ISSN:0976-4933
Journal of Progressive Science
A Peer-reviewed Research Journal
Vol.12, No.01 & 02, pp 34-38 (2021)

An assessment of okra (*Abelmosceus esculentus* L.) *and* Radish (*Raphanus sativus* L.) quality of seed in Ballia district of U.P.

O.P. Singh[**], P.K. Singh, Brijesh Singh[*], V.N. Pathak and Bhaskar Tiwari
Department of Genetics and Plant Breeding,
Shri Murli Manohar Town P.G. College, Ballia, U.P. India
[**]Constutuent author, [*]Email of corresponding author-opsingh3007@gmail.com

Abstract

Okra or Bhindi and Radish are important vegetable crops of Ballia district. A number of private and public company sell seeds of these vegetable crops in Ballia market.The different varieties of seeds were collected and tested in the departmental laboratory for knowing about the ratio of healthy and unhealthy categories of seeds. Five varieties of okra and four varieties of radish for zaid cultivation were studied for seed germination, seed viability, disease intensity, period of sprout length and sprout death period on the categories basis and treated and untreated condition. Healthy seeds were superior for all parameters over other categories diseased and treated seed with few reverse observation usually, exhibited poor seed germination, viability etc. A higher disease intensity was observed among damaged seeds. Almost discoloured seeds shown predominance over shrunken one. Seeds were treated by 2 per cent aqueous solution of sodium hypochlorite for five minutes. The conclusion was drawn from the present study that healthy seeds were superior most over discoloured, shrunken and damaged seeds. Usually discoloured exhibited high healthiness over shrunken categories: discoloured and shrunken, if not a genetical attribute, confuse farmers at the time of seed purchase.Seed viability was estimated with one per cent aqueous solution of 2, 3, 5 triphenyl Tetrazolium Chloride.

Key words- Okra, Radish, sodium hypochlorite, seed categories and sprout length.

Introduction

Okra, hindi name Bhindi, a diploid often cross pollinated species (2n=130, chromosome number), an annual important vegetable crop of Kharif and zaid season in India .It is originated in Abyssinian centre; Ethiopia (Vavilove, 1951) and or Hindustan centre; Northern part of India, Pakistan and Myanmar (Zeven and Zhukovasky,1975). It belongs to family malvaceae. The nutritional value as dietary fibre 12%, vitamin C 38 %, protein 3%, calcium and potassium 8% and magnesium 14% along with sufficient amount of vitamin K on daily basis (USDA report). It has high antioxidant along with lectin protein inhibits cancer cell growth especially brest cancer. India shares approximately 14% of world vegetable production.As per National Horticulture Board 2021-22. Gujarat, West Bengal, Bihar, M.P., Chhattisgarh and U.P. are higher producing states with an average 11.6 Mt per hectare productivity. India shows 73% of world Okra production fallowed by Nigeria, Sudan

and Pakistan. The okra is used in a variety of ways as green vegetable and some times to clean the impurities in Gur (jaggery) formation. Another zaid crop and rabi crop Radish (*Raphanus sativus,* 2n= 18) belongs to family Brassicacae, domesticated in Indian continent. Radish is used in as crunchy salad, pickles etc. It is highly cross pollinated vegetable crop due to sporophytic self incompatibility and entomophilous. Seed production in Ballia is not possible because it needs low temperature and farmer purchase seed from the market. It has also having 6% dietary fibre and 24% potassium and sufficient vitamin C due to low calory and almost trace amount of sugar and fat. It is perfect weight loss food and benefitted in diabetes type 2 and reducing the hypertension. The many varieties of above mentioned vegetable (okra and radish) were available in Ballia market and collected for study of seed quality in treated and untreated conditions. The objective of present investigation was to provide a preliminary information among the farmers and breeders at the time purchase of seed about the seed quality on the basis of visual observation because most farmers unable about the identify from a seed packet about components of quality seeds categories as healthy, discoloured, shrunken and damaged in a unit of seed weight.

