



RESEARCH PAPER

Organic priming in pumpkin - An eco-friendly approach for sustainable agriculture

S. AMBIKA* AND K. BALAKRISHNAN

Department of Seed Science and Technology, Agricultural College and Research Institute, MADURAI (T.N.) INDIA

(Email : ambikasingaram@gmail.com)

Abstract : Seed priming is a simple, low-cost, low-risk intervention and powerful technique to improve seedling emergence, seedling vigour and yields of several crops. The laboratory experiment was conducted at Department of Seed Science and Technology, Agricultural College and Research Institute, Madurai during 2014-2015, to find out the effect of priming with bovine urines of cow, buffalo, goat and pig. The pumpkin seeds were soaked for 12 h with different concentrations of 5 and 10 per cent along with control (dry treatment). The seed quality parameters *viz.*, germination (%), root length (cm), shoot length (cm), vigour index and dry matter production (g seedlings⁻¹⁰) were evaluated. Among the bovine urines, seeds primed with pig urine (5%) recorded highest germination (99 %), root length (15.6 cm), shoot length (28.5 cm), dry matter production (1.4 g seedlings⁻¹⁰) and vigour index I (4366) compared to control (78, 13.0, 24.0, 1.1 and 2886, respectively).

Key Words : Bovine urines, Pumbkin, Priming, Vigour index, Organic

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INTRODUCTION

Organic agriculture is based on principles of self-sufficiency, biodiversity, crop rotation, recycling and independency of chemically based agricultural systems. Organic fields should be fertilized with manure from organic animals, organic animals should be fed with organically produced fodder and organic crops should be produced from organically produced seeds. Most conventional seeds are treated with fungicides, which is not an option in organic agriculture. The organic label is, therefore, a process claim rather than a product claim which is obtained by certification body or authority with logo at various stages in accordance with certain

specified norms or standards during production, handling, processing and marketing. To meet the requirements of the organic farmers and consumers, one has to scale up and further build up the expertise on organic seed production protocols and establish a good knowledge sharing mechanism. To make organic farming more acceptable and for adaption by large number of farmers, supply of good organic seed developed by organic breeding assumes greater importance in the coming years (Shankrayya, 2012 and Hareesh *et al.*, 2014).

Bovine urines contain nitrogen, phosphorus and potassium. It is also considered as a natural disinfectant and pest repellent and forms the main component of Panchagavya (an organic crop booster prepared and

* Author for correspondence

sprayed by Indian farmers) (Tharmaraj *et al.*, 2011). Bovine urines contain growth regulators, nutrients, trace element. Organic seed priming is more affordable so even small scale farmers can practice.

MATERIAL AND METHODS

Genetically pure seeds of pumbkin obtained from Department of Horticulture, Tamil Nadu Agricultural University, Coimbatore were used for the study. The experiment was conducted at Department of Seed Science and Technology, Agricultural College and Research Institute, Madurai during 2014-15 on pumbkin. The seeds were treated with different bovine urines *viz.*, cow, buffalo, goat and pig at the concentration of 5 and 10 per cent along with water and dry seed as control. Seeds were soaked for 12 h and shade dried. Seedlings were evaluated for germination (%), root length (cm), shoot length (cm), dry matter production (g

seedlings⁻¹⁰), vigour index I = germination (%) × total seedling length (cm) and vigour index II = germination (%) × dry matter production (g/10 seedlings). The data from various experiments were analyzed statistically adopting the procedure described by Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

All the bovine urines increased the seed quality parameter. Among the bovine urines, seeds treated with pig urine recorded increased highest germination per cent (99), root length (15.6 cm), shoot length (28.5 cm), dry matter production (1.4 g seedlings⁻¹⁰) and vigour index I (4366) and vigour index II (138.6) compared to control (78, 13.0, 24.0, 1.1, 2886 and 85.8 for germination per cent, root length, shoot length, dry matter production, vigour index I and vigour index II, respectively) (Fig. 1 to 7). Among the two concentrations of bovine urines

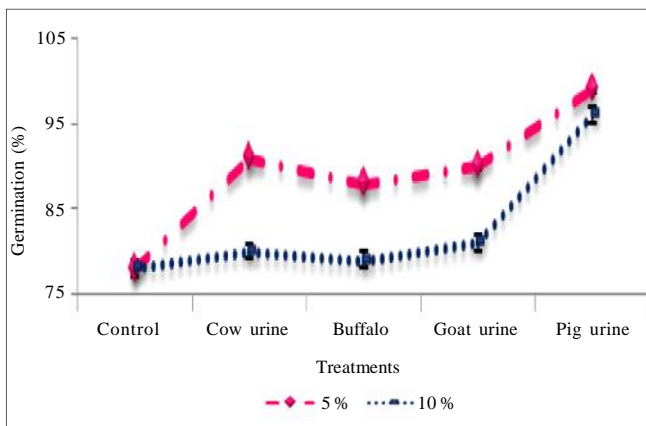


Fig. 1 : Effect of organic priming with bovine urines on germination (%) in pumbkin

