



Shelflife and Quality of Green Gram Sprouts Treated With Different Forms of Ginger

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ABSTRACT

Ginger is the rhizome of the plant Zingiber officinale, consumed as a delicacy, medicine or spice It lends its name to its genus and family (Zingiberaceae). Allium sativum, commonly known as garlic is native to central asia. It is used as a both culinary and medicinal purpose. An experiment was conducted to see the effect of garlic and ginger pieces and paste forms on shelflife and quality of horse gram sprouts 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 both garlic and ginger paste were more effective than pieces.

Received 11.07.2017

Revised 04.08.2017

Accepted 24.08.2017

INTRODUCTION

The mung bean (*Phaseolus aureus*) belongs to family fabaceae also known as mungbean, mung, green gram, golden gram. They are small, ovoid in shape, and green in color. The green gram is one of the most wholesome among pulses in India. It is free from the heaviness and tendency to flatulence, which is associated with other pulses. This plant is a native of India and since ancient times it has been in cultivation. It is not found in a wild state. It was introduced early into Southern China, Indo-China and Java. It has been introduced in comparatively recent times into East and Central Africa, the West Indies and the United States. The green gram forms a very nutritious article of diet. It is consumed in the form of whole dried seeds and in the form of dal prepared by splitting the seeds in a mill. The sprouted mung beans are a highly nutritious food. The beans are soaked overnight, drained and placed in containers in a dark room. They are sprinkled with water every few hours and the sprouts are ready in about three days. One pound of dry beans gives six to eight pounds of sprouts. There is an amazing increase in nutrients in sprouted beans when compared to their dried embryo.

MATERIAL AND METHODS

An investigation was conducted in the Department of Agricultural Microbiology, University of Agricultural Sciences, G. K. V. K., Bengaluru. The horse gram samples were collected from different places. Those collected seed samples were washed and soaked in water for 8 hours at room temperature. Water was drained out and seeds were placed in muslin cloth and tide for sprouting. (Two days for green gram and three days for horse gram).

Preparation of ginger paste

Ginger was selected and soil particles were removed by washing with water. Then outer peel of ginger was removed. They were made into small pieces. Small pieces of ginger were used for the preparation of ginger paste under aseptic conditions by using pestle and mortar.

Shelf life of sprouts of horse gram and green gram was studied by treating the sprouts with garlic and ginger in the form of pieces and paste for their antimicrobial properties. Sprouts were treated with garlic and ginger and packaged in polythene bag of 200 gauge thickness with ventilation by minute holes. The

packaged bags were sealed and incubated at room temperature. The observations were recorded until the sprouts showed the spoilage symptoms.

RESULTS AND DISCUSSION

Effect of ginger pieces and paste forms application on shelflife and quality of green gram sprouts during storage

The effect of both ginger pieces and paste application on green gram sprouts as a biopreservative against spoilage bacteria and fungi on the shelf life of sprouts was studied and the results are presented in the Table 2.

One day after storage, the sprouts treated with all levels of ginger pieces and paste had developed odd brown colour, hard texture, no odd smell. The colour turned to light black, semi hard texture and slightly odd smell was recorded in untreated sprouts (T₁).

Three days after storage, the sprouts treated with ginger pieces turned to light black, hard texture and slightly odd smell was developed. The sprouts treated with ginger paste at all levels developed odd brown, semi hard texture without odd smell. The colour turned to moderately black smooth texture, odd smell was recorded in untreated sprouts (T₁).

After five days of storage, the sprouts treated with ginger pieces at all levels turned to moderately black, smooth texture and odd smell was developed. The sprouts treated with all levels of paste turned to moderately brown, soft texture and slightly odd smell was developed. The colour turned to completely black, soft texture, odd smell was recorded in untreated sprouts (T₁).

After seven days of storage, the sprouts treated with ginger pieces at all levels turned to completely black, soft texture and odd smell was developed. The sprouts treated with ginger paste at all levels turned to moderately black, soft texture with odd smell. The colour turned to completely black, soft texture, foul smell was developed in untreated sprouts (T₁). T₇ (5g garlic paste) was the best treatment in all the days. If we compare pieces and paste, paste shows good result.

Effect of ginger piece and paste on microbial population green gram sprouts

An experiment was conducted to check the effect of ginger pieces and paste on microbial population of bacteria and fungi of homemade horse gram sprouts at different days and the results are presented in the Table 4.

On the third day, of storage, green gram sprouts had the highest bacterial population in T₁ (39×10⁵ cfu/g) which was on par with T₂, T₃, T₄ and T₅ and the lowest bacterial population (29×10⁵ cfu/g) was observed in T₇. But, bacterial and fungal growth was not observed on 1st day.

On the third day the highest fungal population (10×10³ cfu/g) was obtained in T₁, which was on par with T₂, T₃, T₄ and T₅. The lowest fungal population (3×10³ cfu/g) was noticed in T₇ which was on par with T₄, T₅ and T₆.

