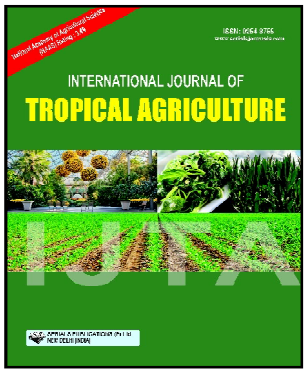

INTERNATIONAL JOURNAL OF TROPICAL AGRICULTURE

ISSN : 0254-8755

available at http: www.serialsjournal.com

Volume 35 • Number 3 • 2017

Microbial Population of Home Made Green Gram Sprouts as Influenced by Varying Number of Washes

G. Bharamappa., Suvarna, V. C., Harish. K., and Prasad, H. J

Department of Agricultural Microbiology, UAS, Bangalore

Abstract: Sprouts are valuable dietary supplements and are considered as natural healthy foods by consumers of many parts of the world. Germination improves nutritional quality of seeds, because lipids, carbohydrates and storage proteins are broken down to smaller and more digestible nutrients during this complex metabolic process. An experiment was conducted to see the microbial population of home made Green 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 compared to fungi bacteria shows highest population.

INTRODUCTION

Sprouts are believed to be rich in health promoting substances compared to their mature counterparts; notably, sprouts of cruciferous plants such as radish, broccoli and those of legumes such as alfalfa are known for their health promoting phytochemicals with antioxidant properties. Consumption of sprouts which was common in Asia is becoming popular in recent years in Western countries, including the USA, because they are often perceived as part of a healthy diet. Research has shown that cruciferous sprouts contain 10-100 times more glucosinolates than their mature counterparts. Sprouts have a strong protective function in inducing carcinogen detoxifying enzyme systems, while dietary *in vitro* and human intervention studies have indicated that cruciferous and leguminous sprouts can decrease H_2O_2 induced DNA damage, which may lower the risk of some cancers. It is well known that plant based diets rich in phytochemicals, primarily with antioxidant properties, can decrease the incidence of chronic

and degenerative diseases, including cardiovascular diseases and several types of cancer.

MATERIAL AND METHODS

Production of sprouts of green gram

The Green gram seed samples were collected. And 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. (Two days for green gram).

Enumeration and isolation of bacteria and fungi from homemade green gram sprout samples at different intervals

The home made Green gram sprout samples were collected. 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

Bacterial population of different homemade green gram sprout samples at different washes and at different time intervals

The bacterial population in homemade green gram sprout samples is presented in the Table 1.

The highest bacterial population was observed with one wash (30.33×10^5 cfu/g) and the lowest bacterial population (20.66×10^5 cfu/g) was observed in sample 1 on third day. The highest bacterial population of ($31x10^5$cfu/g) and (33.33×10^5 cfu/g) and the lowest bacterial population of (22×10^5 cfu/g) and (25×10^5 cfu/g) was observed on third day with one and four washes given for sample two and three respectively. The similar trend was observed on fifth and seventh day in sample one, two and 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) with reference to bacterial population of sample-1 on third day. But, T_3 (Three washes) and T_4 (four washes) were on par with each other. There were a significant difference between the T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes) for sample-one on fifth and seventh day. But, T_3 (Three washes) and T_4 (four washes) were on par with each other. On third, fifth and seventh day of sample two, there was a significant difference between the T_1 (one wash) and T_4 (four washes), T_2 (Two washes) and T_4 (Four washes) and T_3 (Three washes) and T_4 (Four washes) with reference to bacterial population. On seventh day of sample three, there was 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) were on par each other. On third and fifth day of sample-three there were a significant difference between T_1 (one wash) and T_4 (four washes), T_2 (Two washes) and T_4 (four washes) and T_3 (three washes) and T_4 (four washes) with reference to bacterial population.

Fungal population of homemade green gram sprout samples with varying number of washes given at different intervals

The fungal population in homemade green gram sprout samples is presented in Table 2.

The highest fungal population was observed in the first wash (7.66×10^3cfu/g) and the lowest fungal population (3.0×10^3cfu/g) was observed in sample-one. Samples two and three also had the highest fungal population (8.33×10^3cfu/g) and (8.0×10^3cfu/g) respectively and the lowest fungal population of 2.66×10^3cfu/g and (3.66×10^3cfu/g) were observed in one and four washes of sample-two and three respectively. The similar trend was

