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Management of mango bacterial canker disease through antagonists

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ABSTRACT

Experiments were conducted to find out the potent antagonists isolated from various sources for management of mango bacterial canker disease (MBCD) caused by *Xanthomonas campestris* pv. *mangiferaeindicae* (*Xcmi*). *Calotropis* sp., *Lantana* sp. and *Ricinus communis* leaf based organic liquid pesticides along with one commercial preparation (NPV) were evaluated against *Xcmi in vitro* and showed inhibitory (+) effect. Further, 16 bacterial isolates isolated from these organic pesticides of which 5 were found inhibitory (+) against *Xcmi*. Apart from these *in vitro* evaluated bacterial antagonists, LSF-8 (mango fruit surface), *Bc* (mango phylloplane), BDB-1, BDB-2 and BDB-3 (leaf based organic pesticides) found effective *in vitro* earlier were tested under field condition for management of MBCD. These antagonists along with antibiotic, Streptocycline were applied as pre, post and simultaneous (mixed) sprays with host bacterium (*Xcmi*). All the 5 antagonists and antibiotics were found significantly superior over control (63.63-74.35%) in reducing MBCD (0.00-58.82%) in all the 3 yrs of testing. Among the 3 methods, post-application of antagonists followed by mixed ones was found best in checking the disease with disease incidence ranging from 0.00 to 26.00 per cent. In a preliminary trial, all the 5 antagonists and antibiotic were also found significantly superior over control (58.92%) in reducing MBCD (22.39-35.10%) at its hot spot. The results of present investigation clearly indicate that the antagonistic bacterial organisms exist in different environment which could be purified and exploited in bio-control of MBCD, an important disease of mango.

Key Words : *Xanthomonas campestris* pv. *mangiferaeindicae*, antagonists, MBCD, management.

Mango bacterial canker disease (MBCD) caused by *Xanthomonas campestris* pv. *mangiferaeindicae (Xcmi)* is one of the important diseases of mango affecting a number of commercial cultivars (Kishun, 1996). It affects leaf, petiole, twig, fruit etc. and causes severe loss to the crop under favorable environmental conditions (Kishun *et al.*, 2004). Storage rot due to this disease is also reported (Kishun, 1981). The disease can be managed by chemicals such as Streptocycline, copper oxychloride, systemic fungicides etc. (Kishun, 2002), but these are costly, non-ecofriendly and not preferred in the present days WTO regime. The other alternative method is the use of resistant/tolerant varieties but because of absence of true resistance and perennial nature of crop, development of such cultivar(s) is cumbersome and time consuming. In recent years, emphasis is on eco-friendly management of insect pests and diseases by use of organic and botanical pesticides and antagonistic micro-organisms. Therefore, in present investigation, antagonistic organisms particularly bacteria, isolated from various sources were evaluated for management of MBCD pathogen *in vitro* as well as *in vivo* and results obtained are presented in this communication.

MATERIALS AND METHODS

Evaluation of antagonists in vitro: *Calotropis* sp., *Lantana* sp. and *Ricinus communis* leaf based organic liquid pesticides along with a NPV (commercial preparation) and effective bacterial organisms isolated from these were evaluated against *Xcmi in vitro* using paper disc assay method (Thornberry, 1950). Data on its antagonistic potency were recorded after 48 hrs of incubation at 30±1^{0}C.

Evaluation of antagonists in vivo : Bacterial organisms, isolated from mango phylloplane (*Bc*), fruit surface (LSF-8) and *Pongamia glabra* (BDB-1 & BDB-2) and *Azadirecta indica* (BDB-3) leaf based organic liquid pesticides and found inhibitory against *Xcmi in vitro*, were evaluated *in vivo*. Experiments were conducted using these 5 antagonists alongwith effective antibiotic Streptocycline for management of MBCD (*Xcmi* 20) on cv. Mallika under artifical inoculations for 3 consecutive years. The treatments were imposed as pre (24 hrs prior to *Xcmi)*, post (24 hrs. after *Xcmi*) and simultaneous (*Xcmi* + antagonist) sprays at marble stage of fruits. The design used was completely randomized and each treatment was replicated thrice. Data on fruit canker incidence were recorded 15-days prior to harvest and analyzed statistically.

Evaluation of antagonists at hot spot : A preliminary experiment was conducted at hot spot of MBCD, i.e., Bijnor, U.P. on cv. Langra to find out the effectiveness of 5 antagonists (*Bc*, LSF-8, BDB-1, BDB-2 & BDB-3) against local strain, *Xcmi 27*. The treatments and its application methods were similar to earlier experiments barring pre application which was dropped because of its less effectiveness in previous experiments. This