



RESEARCH ARTICLE

# *In vitro* antibacterial activity of plant extracts against *Xanthomonas oryzae* pv. *oryzae* causing bacterial leaf blight in rice

■ L. VENGADESH KUMAR\* AND P. BALABASKAR

Department of Plant Pathology, Faculty of Agriculture, Annamalai University, Annamalai Nagar, CHIDAMBARAM (T. N.) INDIA

## ARTICLE INFO

**Received** : 05.11.2012  
**Revised** : 18.02.2013  
**Accepted** : 18.03.2013

## Key Words :

Plant extracts,  
Antibacterial activity,  
*In vitro* assay,  
Bacterial blight  
rice

## ABSTRACT

In the present study, an attempt has been made to use plant extracts in place of synthetic chemicals to reduce *Xanthomonas oryzae* pv. *oryzae* incidence. Accordingly, the antibacterial activity of 40 plant extracts was assessed and out of which ten plant extracts were found to have appreciable antibacterial activity against *Xanthomonas oryzae*. Among the plant extracts, *Rhizophora apiculata* at 20 per cent showed a large inhibition zone with high activity index and recorded maximum plant vigor index. This was followed by *Aadathoda vesica* and *Punica granatum* at 20 per cent concentration. The efficacy of these ten plant extracts was also tested through detached leaf assay on rice variety ADT 43. The protective treatment (before inoculation) was found to be significantly more effective than the curative treatment (after inoculation) and the most effective plant extract was found to be *R. apiculata*. Rice plants treated with *R. apiculata* developed the smallest lesion which was followed by *Aadathoda vesica*, *Punica granatum*, *Tamarinda indicus* and *Datura stramonium* in the decreasing order of merit. Under pot culture conditions also, the extract of *R. apiculata* showed maximum efficacy against bacterial leaf blight incidence recording minimal lesion size when compared to other treatments.

**How to view point the article :** Kumar, L. Vengadesh and Balabaskar, P. (2013). *In vitro* antibacterial activity of plant extracts against *Xanthomonas oryzae* pv. *oryzae* causing bacterial leaf blight in rice. *Internat. J. Plant Protec.*, 6(1) : 111-117.

\*Corresponding author:  
kumarvengadesh@yahoo.co.in

## INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most widely cultivated food crops and one of the major cereals used all over the world (Salim *et al.*, 2003). Tropical and sub-tropical regions of the world are the major rice-producers, with 90 per cent of production occurring in Asia (Ezuka and Kaku, 2000). Among the various pests and diseases the bacterial leaf blight (BLB) of rice caused by *Xanthomonas oryzae* pv. *oryzae* is the most devastating and harmful limiting factor in rice production especially in South East Asia, since the widespread cultivation of dwarf high-yielding cultivars. In India, yield loss up to 81.3 per cent (Gnanamanickam *et al.*, 1999; Veena *et al.*, 2000) has been reported due to this disease and in Japan the yield losses

ranging between 20-30 per cent and occasionally up to 50 per cent have been reported (Ou, 1985).

*X. oryzae* pv. *oryzae* is known to be seed-borne and seed transmitted (Veena *et al.*, 2000). The contaminated seeds results in poor germination and severe infection and affect the plants at tillering and flowering stages, thereby resulting in the formation of chaffy seeds. In addition to direct yield loss, this disease also adversely affects the seed quality through seed discoloration.

Unsuccessful attempts have been made to manage this disease using chemotherapeutics that are expensive and affect the beneficial microorganisms which prompted us to develop alternative management strategies. Further, excessive chemical use had a detrimental effect on consumers' health, harmful to