The highest bacterial population was noticed in untreated sprout sample (43×10⁵ cfu/g) on 5th day which was on par with T₂, T₃ and T₄. The lowest fungal population (33×10⁵ cfu/g) was noticed in T₇.

The highest fungal population (14.66×10³ cfu/g) was found in untreated sprouts on 5th day which was on par with T₂ and T₃ and the lowest fungal population (4.66×10³ cfu/g) was noticed in T₇.

After 7 days of storage, the highest bacterial population was seen in T₁ (45×10⁵ cfu/g) which was on par with T₂, T₃, T₄ and T₅ and the lowest population was found in T₇ (35×10⁵ cfu/g).

The untreated sprout sample recorded the highest fungal population (18.33×10³ cfu/g) which was on par with T₂ and T₃. In green gram sprout sample treated with 5g of ginger paste found the lowest fungal population (8.33×10³ cfu/g).

Table 2. Effect of ginger pieces and paste forms on shelf life and quality of green gram sprouts during storage

Treatments	(Storage) days											
	1			3			5			7		
	Colour	Texture	Odour	Colour	Texture	Odour	Colour	Texture	Odour	Colour	Texture	Odour
T1= Control (s)	01.30	01.20	01.50	02.90	02.80	02.85	03.75	03.85	03.60	05.00	04.60	04.80
T2= Sprouts +1 g ginger pieces	01.00	01.10	01.40	02.70	02.65	01.75	03.30	03.80	02.90	04.50	04.65	04.70
T3= Sprouts + 2.5 g ginger pieces	01.00	01.05	01.30	02.60	02.55	01.70	03.25	03.50	02.60	04.50	04.80	04.60

T4= Sprouts + 5.0 g ginger pieces	01.00	01.00	01.25	02.45	02.70	01.65	02.95	03.85	02.30	04.25	04.70	04.30
T5= Sprouts + 1 g ginger paste	01.00	01.15	01.20	02.50	02.85	01.50	02.80	03.90	02.10	03.75	04.80	04.15
T6= Sprouts + 2.5 g ginger paste	01.00	01.60	01.10	02.45	02.90	01.40	02.60	03.85	01.80	03.25	04.90	04.00
T7= Sprouts + 5 g ginger paste	01.00	02.00	01.00	02.20	03.00	01.30	02.30	03.90	01.60	03.10	05.00	03.60

Colour

1-2 = brown
 2-3 = Colour turned to light black
 3-4 = Colour turned to moderately black
 4-5 = Colour turned to complete black

Texture

1-2 = Hard
 2-3 = Semi hard
 3-4 = Soft
 4-5 = Very Soft

Aroma

1-2 = No odd smell
 2-3 = Slightly odd smell
 3-4 = Odd smell
 4-5 = Foul smell

Table 4. Influence of ginger pieces and paste forms on bacterial and fungal population of green gram sprouts at different intervals during storage

Treatments	Bacterial population ($\times 10^5$ cfug $^{-1}$)				Fungal population ($\times 10^3$ cfug $^{-1}$)			
	1 st	3 rd	5 th	7 th	1 st	3 rd	5 th	7 th
T1= Control (s)	-	39.00 ^a	43.00 ^a	45.00 ^a	-	10.00 ^a	14.66 ^a	18.33 ^a
T2= Sprouts + 1 g ginger pieces	-	37.00 ^{ab}	41.66 ^a	43.00 ^{ab}	-	09.66 ^a	13.33 ^{ab}	17.00 ^a
T3= Sprouts + 2.5 g ginger pieces	-	35.00 ^{abc}	39.00 ^{ab}	42.33 ^{ab}	-	08.66 ^{ab}	12.00 ^{abc}	14.66 ^{ab}
T4= Sprouts + 5.0 g ginger pieces	-	34.66 ^{abc}	37.66 ^{ab}	40.00 ^{abc}	-	07.00 ^{abc}	10.66 ^{bcd}	13.00 ^b
T5= Sprouts + 1 g ginger paste	-	33.00 ^{abc}	35.00 ^b	38.00 ^{abc}	-	05.66 ^{abc}	09.00 ^{cd}	12.33 ^b
T6= Sprouts + 2.5 g ginger paste	-	31.33 ^{bc}	34.33 ^b	36.66 ^{bc}	-	04.33 ^{bc}	07.33 ^{de}	11.00 ^{bc}
T7= Sprouts + 5 g ginger paste	-	29.00 ^c	33.00 ^b	35.00 ^c	-	03.00 ^c	04.66 ^e	08.33 ^c
SEm\pm	-	01.61	01.38	01.55	-	01.00	00.80	00.90
CD @ 5%	-	04.89	04.18	04.71	-	03.05	02.44	02.75

Note: Mean values indicates average of 3 replications

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CITATION OF THIS ARTICLE

G.Bharamappa, Harish.K., Bandeppa, Prasad. H.J., Basavaraj. M Kolar and Suvarna, V. C.. Shelflife And Quality Of Green Gram Sprouts Treated With Different Forms Of Ginger. *Bull. Env. Pharmacol. Life Sci.*, Vol 6 Special issue 2, 2017: 324-326