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## ***In-vitro* evaluation of indigenous technology knowledge against *Alternaria alternata* (Fr.) Keissler) incited by *Alternaria* blight of Brinjal**

**Anil Kumar Sharma, Rajni Singh Sasode, Pramod Kumar Fatehpuria and RK Pandya**

### **Abstract**

Brinjal or eggplant (*Solanum melongena* L.) belongs to family *Solanaceae* and is recognized as vegetable crop yielding plant and grown throughout the tropical, sub-tropical and warm temperate areas of the world. Various biotic and abiotic constrains in brinjal crop were responsible for lowering average yield of crop as compared to its potential yield. Thus, it becomes imperative to sustain the productivity of brinjal by gathering the information and behavior of disease distribution pattern in the northern region of M.P. The current study therefore greatly emphasized to find out the percent disease intensity. Minimum percent disease intensity was recorded in ST with bijamrut @ 20% + FA with coconut buttermilk @ 50% (31.67%) followed by ST with bijamrut @ 20% + FA with Jivaamrit @ 50% (32.00%), ST with bijamrut @ 20% + FA with neemastra @ 50% (42.33%), ST with bijamrut @ 20% + FA with Sanjivani @ 50% (43.67%), ST with bijamrut @ 20% + FA with amrut jal @ 50 (48.33%), ST with bijamrut @ 20% + FA with coconut buttermilk @ 50% (49.33%), ST with bijamrut @ 20% + FA with sanjivak @ 50% (51.67%), ST with bijamrut @ 20% + FA with amrut pani @ 50% (54.67%), ST with bijamrut @ 20% + FA with amrut ghol @ 50% (55.00%) and ST with bijamrut @ 20% + FA with amrut ghol @ 50% (55.00%), while maximum percent disease intensity was recorded in control (58.33%).

**Keywords:** Brinjal, *Alternaria* leaf spot, ITK, S, *A. alternate*, percent disease intensity

### **Introduction**

Brinjal (*Solanum melongena* L.) also known as eggplant or garden egg a member of *Solanaceae* family is a popular vegetable crop grown almost worldwide. In India, it is one of the most common vegetable crops grown throughout the country except higher altitudes. The fruits of eggplant are very common in Indian daily dietary as it associates good nutritional value (Ribeiro *et al.*, 1998) [10] and therapeutic properties (Reis *et al.*, 2007) [9]. Brinjal is grown in China, India, Bangladesh, Pakistan and Philippines. Brinjal described as “king of vegetables” due to its wide usage in Indian foods (Choudhary and Gaur, 2009; Singh *et al.*, 2014) [4, 13]. Major brinjal growing states in India are Orissa, Bihar, Punjab, West Bengal, Karnataka, Maharashtra, Andra Pradesh and Uttar Pradesh. The global area of eggplant is roughly 2.67 million hectares, with a yield of 34.91 tonnes per hectare, and production is close to 93.21 million tonnes (Anon, 2020) [1]. Brinjal is grown on 0.73 million hectares in India, where it produces 12.78 million tonnes and yields 17.36 tonnes per hectare (Anon, 2020) [1].

*Alternaria solani* is a major destructive species of the *Alternaria* genus which cause early blight on solanaceous crops, more scientific studies are found on *A. solani* in literature but nowadays *A. alternata*, *A. tenuissima* and other species of genus also show increase destruction of crops. *Alternaria tenuissima* causing leaf spot and fruit rot on eggplant in India firstly reported by Raja *et al.*, (2005) [12]. *Alternaria* leaf blight and fruit rot diseases is most severe disease of brinjal and appears regularly, causing heavy losses in yield (Balai and Ahir, 2013) [2]. The disease first makes its appearance in young seedling. It attacks leaves and then spreads to fruits which subsequently rot and become unfit for consumption (Bochalya *et al.*, 2012) [3]. The disease is favoured by warm and humid climate. The accidental rain at flowering stage leads the expansion of *alternaria* leaf spot incidence and results in the poor seed set and seed yield (Sandipan *et al.*, 2014) [14]. Diseases cause heavy damage upto 35-40 per cent to this crop and reduce its seed yields upto 20-30 per cent.

## Materials and Methods

The present investigations was carried out in the Department of Plant Pathology, College of Agriculture, Gwalior. The details of materials and methodologies followed during the course of investigation are described here under: In laboratory experiment, the efficacy of eleven ITK's including control viz., ST with Bijamrut @ 20% + FA with Coconut Buttermilk @ 50%, ST with Bijamrut @ 20% + FA with Sanjivak @ 50%, ST with Bijamrut @ 20% + FA with Jivamrut @ 50%, ST with Bijamrut @ 20% + FA with Neemastra @ 50%, ST with Bijamrut @ 20% + FA with Sanjivani @ 50%, ST with Bijamrut @ 20% + FA with Amrut Ghol @ 50%, ST with Bijamrut @ 20% + FA with Amrut Jal @ 50%, ST with Bijamrut @ 20% + FA with Anda Arkh @ 50%, ST with Bijamrut @ 20% + FA with Amrut Pani @ 50%, and ST with Bijamrut @ 20% + FA with Coconut Buttermilk @ 50%, was assayed against *Alternaria alternata* by seedling symptoms test. Control was maintained without adding any ITK's to the pots. These were observed for artificially inoculated and observation plants were taken weekly. The intensity will be calculated with the help of following formulas.

