

Role of biopolymer based *Trichoderma* in plant growth promotion and mitigation of drought stress in groundnut

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ABSTRACT

Groundnut (*Arachis hypogaea* L.) is frequently subjected to drought stress. Pre-treatment of seeds with Chitosan + *Trichoderma harzianum* (Th4d), polymer1 + Th4d showed significantly greater levels of germination percentage, seed vigor index, soil moisture, shoot fresh and dry weight, relative water content, chlorophyll content, proline content and total sugar levels than Th4d and control treated plants.

Keywords: Drought, Groundnut, Proline, Total sugars

Trichoderma spp. are known to confer abiotic stress tolerance like drought, salinity and are potent biocontrol agents against major soil borne diseases like wilt, stem and root rot, color rot. About 80% of the world groundnut production comes from seasonally rainfed areas in the semi-arid tropics, where climate is characterized by the low and erratic rainfall. Seed coating of groundnut with biopolymer based *Trichoderma* could have a potential application in dryland agriculture.

Groundnut seeds were pre-treated with bio-polymer based *Trichoderma harzianum* (Th4d) such as chitosan + Th4d, polymer 1 + Th4d and Th4d alone along with untreated control and grown in growth chamber (25°C, 70% relative humidity) in sterile soil. The plants were watered for forty days after sowing and thereafter water was withheld to impose drought stress. Seedlings were observed closely for appearance of stress symptoms (rolling and wilting of leaves). Plants were harvested 7 days after withholding water. Observations were made on germination percent, seed vigor index, shoot length, shoot fresh and dry weight, relative water content (RWC), chlorophyll content, proline and total sugars

(Bodhankar *et al.*, 2019) and amplification of drought tolerant genes (Drame *et al.*, 2017).

Seed coating with chitosan + Th4d, polymer 1 + Th4d and Th4d showed significantly higher percent of germination, seed vigor index, shoot length, shoot fresh and dry biomass, proline, total sugars, RWC and soil moisture content over control (Table 1). Efforts are on to understand the genes and the pathways that are up-regulated during the interaction of bio-polymer, chitosan and Th4d with the plants when applied singly or in combination.

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