



E-ISSN: 2278-4136

P-ISSN: 2349-8234

JPP 2019; 8(3): 2435-2437

Received: 14-03-2019

Accepted: 15-04-2019

Suganthi A

Assistant Professor, Dept. of Seed Science and Technology, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

J Afrin

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

Chanchal Gireesh

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

P Deepa Gnana Sundari

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

Nainu Joseph

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

P Pandeeswari

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

A Soundari

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

S Swetha

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

P Tamilarasi

Final year students, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

Correspondence**Suganthi A**

Assistant Professor, Dept. of Seed Science and Technology, College of Agricultural Technology, Kullapuram, Theni, Tamil Nadu, India

Efficacy of *Cassia auriculata* leaf extract on seed quality in tomato PKM 1 Seeds

Suganthi A, J Afrin, Chanchal Gireesh, P Deepa Gnana Sundari, Nainu Joseph, P Pandeeswari, A Soundari, S Swetha and P Tamilarasi

Abstract

The laboratory experiment was conducted at Department of Seed Science and Technology, College of Agricultural Technology, Theni during 2019 to study the effect of *Cassia auriculata* leaf extract on seed quality in Tomato PKM 1 seeds. In this experiment, seeds are soaked with different concentrations of *Cassia auriculata* leaf extract viz., 1 %, 5 % and 10 % and durations viz., 9, 12, 24 and 48 hours along with water and control seeds. The results revealed that, *Cassia auriculata* leaf extract 1% for 24 hours increased the performance through seed quality characteristics like germination (%), root length (cm), shoot length (cm), dry matter production (mg seedlings⁻¹⁰), vigour Index I and vigour Index II compared to other treatments.

Keywords: Seed priming, botanicals, *Cassia auriculata*, tomato, seed quality

Introduction

Good quality seed acts as a catalyst for realizing the potential of all other inputs in agriculture. Without good seed, the investment on fertilizers, water, pesticides and other inputs will not pay the desired dividends. Therefore production of quality seed and maintenance of high germination is of the most importance in a seed programme, where seed quality is a multiple concept comprising several physical, chemical and biological components (Kavitha *et al.*, 2005) [8].

Seed priming is a controlled hydration process that involves exposing seeds to low water potentials that restrict germination, but permits pregerminative physiological and biochemical changes to occur (Heydecker and Coolbear, 1977; Bradford 1986; Khan, 1992) [5, 2, 9]. Upon rehydration, primed seeds may exhibit faster rate of germination, more uniform emergence, greater tolerance to environmental stresses, and reduced dormancy in many species (Khan, 1992) [9]. Seed priming is the process of regulating germination by managing the temperature and seed moisture, in order to maximize the seed's potential.

Uses of different chemicals are costly and may cause natural hazard, whereas botanicals are less costly, easily available to the farmers, safe to handle and can prepare easily. Botanical seed treatment is extracted from naturally occurring sources based on botanical ingredients. It is a liquid formulation which is effective against problems that occur in cold wet soils especially limited disturbance and no-till operations and areas of low moisture. It has synergistic effect on early and uniform seed germination and enhances tolerance to pest and disease during early crop stage (De Lespinay *et al.*, 2010) [3]. Many researchers have shown the ability of different botanicals like moringa leaf extract, prosopis leaf extract, neem leaf extract, pungam leaf extract, arappu leaf extract, garlic extract, ginger extract, tulsi extract and turmeric extract in combating adverse climatic condition.

With this background, the study was carried out to determine the effects of *Cassia auriculata* on seed quality in Tomato PKM 1 seeds.

Materials and Methods

The laboratory experiment was conducted at Department of Seed Science and Technology, College of Agricultural Technology, Theni during 2019. The present investigation was carried out to study the effect of *Cassia auriculata* leaf extract on seed quality through physiological parameters viz., germination (%), shoot length (cm), root length (cm), dry matter production (mg seedlings⁻¹⁰), vigour index I and vigour index II. The fresh leaves are collected from near college area and extract is prepared by using pestle and mortar. The solution is considered as 100 % stock solution. From this stock solution, different concentrations viz., 1 %, 5 % and 10 % were prepared.

The seeds are soaked with each concentration along with different soaking durations *viz.*, 9 hr, 12 hr, 28 hr and 48 hr. Water soaking seeds and Non-primed seeds are also taken. The treated seeds are taken to assessing the seed quality parameters.