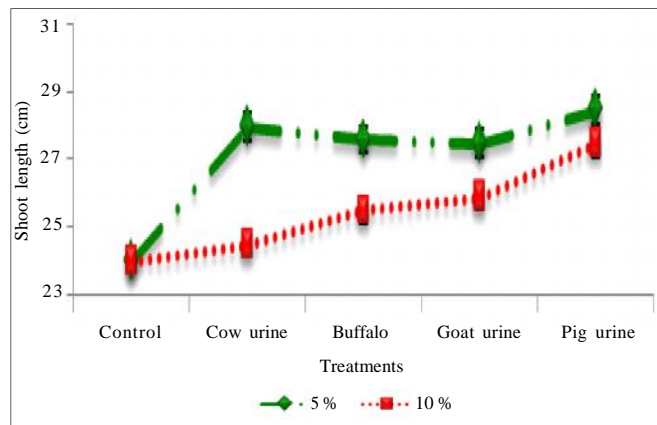


Fig. 3 : Effect of priming with bovine urines on shoot length (cm) in pumbkin

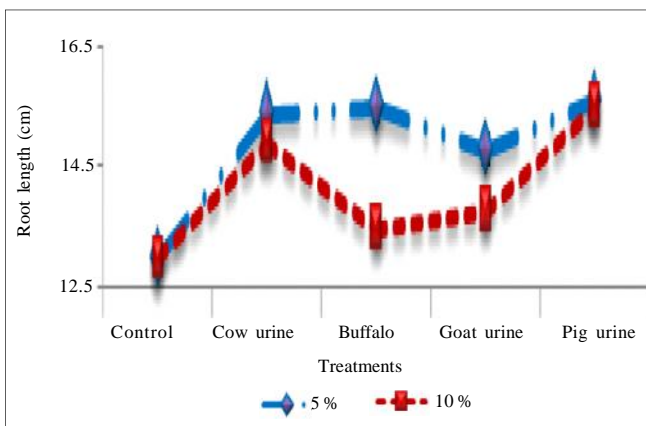


Fig. 2 : Effect of priming with bovine urines on root length (cm) in pumbkin

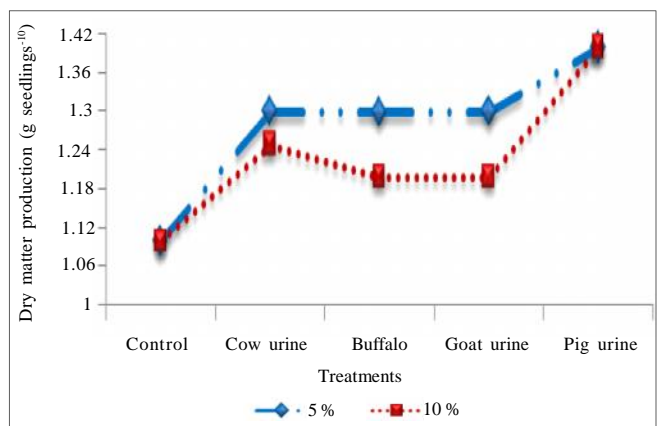


Fig. 4 : Effect of priming with bovine urines on dry matter production (g seedlings⁻¹⁰) in pumbkin

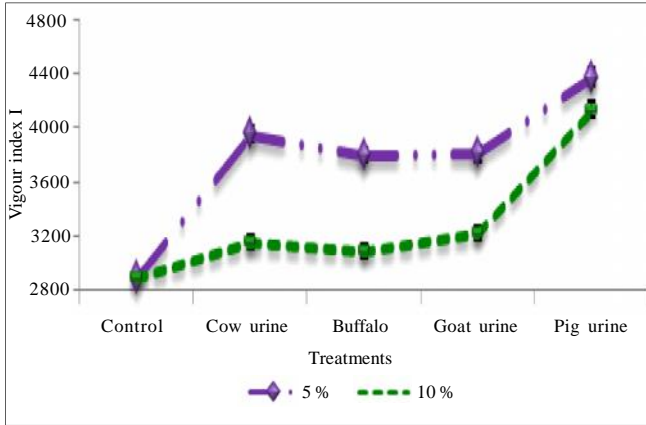


Fig. 5 : Effect of priming with bovine urines on vigour index I in pumbkin

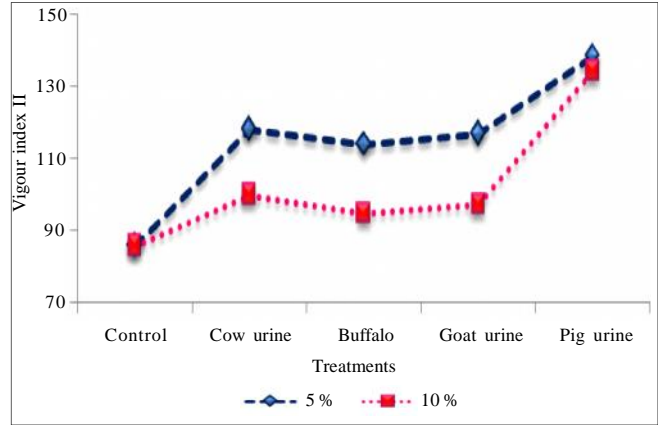


Fig. 6 : Effect of priming with bovine urines on vigour index II in pumbkin



Fig. 7 : Effect of priming with bovine urines on seedling vigour in pumbkin

(5% and 10%), the maximum seed physiological parameters were observed in 5 per cent concentration.

