Efficacy of Organic and Conventional seed Treatments for Enhancing Seed Quality in Chickpea Varieties

Sandeep Kumar Lal[1], Shiv K. Yadav[2], S. Basu[3], O.K. Sharma[4]

Division of Seed Scienvce Andtechnology, Iari, New Delhi- 110012

[1]sandeeplal@iari.res.in, [2]skl_nsp@yahoo.com

ABSTRACT

Seed treatment with fungicides is generally recommended to provide protection against seed- and soil-borne pathogens, which helps in better plant stand establishment, more vigorous plants and enhancing storage life. However, seed treatment chemicals have been overused and misused to the extent of possible environmental consequences. Hence, it is the need of the hour to investigate alternative methods to replace the chemical pesticides with botanicals and biological control agents to minimize the undesirable side effects on environmental degradation. In the present study, efficacy of botanicals and bio-agents was evaluated for enhancing the seed quality in chickpea. The seeds of two varieties namely; Pusa 5028 (desi) and Pusa 1108 (kabuli) were subjected to seed treatments with Thiram @ 2.5 g/Kg, Hydration +Thiram @ 2.5 g/Kg, Cruiser @ 5ml/ Kg, Kalisena (AN 27) @ 10 g/ Kg, Ecoderma (*Trichoderma harzianum*) @ 10 g/ Kg, *Trichoderma viride* @ 0.5%, *Trichoderma viride* @ 0.5% + Kaolin, Turmeric extract @ 2.5 g/ Kg, Garlic extract @ 2.5 g/ Kg, Marigold extract @ 3.0 g/ Kg, Ascorbic acid @ 1000 ppm and Magnetic treatment @ 1000 G (2 hrs.).

The results revealed wide variation in the field performance of the both the varieties with respect to different seed treatments. A significant increase in seedling length, fresh weight, dry weight and field emergence was recorded in seeds treated with *Trichoderma* strains in desi chickpea. However, the nodulation was highest, followed by Garlic extract, Turmeric extract and hydration treatments. Though, seeds treated with Thiram exhibited higher values for germination, field emergence and Vigour index I in kabuli chickpea, it was found to inhibit nodule formation. Maximum fresh and dry weights were recorded in turmeric extract treated in seeds of kabuli chickpea as compared to control.

The root analysis of seedlings was done by WinRhizo software for precise measurements of the root morphological parameters (length, surface area and volume), which indicated that seed treatment with Thiram, Magnetic field and Garlic extract in desi chickpea, and *Trichoderma* strains, Hydration +Thiram, Turmeric extract and Ascorbic acid in kabuli chickpea performed significantly better over all other treatments. The seed health tests indicated a lower fungal incidence in seeds treated with Thiram, Turmeric, Ecoderma and Garlic in both types of chickpea. The germination pattern of seeds treated with botanicals and bio-agents under sub-optimal conditions (moisture, salinity and low temperature stress) revealed faster speed of radicle emergence as compared to chemical treatments and control.