Material and methods

Under the assessment 5 varieties of Okra *viz*., S 51 (Sangto seeds), Prabhani kranti (Hybrid seed company, Jallana), Arka anamika (IIHR Banglore), Ankur 41 (Ankur seed production, Nagpur) and local Desi were collected from Ballia market. Similarly 4 varieties of Radish *viz*., Baramashi (Evergreen Farm, Gurdaspur), Pusa Mino early (Harsharam seeds), Pusa chetaki (Gurdaspur seed, Gurdaspur) and local Pusa Desi were also collected from the same market in 1998. A 100 g seeds from each Okra and Radish morphologically divided into healthy and deteriorated one. Further more deteriorated category was sub divided into discoloured seed, shrunken seeds and damaged seed. The comparative components of categories is given in table 1. 10 seeds from each category of each varieties of Okra and Radish were grown in petri dishes in the laboratory of Genetic and Plant Breeding, S.M.M.TOWN P.G. College, Ballia (U.P.) in CRBD under two conditions - Normal and treated. The seeds were put in petri dishes with quadri folded sheet of wet blotter papers. The seeds were treated by 2 % aqueous solution of sodium hypochlorite. The data were collected on seed germination percentage, disease intensity, period of maximum sprout length, rate of sprout development, seed viability and period of death of sprouts. The seed germination percentage was calculated formula given by Aggrawal (1994) and disease intensity by Kallu (1983). The sprout length was measured through thread and meter scale. All treatments (36 treated and 36 untreated) were grown with 3 replications therefore 216 Petri dishes were used.

Results and discussion

Eventually healthy seeds in both treated and untreated exhibited superiority in seed germination over other categories in both treated and untreated. The lowest germination was noted for damaged seeds in both one. Arka anamika and Ankur 41 of okra and Pusa Desi of Radish germinated almost 100% in untreated condition while Radish did not showed. Another varieties of both crop varied from 90 to 97. Usually okra was much affected by seed germination by seed treatment (0 to 66.6%) on the other hand Radish varieties were observed a higher percentage of seed germination in treated than non treated. But in other categories (deteriorated) had poor seed germination percentage in sterilized condition than non - sterilized condition.

As per expectation the damaged seeds coat and sprout had higher pathogen observance in Radish varieties the Arka anamika didn't showed any pathogen in healthy seeds but rarely observed

in discoloured and shrunken seed while damaged seeds in few instances exhibited pathogen in both treated and untreated on sprout. In contrast Ankur 41 didn't showed any pathogen in any categories of seeds in treated and untreated but Desi Okra had recorded pathogen occurrence in all categories in both treated and untreated. Healthy seeds of Pusa chetki had no disease occurrence but rarely observed in deteriorated seeds. Pusa Mino early also didn't showed any pathogenicity in healthy and discoloured seed in both treated and untreated but rarely in damaged seeds. S 51 variety of healthy and untreated of Okra exhibited maximum sprout length after 10 days sowing and died. All sprouts after 20 days usually sprout length and early death were noted less in discoloured seeds fallowed by shrunken and damaged seed in both treated and untreated condition in same variety. A similar results were also noted in Prabhani kranti but Arka anamika didn't showed any sprout in treated healthy and discoloured seeds while poor sprout growth discoloured seeds while poor sprout growth was observed in shrunken and damaged seeds. Although a similar result was noted for all categories in untreated condition. The Ankur 41 Okra had poor sprout length in comparison to other varieties in healthy and deteriorated seeds drastically the sprout length was found nil after 8 days of sowing in damaged and untreated seeds but treated one death was noted after 13 days of sowing. The Desi varieties of Okra due to its adaptiveness not only exhibited highest sprout length in almost all categories of untreated seeds but also sprout death observed after longest period of sowing. It is also noted that neither damaged seed was germinated under sterilized condition. Almost similar result was observed in Radish varieties with varying one as per varietal performance.

Table 1 period in hour of seed germination of approximately 50% of summer okra and Radish

S.No.	Name of varieties	Healthy Seeds (A)		Deteriorated seeds					
				Discolour seeds (B)		Shrunken seeds (C)		Damaged seeds (D)	
		U.T.	T.	U.T.	T.	U.T.	T.	U.T.	T.
	Okra								
1	S-51	24	120	24	96	24	72	24	96
2	Prabhani kranti	24	144	24	240	24	120	24	160
3	Arka anamika	48	NC	24	NC	24	72	120	120
4	Ankur 41	72	114	24	120	24	72	48	144
5	Deshi	24	168	24	72	24	24	96	NC
	Radish								
1	Baramashi	48	144	48	120	48	168	96	NC
2	Pusa chetaki	48	24	48	24	48	24	48	48
3	Pusa Mino early	24	24	24	24	24	24	48	48
4	Pusa Deshi	24	24	24	24	24	24	72	24

