



Influence of different methods of seed extraction on seed quality in cucumber [*Cucumis sativus* (L.)] cv. HASSAN LOCAL

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Abstract : The supply of quality seeds is the constraint in getting higher fruit yield for consumption. Raising the crop for good quality cucumber seed, method of seed extraction is most important to maintain the quality of seeds, which involves removal of pulp and gelatinous substance present around the seed with direct extraction, fermentation, acid extraction and alkali extraction. Improper seed extraction result in inferior seed quality hence, the study on influence of different methods of seed extraction on seed quality in cucumber [*Cucumis sativus* (L.)] cv. HASSAN LOCAL was carried out in the Department of Seed Science and Technology, University of Agricultural Sciences, GKVK, Bangalore. Crop was raised at the Vegetable Seed Production plot, Department of Horticulture, during *Khariif*, 2010 by adopting Randomized Complete Block Design, design with four replications following recommended package of practices. The study comprised of six treatments viz., E₁ (Natural fermentation for 24 hours), E₂ (Alkali extraction) E₃ (1% Hcl), E₄ (1.5% HCl), E₅ (2% Hcl), and E₆ (Control). The results revealed that the highest germination (94.50%), maximum mean seedling length (28.28 cm) highest mean seedling dry weight (12.53 mg), higher vigour index I (2671), vigour index II (1183), maximum field emergence (92%) and with low electrical conductivity (341 μSm^{-1}) was recorded in E₁. The study can concluded that the seed quality parameters in seeds extracted with natural fermentation is more appropriate for better seed quality in cucumber.

Key Words : Cucumber, Vigour index, Seed quality parameters, Fermentation

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INTRODUCTION

Cucumber is a warm season crop mainly grown throughout the year in tropical and sub-tropical countries. Cucurbits requires comparatively dry, warm and long growing season for seed production. Annually quality seeds of cucumber marketing about 1000 tonnes with worth of 14.33 \$ million (Indian Horticulture Database, 2005). Seed production in cucumber is not a difficult job. Farmers can easily produce seeds of cucumber in their own farms, to avoid the uncertainty of buying good seed by selection of healthy fruit and seed. The supply of quality seeds is the constraint in getting higher fruit yield for consumption. Many advances are being made regarding raising of the seed crop for good quality cucumber seed, but best method of seed extraction has not been given

equal attention to maintain the quality of seeds. Improper seed extraction result in poor quality. Therefore, best method of seed extraction needed to get good seed quality. The realization of higher seed quality in cucumber is much depends on the use of seed production technologies like standard method of seed extraction. The information available on the best method of seed extraction in cucumber (*Cucumis sativus* L.) is limited. Considering the importance of above practical problems involved in maintaining seed quality parameters, the present study has carried out.

MATERIALS AND METHODS

The material consists of seeds of cucumber (*Cucumis sativus* L.) cv. HASSAN LOCAL were obtained from Department of

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Horticulture, G.K.V.K, University of Agricultural Sciences, Bengaluru. The seed crop was sown during *Khariif*, 2010 by adopting Randomized Complete Block Design, design with four replications following recommended package of practices (Anonymous, 2010) at the vegetable seed production plots of Department of Horticulture. The spacing maintained was 1.5 x 0.75 m and four to five seeds per hill were hand dibbled. Thinning operation was carried out 8th day after sowing by removing weak seedlings. Only one healthy seedling per hill was maintained and 100 per cent population was maintained. All the recommended agronomic and plant protection practices were followed with protective irrigation to raise a healthy crop. Hassan local variety bears 5 to 6 fruits per vine, but well developed fruits between 3 to 5 and the crop mature in about 90 days. At harvest, leaves turn pale yellow to yellow and stem becomes woody. The fruits were harvested at 90 DAS (days after sowing), when they were fully matured and turned dark brown colour. Five randomly selected plants in each treatment in all the replication were tagged and harvested. Seeds were extracted using four methods.

Alkali extraction :

Pulp was removed by cutting the fruit longitudinally. 100 ml of sodium bicarbonate (30 g dissolved in 100 ml like warm water) was added to one litre of pulp and kept in a plastic container for 12 hours. The seeds were separated by washing the pulp with water for 3-4 times and kept for drying.

