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Study of microflora associated with pulses and their sprouts from different food marts

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Abstract
Pulses are the edible seeds of the plants in the legume family. Growing pulses Also promotes sustainable agriculture, as pulse crops help decrease greenhouse gases, increase soil health, and use less water than other crops. Pulses are the dried seeds of the legume plants. An experiment was conducted to see the Microflora of raw Pulses and their sprouts collected from different Food Marts, at Department of Agricultural Microbiology, University of Agricultural Sciences, G. K. V. K., Bengaluru during the year 2009-2011. In this study, Enumeration of microflora associated with damaged horse gram and green gram samples collected from different places, showed that the Sample-two and three were statistically non-significant with reference to bacterial population. But, both of them were significantly differing from sample-one. Sample-two and three were statistically non-significant with reference to fungal population. Both of them significantly differed from sample-one.

Keywords: Study, microflora associated with pulses, the plants, legume family

Introduction
Pulse is derived from the latin words puls or pultis meaning “thick soup”. Pulse crops are one of the most sustainable crops a farmer can grow. It takes just 43 gallons of water to produce one pound of pulses, they also contribute to soil quality by fixing nitrogen in the soil. Pulses are also known as grain legumes, are a group of 12 crops that includes dry beans, dry pea’s chick peas and lentils. They are high in protein, fibre, and various vitamins, provide amino acids, and are hearty crops. They are most popular in developing countries, but are increasingly becoming recognized as an excellent part of a healthy diet throughout the world.
Pulses are one of the important food crops globally due to higher protein content. Pulses are an important group of crops in India, which is also responsible for yielding large financial gains by amounting for a large part of the exports. pulses are the major sources of protein in the diet. of all categories of people pulses form an integral part of the Indian diet, providing much needed protein to the carbohydrate rich diet. India is the largest producer of pulses in the world. Pulses are 20 to 25percent protein by weight which is double the protein content of wheat and three times that of rice.
Upto to 25 percent of pulses are used as feed stuff, particularly for pigs and poultry. As a study source of nutrion, feed for animals, and soil sustainability, pulse crops play major role in food security, a role which will only grow in future.

Material Methods
Enumeration and isolation of bacteria and fungi from horse gram and green gram samples
Green gram and horse gram samples collected from different places were subjected to enumeration and isolation of bacteria and fungi by employing standard plate count method using Nutrient agar and Martin’s Rose Bengal agar respectively.

Enumeration and isolation of bacteria and fungi from green gram and horse gram sprout samples collected from different food marts.
The food marts sprout samples were collected. These collected Sprouts samples were subjected for enumeration and isolation of bacteria and fungi by employing standard plate count method. Observations pertaining to colony forming units were recorded.

Experimental Results
The results, of the experiments conducted to enumerate and isolate micro flora from raw pulses namely horse gram, green gram samples collected from different places, and also the

microbiology of horse gram, green gram sprouts samples collected from different food marts were studied under laboratory conditions are presented in this chapter.

Bacterial and fungal population of horse gram and green gram samples

The bacterial population of horse gram and green gram samples is presented in Table1. Horse gram sample-three had the highest bacterial population (47.33×10^5cfu/g). The lowest bacterial population was observed in sample-one (30×10^5 cfu/g). Green gram sample-two had the highest bacterial population (51.33×10^5 cfu/g). The lowest bacterial population of green gram was observed in sample-1 (36×10^5 cfu/g).

The Sample-two and three were statistically non-significant with reference to bacterial population. But, both of them were significantly differing from sample-one.

The fungal population in horse gram and green gram samples is presented in Table 1. Horse gram sample-three had the highest fungal population of (16.66×10^3 cfu/g). The lowest fungal population was observed in sample No. one (9.33×10^3cfu/g). Green gram sample-three had the highest fungal population of 20.33×10^3 cfu/g. The lowest fungal population was observed in the sample-three (11.33×10^3 cfu/g).

Sample-two and three were statistically non-significant with reference to fungal population. Both of them significantly differed from sample-one.