$$PDI = \frac{\text{Sum of all numerical ratings}}{\text{Total number of observations} \times \text{highest grade in the scale}} \times 100$$

## Results

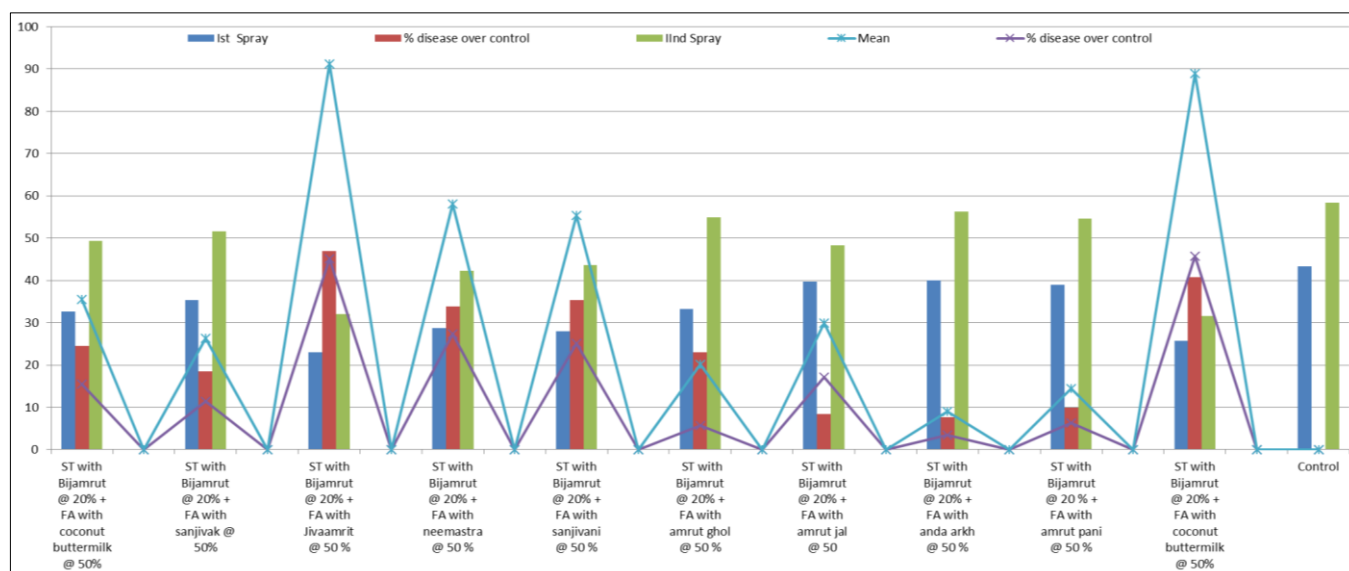
Fungi toxic effect of different ITK's was assayed against *A. alternate* and the data clearly indicated that, at first spray minimum percent disease intensity and maximum disease over control was recorded in ST with Bijamrut @ 20% + FA with Jivaamrit @ 50% (23.00% and 46.92%), followed by ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50% (25.67% and 40.76%), ST with Bijamrut @ 20% + FA with Sanjivani @ 50% (28.00% and 35.38%), ST with Bijamrut @ 20% + FA with neemastra @ 50% (28.67% and 33.83%), ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50% (32.67% and 24.60%), ST with Bijamrut @ 20% + FA with amrut ghol @ 50% (33.33% and 23.08%), ST with Bijamrut @ 20% + FA with sanjivak @ 50% (35.33% and 18.46%), ST with Bijamrut @ 20% + FA with amrut pani @ 50% (39.00% and 9.99%) and ST with Bijamrut @ 20% + FA with amrut jal @ 50 (39.67% and 8.45%), while maximum percent disease intensity and minimum percent disease over control was

recorded control (43.00% and 0.00%). At second spray the minimum percent disease intensity was recorded in ST with bijamrut @ 20% + FA with coconut buttermilk @ 50% (31.67%) followed by ST with bijamrut @ 20% + FA with Jivaamrit @ 50% (32.00%), ST with bijamrut @ 20% + FA with neemastra @ 50% (42.33%), ST with bijamrut @ 20% + FA with Sanjivani @ 50% (43.67%), ST with bijamrut @ 20% + FA with amrut jal @ 50 (48.33%), ST with bijamrut @ 20% + FA with coconut buttermilk @ 50% (49.33%), ST with bijamrut @ 20% + FA with sanjivak @ 50% (51.67%), ST with bijamrut @ 20% + FA with amrut pani @ 50% (54.67%), ST with bijamrut @ 20% + FA with amrut ghol @ 50% (55.00%) and ST with bijamrut @ 20% + FA with amrut ghol @ 50% (55.00%), while maximum percent disease intensity was recorded in control (58.33%). Reduction of percent disease over control was recorded ST with bijamrut @ 20% + coconut buttermilk @ 50% (45.71%), followed by ST with bijamrut @ 20% + Jivaamrit @ 50% (45.14%), ST with Bijamrut @ 20% + FA with neemastra @ 50% (27.43%), ST with Bijamrut @ 20% + FA with sanjivani @ 50% (25.13%), ST with Bijamrut @ 20% + FA with amrut jal @ 50 (17.14%), Bijamrut @ 20% + FA with coconut buttermilk @ 50% (15.43%), ST with Bijamrut @ 20% + FA with sanjivak @ 50% (11.42%), ST with Bijamrut @ 20% + FA with amrut pani @ 50% (6.27%), ST with Bijamrut @ 20% + FA with amrut ghol @ 50% (5.71%), while minimum percent disease over control was recorded in treatment ST with Bijamrut @ 20% + FA with anda arkh @ 50% (3.43%).

