In-vivo study revealed that the production of cellulose took place only after leaves infected by *R. bataticola*. The maximum loss of viscosity with 31.6 % was observed at 60 min. of incubation in disease leaves. It is also observed that after 60 min., there was no loss of viscosity (Fig. 1). *In-vivo* pectin-methylgalacturonase acitivity of *R. bataticola* showed that the production of pectin-methylgalacturonase also took place only in the leaves infected with *R. bataticola*. The maximum (27.6 %) losses of viscosity were observed at 60 min. and after that it became constant.. Similarly, production of polygalacturonase also took place only in the *R. bataticola* infected leaves, showing maximum loss of viscosity with 40.7 % at 60 min. of standing in the disease leaves (Fig. 1). Similar results were also reported by Jain and Yadav (2003).

References

Jain, A.K. and H.S. Yadav (2003). Biochemical constituents of finger millet genotypes associated with resistance to blast caused by *Pyricularis grisea*. *Ann. Pl. Protec. Sci.* **11**: 70-74.

Kushwaha, K.P.S. and Udit Narain (2005). Biochemical changes in pigeon pea leaves infected with *Alternaria tenuissima*. *Ann. Pl. Protec. Sci.* **13**: 415-417.

Muse, R.R., H.B. Couch, L.D. Moore and B.D. Muse. (1972). Pectolytic and cellulolytic enzyme associated with *Helminthosporium*. leaf spot in kentucky blue. grass. *Can. J. Microbiol.* 18: 1091-1098.

Fungitoxicity of Plant extracts against *Phytophthora parasitica* var. *piperina*

R.K. Yadav and Heera Lal Yadav

P.G. Department of Botany, A.B.R.P.G. College Anpara, Sonebhadra (U.P.) India

Leaf rot of betel vine caused by *Phytophothora parasitica* var. *piperina* result in severe loss to the grower. A number of synthetic organic and inorganic compounds have been introduced in the field of disease management (Maheshwari *et al.*, 2007). The leaf of betel vine is used directly for chewing without any treatment. Hence, plant extracts were tested and results are reported herein. *Phytophthora parasitica* var. *piperina* was isolated from infected leaves of betel vine and grown on oat meal agar medium, maintained in PDA slant as stock culture. The fresh leaves of different plant were thoroughly washed, extracted and tested as per the procedure described by Sahani and Saxena (2009).

All plant extracts were found effective against test pathogen but the degree of effectiveness was varying with extract and concentration from 10 to 30%. Out of 15 plants, six plants extract showed most fungitoxic against test pathogen at 30% concentration. Maximum growth inhibition of the pathogen was recorded with *Aegle marmelos* (88.3%) followed by *Murrya koenigii* (82.6%), *Lowsonia inermis*, (81.3%), *Argemone mexicana*

Table 1. Effect of plant extracts on mycelial growth, sporulation of *Phytophthora parasitica*.

Plant Species	Inhibition in the mycelial Growth (%) Concentration (%)			Sporulation at 30% Concen-tration	Reduction in leaf lession (%) Concentration (%)		
	10	20	30		10	20	30
Aegle marmelas	60	75.6	88.3	+	58.2	70.6	84.4
Argemone mexicana	59.2	70.2	80.1	+	49.4	63.1	76.0
Cannabis *sativa*	20	35.3	40.6	++++	–	–	–
Cassia *tora*	20	50.5	60.3	+++	–	–	–

Catharen-*thus roesus*	50	70.1	72.5	++	–	–	–
Hibiscus rosa-sinensis	5.5	30.8	44.8	++++	37.0	53.4	65.3
Launea nudicaulis	10	50.2	65.3	+++	–	–	–
Lawsonia inermis	50	80.6	81.3	+	48.0	62.3	70.1
Loranthus falcatus	10	25.1	44.2	++++	–	–	–
Melia azadirach	54	60.3	68.7	++	39.9	54.2	62.6
Murrya koenigii	55	70.6	82.6	++	51.6	60.3	71.4
Parthenium hystero-phorus	12	20.8	50.6	+++	–	–	–
Tectona grandis	12.5	30.2	53.3	+++	–	–	–
Terminalia arjuna	15	40.5	56.5	+++	–	–	–
Xanthium strumarium	10	50.6	64.4	+++	–	–	–
Control	00	00	00	++++	–	–	–

Sporulation: + Poor; ++ Moderate; +++ Good, ++++ Excellent – Not calculated.

(80.1%), *Catharanthus roseus* (72.5%) and *Melia azadirach* (68.7%). The extract of *A. marmelos*. *A. mexicana* and *L. inermis* exhibited significant effect on sporulation of test pathogen at 30% whereas at the same concentration of *Catharanthus roseus, Melia azadirach* and *Murraya koenigii* showed moderate effect on the sporulation of test pathogen. *In vivo* condition most effective six plant extract showed almost similar trend of results (Table 1).

Various workers screened a large number of plants to test their fungitoxic properties. Mostly the aqueous extracts of plants were used to evaluate their fungitoxcity (Sinha & Sinha, 2006; Karande *et al*., 2007). *A. marmelas* was reported for the fungitoxic action against *Alternaria* blight (Singh *et al*. 2007). *Catharanthus roesus* showed antifungal activity against *Phytopthora* (Pramod *et al*., 2007). *Murraya koenigii* was also fond effective against plant pathogen (Tripathi & Tripathi 2005).

Acknowledgements: The author are grateful to Dr. Deepak Vyas, Department of Botany, Dr. H.S. Gour University, Sagar (M.P.) and Prof. Kamal, Departmet of Botany, D.D.U. Gorakhpur University, Gorakhpur and Dr. A.R. Saxena, Departmet of Botany, D.A.V. P.G. College Azamgarh for their kind helps throughout the research work.

References

Karande, M.G., S.P. Raut and A.D. Gawande (2007). Efficacy of fungicides, bio-organic against *Rhizoctonia solani* in rice. *Ann. Pl. Protec. Sci.* **15**: 267-268.

Pramod, G., A. Palani Swami and P. Srinivas (2007). Evaluation of botanicals and bio-control agents against post-harvest pathogens of papaya. *Ann. Pl. Protec. Sci.* **15**: 402-404.

Sahani, R.K. and A.R. Saxena (2009). Fungitoxic properties of medicinal and aromatic plants against *Fusarium oxysporum* f. sp. *pisi. Ann. Pl. Protec. Sci* **17**: 146-148.

Singh, R.P., A.K. Singh and R.N. Singh (2003). Effect of neem products on the growth of *Alternaria triticina*. *Ann. Pl. Protec. Sci.*, **11**: 834-386.

Sinha, B.B.P. and R.K.P. Sinha (2006). Effect of bio-pesticides, botanicals and fungicides against *Rhizoctonia solani* in rice. *Ann. Pl. Protec. Sci.* **14**: 254-255.

Tripathi, M. and S.C. Tripathi (2005). fungitoxic evaluation of essential oils of higher plants against sugarcane pathogen *in vitro*. *Ann. Pl. Protec. Sci.* **13**: 223-224.