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

Treatments (No.of washes)	*Bacterial population (×10⁵cfu/g)*											
	Sample 1 (days)				*Sample 2 (days)*				*Sample 3 (days)*			
	1st	*3rd*	*5th*	*7th*	*1st*	*3rd*	*5th*	*7th*	*1st*	*3rd*	*5th*	*7th*
1	-	30.33	33.33	37.66	-	31.00	37.00	42.00	-	33.33	38.66	42.00
2	-	25.00	30.00	34.00	-	28.00	35.00	40.00	-	29.00	34.00	37.00
3	-	23.00	29.00	32.00	-	25.00	32.66	37.00	-	30.00	34.33	35.00
4	-	20.66	27.00	32.00	-	22.00	29.00	34.00	-	25.00	29.00	33.00
SEm±	-	00.99	00.75	00.65	-	00.91	00.90	00.86	-	00.95	01.00	00.91
CD @ 5%	-	03.24	02.45	02.15	-	02.97	02.94	02.82	-	03.10	03.29	02.97

Note: Mean values indicate average of 4 replications

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

Treatments No. of washes	*Fungal population (×10³cfu/g)*											
	Sample 1 (days)				*Sample 2 (days)*				*Sample 3 (days)*			
	1st	*3rd*	*5th*	*7th*	*1st*	*3rd*	*5th*	*7th*	*1st*	*3rd*	*5th*	*7th*
1	-	07.66	10.00	12.00	-	08.33	11.00	13.00	-	08.00	11.66	13.00
2	-	05.00	07.33	10.00	-	06.33	09.00	11.00	-	06.00	08.33	11.00
3	-	04.00	06.33	08.00	-	04.00	06.66	09.00	-	05.00	07.00	08.66
4	-	03.00	05.00	06.66	-	02.66	05.00	07.33	-	03.66	06.33	07.00
SEm±	-	00.56	00.59	00.53	-	00.50	00.53	00.48	-	00.45	00.64	00.53
CD @ 5%	-	01.82	01.93	01.74	-	01.63	01.74	01.56	-	01.47	02.10	01.74

Note: Mean values indicate average of 4 replications

observed on fifth and seventh day in sample-one, two and three.

The fungal population on first day was not observed in all the three samples. There were a significant difference between T_1 (one wash) and T_4 (four washes), T_2 (Two washes) and T_4 (four washes) on third day of sample-one and two with reference to fungal population. T_3 (Three washes) and T_4 (four washes) were on par with each other. But, for sample-two on seventh day, 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). There was a significant difference between T_1 (one wash) and T_4 (four washes), T_2 (two washes) and T_4 (four washes) on third day. But, T_3 (three washes) and T_4 (four washes) were on par with each other.

REFERENCES

Gabriel, Mirasol, G. A., Marie, P. B., Estrad, M. A., Angelica, A. G., Gilbert, B. L., Alonzo, A., (2007), Microbiology of retail mung bean sprouts vended in public markets of national capital region. *Philippines Food. Control*, **18:**1307-1313.

Gamage, Gayani, R., and Kim, G., (2008), Effectiveness of antimicrobial coated oriented polypropylene/ polyethylene films in sprout packaging. Life Sciences and Biotechnology, *Korea University in Seoul Korea, 206 Green Campus, Seoul.* **42***:* 136-713.

National Advisory Committee on Microbiological Criteria for Foods. 1999.

Microbiological safety evaluations and recommendations on sprouted seeds. *Int. J. Food Microbiol.,* **52:**123-153.

Noguchi, Y., and Kaumagai, S., (1998), Studies on the enterohaemorrhagic *E. coli* O157; h7 present in radish sprouts *Appl. Envt. Microbiol.,* **64:** 1532-1535.

Robertson, L J., Johannessen, G. S., Gjerde, B. K. and Loncarevic, S., (2001), Microbiological analysis of seed sprouts in Norway. *Int. J. Food. Microbiol.* **75**:119–126.

Shipard., (2005), Introduction to sprouts, www.science direct.com

Tassan, C. C and Nuchar, G. T. E., (1994), Inhibition of *Staphylococcus aureus* by olive phenolics in broth in a model food system. *J. Food. Prot.,* **57**:120-124.

Thoroski, T., Blank, G. and Billiaderis, C., (1981), Eugenol induced inhibition of extracellular enzyme production by *Bacillus subtilis. J. Food. Prot.*, **52**: 399 – 403.

Vandan, N. and Jayant R. Bandekar., (2009), Studies on the microbiological quality of packed sprouts from supermarkets in Mumbai, India. *Inter. National J. Food. Safety, Nutrition. Publ. Health,* **2:**165-175.

Young –Ho Seo Ji –Hyunjang., and Kwang –Deog Moon., (2005), Studies on the microbial evaluation of minimally processed vegetables and sprouts produced in Seoul. Korea. *Food. Sci. Biotechonol.,* **19:** 1283-1288.