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Effect of rhizobium, alone and in combination with neem product against early blight *Alternaria solani* (Ell & Mart*)* disease of potato on yield

Bhunesh Diwakar and Madan Jha

Abstract
An experiment was conducted to evaluate the effect of plant extracts, bioagents and fungicide *in-vivo* and *in situ* against *Alternaria solani* causing early blight of potato. Carbendazim @ 0.1% as treated check was found effective in the disease reduction (48.74%), followed by neem oil @ 1% (38.96%), NSKE @ 5% (38.09%) followed by neem leaf extract @ 1% (37.96%), neem cake 5% (37.45), rhizobium @ 10 g/kg (35.36%) and neem bark @5% (34.17) was found effective in disease reduction (37.96%).

Keywords: Plant extracts, fungicide, potato, *Alternaria solani*

Introduction
Potato (*Solanum tuberosum* L.) popularly known as 'The king of vegetables', has emerged as fourth most important food crop in India after rice, wheat and maize. Indian vegetable basket is incomplete without potato. Because, the dry matter, edible energy and edible protein content of potato makes it nutritionally superior vegetable as well as staple food not only in our country but also throughout the world. The potato crop attacked by a number of pathogen like late blight of potato (*Phytophthora infestans*), early blight of potato (*Alternaria solani*), Wart disease of potato (*Synchytrium endobioticum*), scab disease of potato (*Reptomyc esscabies*) but *Alternaria solani* causing early blight, plays an important role in potato production. (Fontein and Aighewi, 1992). Early blight is also enhanced through continuous potato production. The young plants of potato show high resistance to early blight caused by *A. solani* as compared to older ones. Within the same plant, the lower leaves which are physiologically different from middle and top ones are more susceptible to certain pathogens with resistance increasing in an acropetal direction. Potato early blight symptoms first occur on the lower senescing leaves, which become chlorotic and abscise prematurely. Excessive defoliation may lead to death of the plant and consequent yield loss The pathogen causes consider arable damage to the crop throughout the country wherever the crop grown. In India it may cause up to 40 % loss in yield of tubers (More *et al.*, 2016) [3].

The first symptoms usually appear on older leaves and consist of small, irregular, dark brown to black, dead spots ranging in size from a pinpoint to ½ inch in diameter. As the spots enlarge, concentric rings may form as a result of irregular growth patterns by the organism in the leaf tissue (Singh *et al.*, 2016) [4]. The losses due to early blight of potato can be managed through the foliar application of plant extracts in disease management is considered as eco-friendly, without any environmental pollution. Plant extracts have been used in disease management for long time as seed treatment but their use as foliar spray is rarely followed approach. The present study was carried out to explore, the efficiency of some plant extracts against early blight of potato caused by *Alternaria solani in vivo* at Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, (U. P), India.

Neem, *Azadirachta indica* commonly known as neem, is native of India and naturalized in most of tropical and subtropical countries are of great medicinal value and distributed wide spread in the world. Every part of neem tree have been known to possess a wide range of pharmacological properties, especially as antibacterial, antifungal, antiulcer, antifeedant, repellent, pesticide, inhibitor and sterilant and is thus commercially exploitable, and hence, traditionally used to treat large number of diseases. This eco-friendly native tree of India is perhaps most researched tree in the world. Fungal diseases of crop plants have always been one of the major constraints in successful crop production which causes severe yield loss every year.

Effect of rhizobium and neem products of potato on yield q. ha-1

The data reported in table 1 Reveals that the significant increase of Yield ha-1 was recorded in T3 - Neem oil (228.33), T4 - Neem Leaf Extract (213.33), T7 - Neem seed kernel Extract (226.11), T5 – Neem cake (215.55), T6 - Neem Bark (212.78), T1–Rhizobium (198.33) as compared to treated control T2 - Carbendazim (253.09) and untreated Control T0 - (168.88). All the treatments were found statistically significant from T0 Control and among the treatments (T1, T6, and T4) and (T5, T7 and T3), were found non- significant to each other.

The probable reason for such findings about neem oil control is due to antioxident, antimicrobial and larvicidal properties, food competition and penetrate plant root tissues and initiate a series of morphological and biochemical changes in the plant similar finding have been reported by (Hawary *et al*., 2013).

Table 1: Effect of rhizobium and neem products on yield q. ha-1

Treatment NO.	Treatments	R1	R2	R3	MEAN
T_0	Control	166.66	153.33	186.3	168.88
T_1	Rhizobium	200.00	196.66	198.4	198.33
T_2	Carbendazin (Treated check)	266.60	244.33	248.33	253.09
T_3	Neem Oil	231.66	228.33	225.00	228.33
T_4	Neem leaf extract	215.00	208.33	216.99	213.33
T_5	Neem Cake	216.66	225.00	205.00	215.55
T_6	Neem Bark	210.00	220.00	208.33	212.78
T_7	Neem Seed Kernal Extract	225.70	221.66	231.66	226.11
S.E d (±)					5.26
C.D. (P=0. 05)					15.96

References

1. Fisher RA, Yates. Statistical method for research worker Oliver and Boyd Ltd. Edin burgh and London. 1968, 31-32.
2. Hawary SS, Tantawy ME, Rabeh, Badr WK. Chemical composition and biological activities of essential oils of *Azadirachta indica.* International Journal of Applied Research in Natural Products. 2015; 6(4):32-42.
3. More SA, Deshmukh MR, Katkar M. Efficacy of sequential sprays of different fungicides against early blight *Alternaria solani* (Ellis and Martin) in potato *Solanum tubrosum* L. International Journal of Environment, Agriculture and Biotechnology. 2016, 1(3).
4. Singh MK, Chandra R, Kumari A, Srivastava DK. In-evaluation of botanical extracts against *Alternaria solani* causing barly blight of Potato. Indian J.L. Sci. 2016; 5:7-9.