NC-Non calculated because there was no germination, U.T.- untreated, T .- Treated

The maximum sprout growth development was observed in Desi variety of Okra (288 hours) fallowed by S 51, orka anamika, Prabhani kranti and Ankur 41 interestingly, Prabhani kranti showed same growth development in both condition but lesser in shrunken and damaged seed. In Radish Baramashi and Pusa Desi had highest development hour (288) fallowed by Pusa chetaki and Pusa Mino 264 in healthy seeds (Rao *et al*. 1989, Aggarwal, 1990). The Baramashi exhibited the highest growth development (312) in treated one. A similar results were also observed in other categories with lower growth development hour with prepondress of discoloured over shrunken and damaged seeds. Seed viability was noted higher in healthy seed over deteriorated seeds as expected discoloured seeds were more viable than shrunken and damaged seeds respectively. After maximum sprout growth the death of sprout was also noted in okra varieties and presented in table 2, the similiar findngs has been given by Singh (1998).

Table 2 Per cent of seed germination in varieties of Okra and Radish

S.No.	Name of varieties	Healthy Seeds (A)		Deteriorated seeds					
				Discolour seeds (B)		Shrunken seeds (C)		Damaged seeds (D)	
		U.T.	T.	U.T.	T.	U.T.	T.	U.T.	T.
1	Okra S 51	90	60	83.3	26.6	80	86.6	26.6	23.3
2	Prabhani kranti	96	66.6	93.3	63.3	90	90	20	60
3	Arka anamika	100	NC	96.6	NC	66.6	33.3	20	36.6
4	Ankur 41	100	56	96.6	26.6	80	23.3	23.3	20
5	Deshi	90	36	83.3	23.3	83.3	16.6	26.6	NC
1	Radish Baramashi	93.3	100	90	93.3	90	53.3	33.3	NC
2	Pusa chetaki	96.6	100	83.3	83.3	63.3	70	13.3	16.6
3	Pusa Mino early	93.3	96.6	90	90	73.3	83.3	23.3	16.6
4	Pusa Deshi	100	100	83.3	90	43.3	50	16.6	16.6

NC– Non calculated because there was no seed germination, U.T.- untreated. T.- treated.

Conclusion

Healthy seeds of any variety (as expectation) exhibited superior over deteriorated seeds usually farmers think shrunken seeds are superior to discoloured seeds but vigourisity of discoloured seeds established over shrunken and damaged seeds. Both okra and Radish seeds are dicotyledons with more hardy seed coat of earlier one. Sometime a poor germination in varieties are crop might be influenced by seed dormancy. The loss of seed coat colour might be poor presence of Flanoids or due to some physiological change there why discoloured seeds has poor seed health during seed st

storage and seed germination than healthy one. Probably due to physiological, genetical, or microbial effect. By observing these result during time of seed purchase a farmer may be choosen, on the basis of visual observation which seed varieties have more percentage of healthy seeds and less percentage of deteriorated one. A clear picture arose in this study that prepondress of discoloured seeds over shrunken one. In most of the cases treated seeds were shown poor germination and sprout length. The untreated because of a higher concentration of sodium hypochlorite seed treatment was used which affect the germination and other parameter with few exception.

Table 3- Period (in hours) death of germinated seed in different varieties of summer okra and Radish

S.No.	Name of varieties	Healthy Seeds (A)		Deteriorated seeds					
				Discolour seeds (B)		Shrunken seeds (C)		Damaged seeds (D)	
		U.T.	T.	U.T.	T.	U.T.	T.	U.T.	T.
1	**Okra** S-51	240	240	240	216	216	216	168	216
2	Prabhani kranti	264	216	264	240	264	216	168	192
3	Arka ana-mika	240	NC	240	NC	216	144	96	192
4	Ankur 41	288	288	240	216	216	168	120	192
5	Deshi	240	264	264	192	175	168	168	NC
1	**Radish** Baramashi	192	216	240	168	168	168	144	NC
2	Pusa chetaki	240	240	216	288	168	216	96	96
3	Pusa Mino early	240	216	240	264	192	192	144	120
4	Pusa deshi	216	240	192	216	144	192	96	144

NC- Not counted because there was no seed germination, U.T.- untreated. T.- treated.

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Received on 23.08.2021 and accepted on 22.12.2021