The germination test in quadruplicate using 100 seeds each with 4 replicates of 25 seeds, where carried out in germination paper (ISTA, 2010) [7], in a germination room maintained at a temperature of 25 ± 2 °C and RH 95 ± 2 % with diffuse light (approx. 10h) during the day. Final count on normal seedlings was recorded on 14th day observation on germination (%), root length (cm), shoot length (cm), dry matter production (mg seedlings⁻¹⁰) after drying at 80 ± 2 °C for 24 h (ISTA, 1999) [6], vigour index I (Abdul-Baki and Anderson, 1973) [1] and vigour index II (Reddy and Khan, 2001) [11] were measured at the end of the germination test. The experimental design was completely randomized design (CRD). The data obtained from each of the experiments were subjected to an analysis of variance and treatment differences tested for significance ($P= 0.05$) as per the methodology described by Gomez and Gomez (1984) [4]. Wherever necessary, the percent values were transformed to arc-sine values before

analysis. The critical differences (CD) were calculated at 5 and 1 per cent probability level.

Results and Discussion

Seed priming is the pre-treatment of seeds by various methods in order to improve seed germination rate, percentage germination and improve uniformity of seedling emergence by controlling the water available in the seed. The pre-treatment initiates the early stages of germination, but does not permit radical protrusion. Botanical priming is a process of using the leaf extracts in which the tomato seeds are soaked. It enhances the germination and seedling emergence uniformly under adverse environmental conditions and normal condition.

The present investigation showed that, *Cassia auriculata* leaf extract 1% for 24 hrs increased the performance of seed quality characteristics like germination (83 %), root length (8.81 cm), shoot length (7.10 cm), dry matter production (14.9 mg seedlings⁻¹⁰), vigour Index I (1321) and vigour Index II (1236) compared to control seeds 69 %, 7.73 cm, 5.90 cm, 12.2 mg seedlings⁻¹⁰, 940 and 841 respectively.

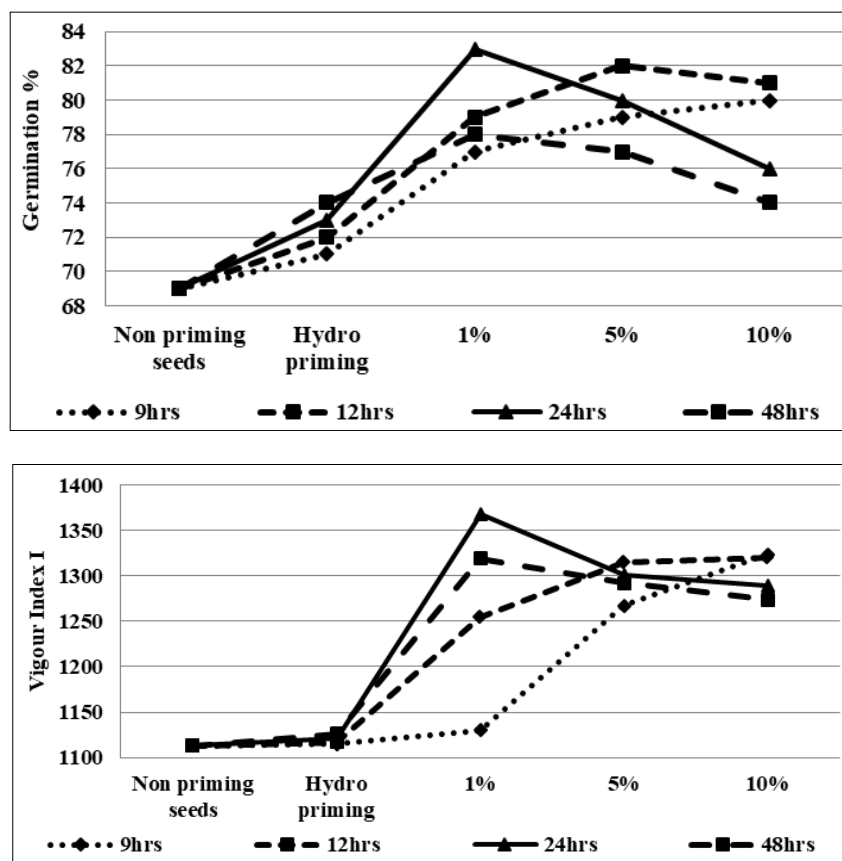


Fig 1: Standardization of seed priming using *Cassia auriculata* on germination (%) and vigour index I in Tomato PKM 1 seeds

The increase in germination by these *Cassia auriculata* leaf extract is not very much known due to lack of information on the active principle involved in it. However, it is presumed that these botanicals contain some of the micro nutrients which are conducive for seed invigoration as reported by Sasthri and Srimathi (2010) [12]. But Ramesh Kumar *et al.*,

2014 reported that the leaf extracts contain saponin like substance which acts as a precursor of GA₃ and invigorated the seed at a particular concentration. As far as the growth parameters are concerned, the majority of leaf extracts showed a phytostimulatory effect by way of enhanced seed germination percentage.