Bacterial and fungal population of horse gram sprout samples procured from different food marts at different intervals of storage

The bacterial and fungal population of different food mart horse gram sprout samples at different intervals is represented in Table 2.

The highest bacterial population (36.33×10^5cfu/g) was observed in horse gram sprout sample-one on third day collected from food mart. The lowest bacterial population (31×10^5cfu/g) was observed in the sample-three on third day collected from food marts. The highest and the lowest fungal population (6.33×10^3cfu/g) and (3.66×10^3cfu/g) were observed in horse gram sprout samples-three and one respectively on the third day. Similar observations were recorded on fifth and seventh day in sample one, two and three respectively.

The sample-two and three were statistically non-significant with reference to bacterial population. But, both of them were differing significantly from sample-one

With reference to fungal population, there was a significant difference between the sample-one and three. But, there was no significant difference between sample-two and three, they were on par with each other.

Bacterial and fungal population of green gram sprout samples collected from different food marts at different intervals of storage.

The bacterial and fungal population of green gram sprout sample collected from food mart at different intervals is represented in Table 3. The highest bacterial population of 34.66×10^5cfu/g was observed in green gram sprout sample-one on third day collected from food mart. The lowest bacterial population (30.00×10^5 cfu/g) was observed in the sample-two on third day collected from food mart. The highest and the lowest fungal population of 5×10^3 and 3×10^3cfu/g were observed in green gram sprout samples three and two respectively which were collected from food marts. Similar observations were recorded on fifth and seventh day.

With reference to bacterial population, there was a significant difference between the sample-one and three. But, sample-two and three were on par with each other.

The sample-two and three were statistically non-significant with reference to fungal population. But, both of them were differing significantly with sample-one.

Table 1: Enumeration of microflora associated with damaged horse gram and green gram samples collected from different places

S. No.	Pulses samples	Bacterial population ($\times10^5$cfu/g)		Fungal population ($\times10^3$cfu/g)	
		Horse gram	Green gram	Horse gram	Green gram
1	Sample 1	30.00	36.00	09.33	11.33
2	Sample 2	46.33	51.33	15.33	17.66
3	Sample 3	47.33	50.00	16.66	20.33
SEm±		01.98	00.93	00.81	00.92
CD @ 5%		06.63	03.11	02.73	03.09

Note: Mean values indicates average of 5 replications

Table 2: Bacterial and fungal population of horse gram sprout samples collected from food marts at different intervals

Treatments	Bacterial population ($\times10^5$cfu/g) in horse gram				Fungal population ($\times10^3$cfu/g) in horse gram			
	1st day	3rd day	5th day	7th day	1st day	3rd day	5th day	7th day
Sample 1	-	36.33	39.66	43.00	-	03.66	07.33	16.66
Sample 2	-	32.66	35.00	36.00	-	05.66	11.66	20.33
Sample 3	-	31.00	34.66	35.00	-	06.33	12.66	20.33
SEm±	-	00.65	00.68	01.00	-	00.30	00.69	00.47
CD @ 5%	-	02.20	02.28	03.37	-	01.03	02.30	01.57

Note: Mean values indicate average of 5 replications

Table 3: Bacterial and fungal population of green gram sprout samples collected from food marts at different intervals

Treatments		Bacteria ($\times10^5$cfu/g) in green gram			Fungi ($\times10^3$ cfu/g) in green gram			
	1st day	3rd day	5th day	7th day	1st day	3rd day	5th day	7th day
Sample 1	-	34.66	39.00	40.66	-	04.66	07.66	10.00
Sample 2	-	30.00	34.00	36.00	-	03.00	04.66	06.66
Sample 3	-	31.00	34.00	35.00	-	05.00	08.00	10.00
SEm±	-	00.62	00.73	00.74	-	00.27	00.46	00.44
CD @ 5%	-	02.09	02.45	02.48	-	00.91	01.53	01.49

Note: Mean values indicate average of 5 replications

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