.13	02.78	02.66

Note: Mean values indicate average of 4 replications

Table 2: Fungal population of homemade horse gram sprout samples as influenced by varying number of washes during storage.

Treatments (No. of washes)	Fungal population ($\times10^3$cfu/g)											
	Sample 1 (days)				Sample 2 (days)				Sample 3 (days)			
	1st	3rd	5th	7th	1st	3rd	5th	7th	1st	3rd	5th	7th
1	-	07.33	11.66	16.00	-	08.66	12.66	15.00	-	07.33	10.33	13.00
2	-	05.66	08.00	11.00	-	07.00	11.00	13.66	-	06.00	08.33	10.00
3	-	04.66	07.33	10.00	-	05.66	09.00	12.00	-	04.66	07.00	08.33
4	-	04.00	07.00	09.00	-	04.0	06.66	09.00	-	03.00	05.00	07.33
SEm±	-	00.40	00.51	00.72	-	00.31	00.43	00.45	-	00.49	00.59	00.51
CD @ 5%	-	01.33	01.68	02.36	-	01.40	01.40	01.47	-	01.60	01.93	01.68

Note: Mean values indicate average of 4 replications

References

1. Feet WF. Reduction of the native microflora on alfalfa sprouts during addition of antimicrobial compounds to the irrigation water Int. J Food. Microbiol. 2001; 72:13-18.
2. Gabriel Mirasol GA, Marie PB, Estrad MA, Angelica AG, Gilbert BL, Alonzo A. Microbiology of retail mung bean sprouts vended in public markets of national capital region. Philippines Food. Control. 2007; 18:1307-1313.
3. Gamage Gayani R, Kim G. Effectiveness of antimicrobial coated oriented polypropylene/polyethylene films in sprout packaging. Life Sciences and Biotechnology, Korea University in Seoul Korea, 206 Green Campus, Seoul. 2008; 42:136-713.
4. National Advisory Committee on Microbiological Criteria for Foods. Microbiological safety evaluations and recommendations on sprouted seeds. Int. J Food Microbiol. 1999; 52:123-153.
5. Noguchi Y, Kaumagai S. Studies on the enterohaemorrhagic *E. coli* O157; h7 present in radish sprouts Appl. Envt. Microbiol. 1998; 64:1532-1535.
6. Robertson LJ, Johannessen GS, Gjerde BK, Loncarevic S. Microbiological analysis of seed sprouts in Norway. Int. J Food. Microbiol. 2001; 75:119-126.
7. Shipard. Introduction to sprouts, 2005, www.science direct.com

8. Tassan CC, Nuchar GTE. Inhibition of *Staphylococcus aureus* by olive phenolics in broth in a model food system. J Food. Prot. 1994; 57:120-124.
9. Thoroski T, Blank G, Billiaderis C. Eugenol induced inhibition of extracellular enzyme production by *Bacillus subtilis*. J Food. Prot. 1981; 52:399-403.
10. Vandan N, Jayant R, Bandekar. Studies on the microbiological quality of packed sprouts from supermarkets in Mumbai, India. Inter. National J Food. Safety, Nutrition. Publ. Health. 2009; 2:165-175.
11. Young Ho, Seo Ji, Hyunjang, Kwang-Deog Moon. Studies on the microbial evaluation of minimally processed vegetables and sprouts produced in Seoul. Korea. Food. Sci. Biotechonol. 2005; 19:1283-1288.