Table 1: Standardization of seed priming using *Cassia auriculata* on root length (cm) and shoot length (cm) in Tomato PKM 1 seeds

Treatments	Root length (cm)				Shoot length (cm)			
	9 hrs	12 hrs	24 hrs	48 hrs	9 hrs	12 hrs	24 hrs	48 hrs
Non primed seeds	7.73	7.73	7.73	7.73	5.90	5.90	5.90	5.90
Hydro priming	7.95	8.01	8.07	8.12	6.01	6.07	6.12	6.15
1 %	8.23	8.45	8.81	8.37	6.21	6.53	7.10	6.89
5 %	8.52	8.64	8.49	8.27	6.58	6.72	6.64	6.57
10 %	8.59	8.73	8.32	8.14	6.67	6.81	6.54	6.49
Mean	8.20	8.28	8.31	8.12	6.27	6.41	6.46	6.40
	T	D	TXD		T	D	TXD	
SEd	0.073	0.065	0.146		0.067	0.060	0.135	
CD (P=0.05)	0.147*	0.132*	0.295*		0.136*	0.122**	0.273*	

Table 2: Standardization of seed priming using *Cassia auriculata* on dry matter production (mg seedlings⁻¹⁰) and vigour index II in tomato PKM 1 seeds

Treatments	Dry matter production (mg seedlings ⁻¹⁰)				Vigour index II			
	9 hrs	12 hrs	24 hrs	48 hrs	9 hrs	12 hrs	24 hrs	48 hrs
Non primed seeds	12.20	12.20	12.20	12.20	841	841	841	841
Hydro priming	12.31	12.35	12.39	12.41	874	889	904	918
1 %	12.92	13.74	14.90	13.64	994	1085	1236	1063
5 %	13.82	13.94	13.42	13.13	1091	1143	1073	1011
10 %	13.75	13.60	13.30	13.08	1100	1107	1017	967
Mean	13.00	13.18	13.89	12.26	980	1013	1014	960
	T	D	TXD		T	D	TXD	
SEd	0.120	0.107	0.240		9.354	8.366	18.709	
CD (P=0.05)	0.243*	0.217*	0.487*		18.906*	16.910*	37.813*	

Conclusion

It could be concluded that, *Cassia auriculata* leaf extract 1 % for 24 hr soaking improved the seed quality in Tomato seeds.

References

1. Abdul-Baki AA, Anderson JD. Vigour deterioration of soybean seeds by multiple criteria. *Crop. Sci.* 1973; 13:630-633.
2. Bradford KJ. Manipulation of seed water relations via osmotic priming to improve germination under stress conditions. *Hort. Sci.* 1986; 21:1105-1112.
3. De Lespinay A, Lequeux H, Lambillotte B, Lutts S. Protein synthesis is differentially required for germination in *Poa pratensis* and *Trifolium repens* in the absence or in the presence of cadmium. *Plant Growth Regul.* 2010; 61:205-214.
4. Gomez KA, Gomez AA. *Statistical Procedures for Agricultural Research.* John Wiley and Sons, New York, 1984.
5. Heydecker W, Coolbear P. Seed treatments for improved performance survey and attempted prognosis. *Seed Sci. & Technol.* 1977; 5:353-425.
6. ISTA (International Seed Testing Assosiation). *International Rules of Seed Testing.* *Seed Sci. & Technol.* 1999; 27:27-32.
7. ISTA. *International Rules for Seed Testing.* Bassersdorf, Switzerland, 2010.
8. Kavitha M, Natarajan S, Senthamizhselvi B. Effect of organics on growth and yield of onion (OASIS). *Proceedings Seminar on Organic Agriculture Peninsular India – Promotion.* Tamil Nadu Agricultural University, Coimbatore, 2005, 61-69.
9. Khan AA. Preplant physiological seed conditioning. *Hort. Rev.* 1992; 13:131-181.
10. Ramesh Kumar S, Kumar M, Muthukrishnan R. Studies on seed quality enhancement with botanicals in Tomato and chillies. *Res. J Agrl. Sci.* 2014; 5(5):852-855.
11. Reddy YTN, Khan MM. Effect of osmopriming on germination, seedling growth and vigour of khirni

(*Mimops hexandra*) seeds. *Seed Res.* 2001; 29(1):24-27.

12. Sasthri G, Srimathi P. Effect of organic and inorganic seed priming treatment on production of quality seed in cowpea. *Green Farming.* 2010; 1(4):366-368.