Acid extraction :

1.0 per cent, 1.5 per cent and 2.0 per cent hydrochloric acid (35%) was added to three different containers containing one litre of pulp and stirred well before keeping it for three hours. The seeds were separated by washing the pulp with water for 3-4 times and then subjected to drying.

Fermentation :

The pulp obtained from the fruits was allowed to ferment naturally for 24 hours. Then, the seeds were separated by repeated washing with water for 3-4 times and then kept for drying.

Direct extraction :

The seeds were scooped out from the fruit manually then the pulp was washed thoroughly with water for 5-6 times to remove gelatinous substance present around the seed. The seeds were then subjected to drying. The data were recorded on seed quality parameters, seed germination (%), mean seedling length (cm), mean seedling dry weight (mg), vigour indices, electrical conductivity (μScm^{-1}), field emergence (%). The mean seedling length was computed by adding both root and shoots length of ten normal seedlings from each treatment and expressed in centimeter. The seedlings were dried at $85^{\circ}\pm 2^{\circ}\text{C}$ and weighed using electronic balance and mean weight of ten dried seedlings weight was computed and expressed in milligrams. The vigour index was computed by adopting the formula as suggested by

Table 1 : Effect of different methods of seed extraction on germination, mean seedling length (cm), seedling dry weight (mg), vigour index I, vigour index II, EC and field emergence in *[Cucumis sativus (L.) cv. HASSAN LOCAL]*

Treatments	Germination (%)	Mean seedling length (cm)	Seedling dry weight (mg)	Vigour index I	Vigour index II	EC (μScm^{-1})	Field emergence (%)
E ₁ : Fermentation	94.50 (76.54)	28.28	12.53	2671	1183	341.50	92.00 (73.66)
E ₂ : Alkali extraction	79.25 (62.88)	26.49	12.03	2130	956	387.50	74.50 (59.69)
E ₃ : Acid extraction (1%)	74.00 (59.34)	24.08	11.08	1788	816	413.75	71.25 (57.61)
E ₄ : Acid extraction (1.5%)	66.00 (54.33)	24.35	11.00	1607	726	495.50	66.00 (54.32)
E ₅ : Acid extraction (2%)	65.00 (53.70)	23.19	9.18	1507	597	543.50	61.75 (51.80)
E ₆ : Direct extraction	74.00 (54.32)	25.82	11.20	1909	829	402.25	71.50 (57.72)
Mean	75.50	25.36	11.16	1935	8501	430.66	72.83
S.E. _±	1.29	0.31	0.20	38.77	15.00	2.07	1.58
C.D. (P=0.05)	5.39	1.32	0.84	161.59	62.53	8.66	6.59
C.V. (%)	0.03	0.02	0.03	0.04	0.03	0.009	0.04

() figures in parentheses indicate arc sine values

Abdul Baki and Anderson (1973) and expressed as whole number. Electrical conductivity (μScm^{-1}) was measured the using seed leachate with Electrical Conductivity Bridge and expressed as μScm^{-1} (Anonymous, 2007). The total number of seedlings emerged up to 8th day were counted and expressed in per cent for field emergence test and expressed in per cent.

RESULTS AND DISCUSSION

The observation recorded on effect of extraction methods on seed quality in Cucumber (*Cucumis sativus* L.) cv. HASSAN LOCAL are presented in Table 1. The results revealed that the fermentation method of seed extraction recorded significantly higher germination (94.50%), mean seedling length (28.28cm), seedling dry weight (12.25 mg), vigour index I (2671), vigour index II (1183), field emergence (92.0%) and lowest electrical conductivity of seed leachate (341.50) as compared to acid, alkali and direct extraction method. It may be due to more damage caused by hydrochloric acid on seed coat, hence these seed quality parameters were recorded lower values compared to fermentation methods. The permeability of cell membrane is much altered in acid, alkali and direct methods. Hence, higher electrical conductivity values are observed. Similar results are also reported by, Ravikumar (2001) in cucumber.

This is concluded that Seed extraction by fermentation resulted in higher seed quality seeds namely higher germination, mean seedling length, seedling dry weight, vigour index I, vigour index II and field emergence with reduced electrical conductivity. Therefore this method can be recommended for better seed quality.

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