Reduction of disease over control mean data clearly indicates that the maximum disease control was recorded ST with Bijamrut @ 20% + FA with Jivaamrit @ 50% (46.03%), followed by ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50% (43.24%), ST with Bijamrut @ 20% + FA with neemastra @ 50% (30.63%), ST with Bijamrut @ 20% + FA with sanjivani @ 50% (30.26%), ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50% (20.02%), ST with Bijamrut @ 20% + FA with sanjivak @ 50% (14.94%), ST with Bijamrut @ 20% + FA with amrut ghol @ 50% (14.40%), ST with Bijamrut @ 20% + FA with amrut jal @ 50 (12.80%) and ST with Bijamrut @ 20% + FA with amrut pani @ 50% (8.13%), while minimum disease over control was recorded in ST with Bijamrut @ 20% + FA with anda arkh @ 50% (5.56%).

**Table 1:** Effect of ITK'S on *Alternaria* blight of brinjal against of *A. alternate* under *in-vitro* conditions.

ITK'S	% disease intensity				Mean
	I <sup>st</sup> Spray	% disease over control	II <sup>nd</sup> Spray	% disease over control	
ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50%	32.67	24.60	49.33	15.43	20.02
ST with Bijamrut @ 20% + FA with sanjivak @ 50%	35.33	18.46	51.67	11.42	14.94
ST with Bijamrut @ 20% + FA with Jivaamrit @ 50%	23.00	46.92	32.00	45.14	46.03
ST with Bijamrut @ 20% + FA with neemastra @ 50%	28.67	33.83	42.33	27.43	30.63
ST with Bijamrut @ 20% + FA with sanjivani @ 50%	28.00	35.38	43.67	25.13	30.26
ST with Bijamrut @ 20% + FA with amrut ghol @ 50%	33.33	23.08	55.00	5.71	14.40
ST with Bijamrut @ 20% + FA with amrut jal @ 50	39.67	8.45	48.33	17.14	12.80
ST with Bijamrut @ 20% + FA with anda arkh @ 50%	40.00	7.69	56.33	3.43	5.56
ST with Bijamrut @ 20% + FA with amrut pani @ 50%	39.00	9.99	54.67	6.27	8.13
ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50%	25.67	40.76	31.67	45.71	43.24
Control	43.33	-	58.33	-	-
S.Em±	0.52	NS	0.57	NS	-
CD at 5%	1.02	NS	1.07	NS	-



**Fig 1:** Evaluation of different ITK'S against mycelial growth and percent inhibition of *A. alternate*.

## Discussion

A pot experiment was carried out for the efficacy of various ITK, S for the *in-vitro* management of Alternaria blight of brinjal. In management study the treatments were selected and spraying in two sprayed schedules at 15 days intervals. Reduction of disease over control mean data clearly indicates that the maximum disease control was recorded ST with Bijamrut @ 20% + FA with Jivaamrit @ 50%, followed by ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50%, ST with Bijamrut @ 20% + FA with neemasthra @ 50%, ST with Bijamrut @ 20% + FA with sanjivani @ 50%, ST with Bijamrut @ 20% + FA with coconut buttermilk @ 50%, ST with Bijamrut @ 20% + FA with sanjivak @ 50%, ST with Bijamrut @ 20% + FA with amrut ghol @ 50%, ST with Bijamrut @ 20% + FA with amrut jal @ 50 and ST with Bijamrut @ 20% + FA with amrut pani @ 50%, while minimum disease over control was recorded in ST with Bijamrut @ 20% + FA with anda a arkh @ 50%. Similar results are also reported by (Deshmukh, 2015, Narayanasamy, 2001) [5, 6]. ITK are cheap and local which makes it easier to adopt and use for the subsistence and semi commercial farmers (Nkunika, 2002) [7] whereas commercial farmers prefer use of costly pesticides which give immediate results (Palikhe, 2002) [8]. Reported the combination of Bijamrut + neemasthra minimum the alternaria leaf blight infection. Pandia *et al.*, (2019) [15] conducted the study and concluded that Bijamrut + Jivaamrit maximumly control the development of Alternaria disease.

## Conclusion

Efficacy of various ITK, S for the *in-vitro* management of Alternaria blight of brinjal maximum disease control was recorded ST with Bijamrut @ 20% + FA with Jivaamrit @ 50%.

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