The reason for increased seed physiological parameters observed in the study may be due to the fact that bovine urine contains physiologically active substances viz., growth regulators, nutrients (Joseph and Nair, 1989) and trace elements (Munoz, 1988). Illango *et al.* (1999) reported increased chlorophyll content and soluble protein upon soaking *Albizia lebbek* seeds in cow urine. Significantly higher plant height, leaf dry weight, more number of tillers, leaf area duration and higher straw yield was recorded in wheat seeds soaked in 10 per cent cow urine (Shivamurthy, 2005). The cow's urine treatment with 1: 10 concentration was found very suitable to treat seeds of finger millet for good germination

and seedling vigour. Shankaranarayanan *et al.* (1994) also reported that soaking of tamarind seeds in 10 per cent cow urine or cow dung solution for 24 h increased the germination and vigour index as compared to that of untreated seeds. Present results are in close conformity with the findings in *Albizia lebbek* (Illango *et al.*, 1999), jamun (Swamy *et al.*, 1999), asparagus (Misra *et al.*, 2002), Shivamurthy (2005) in wheat and Sivasubramaniyam *et al.* (2012) in pulses. Panchagavya treated seeds were also maintained seed quality during storage because, it contains bacteria which produce plant growth promoting substances as well as bacteria having biological deterrent activities. Presence of such beneficial microbial biomass might have resulted in improving seed quality parameters. These results are in accordance with

findings of Nagaraj and Sreenivasa (2009) in wheat and Shakuntala *et al.* (2012) in paddy and Hareesh *et al.* (2014) in pigeonpea.

It could be concluded from the present study that pig urine (5%) can be recommended as organic seed priming treatment for increasing the vigour in pumbkin.

REFERENCES

- Hareesh, K.K., Shakuntala, N.M., Vasudevan, S.N. and Sangeeta, I. Macha. (2014). Organic priming in pigeonpea - An ecofriendly approach for sustainable agriculture. *Ecoscan*, **6**: 237-243.
- Illango, K., Mallika Vanangamudi, K., Vanangamudi, A., Venkatesh, Vinayarai, R.S. and Balaji, S. (1999). Effect of growth stimulants on seed germination and seedling vigour in *Albizia lebbek* (L). Benth. *Seed Res.*, **27**(2): 188-190.
- Joseph, Kamalam and Nair, Rajappan (1989). Effect of seed hardening on germination and seedling vigour in paddy. *Seed Res.*, **17**(2): 188-190.
- Misra, S.K., Singh, Virender, Pareek, S.K. and Singh, V. (2002). Standardization of propagation techniques in asparagus. *Ann. Agric. Res.*, **23**(4): 608-610.
- Munoz, A.M. (1988). Increasing the vigour of rice seeds with trace element application. *Arrazy*, **37**: 20-27.
- Nagaraj and Sreenivasa, M.N. (2009). Influence of bacteria isolated from *Panchagavya* on seed germination and seed vigour in wheat. *Karnataka J. Agric. Sci.*, **22**(1): 231-232.
- Panase, V.G. and Sukhatme, P.V. (1985). *Statistical methods for agricultural workers*, Indian Council of Agricultural Research, NEW DELHI, INDIA.
- Sankaranarayanan, R., Vijayakumar, M. and Rangasamy, P. (1994). Cow urine for ideal seed germination in tamarind. *Indian J. Hort.*, **38**(4): 15.
- Shakuntala, N.M., Vasudevan, S.N., Patil, S.B., Doddagoudar, S.R., Mathad, R.C., Macha, S.I. and Vijaykumar, A.G. (2012). Organic biopriming on seed vigour inducing enzyme in paddy- An alternative to inorganics. *Ecoscan*, **1**(Special Issue): 251-257.
- Shivamurthy, D. (2005). Effects of method of planting and seed treatments on performance of wheat genotypes under rainfed condition. M.Sc. Thesis, Department of Agronomy, College of Agriculture, Dharwad, University of Agricultural Sciences, Dharwad, KARNATAKA, INDIA.
- Sivasubramaniam, K., Balakrishnan, K. and Selvarani, K. (2012). Evaluation of bovine urines as pre-sowing seed treatment in enhancing seed germination and vigour of pulses. *Mysore J. Agric. Sci.*, **46**(4): 751-759.
- Swamy, G.S.K., Patil, P.B., Athani, S.I. and Prabhushankar, D.S. (1999). Effect of organic and inorganic substances on germination of jamun (*Syzygium cumini*) seeds. *Adv. agric. Res. India*, **11**: 89-91.
- Tharumaraj, K., Ganesh, P., Suresh Kumar, R., Anandan, A. and Lolanjinathan, K. (2011). A critical review on *Panchagavya* – A boon to plant growth. *Interant. J. Pharma & Biol. Arch.*, **2**(6): 1611-1614.

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