SHORT COMMUNICATIONS

Preliminary Evaluation of Herbicidal Potential of *Streptomyces* WC # 150 against *Lantana camara*

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Lantana camara L. is a globally important weed of the family verbenaceae. It poses a serious threat to the resurgence of forest trees in India (Prasad & Jamaluddin, 1986; 1989). It is also responsible for many serious poisoning of livestock, humans and animals (Gopinath *et al.*, 1969; Pass *et al.*, 1981a,b). Thus, an effective and safe mean of its management is one of the most important challenge of the day. Strains of actinomycetes including the genus *Streptomyces* are known to produce array of novel compounds, some of which have shown very high herbicidal potential against weeds (Pandey, 1999). Therefore, in the present communication, the phytotoxicity of cell free culture filtrate of some indigenous strains of *Streptomyces* sp. have been evaluated against *L. camara*.

Streptomyces sp. WC # 150 isolated from rhizosphere soil of the weed was maintained on glucose peptone agar slants in the refrigerator. Organism was grown separately in 1000 ml Erlenmeyer flasks containing 500 ml sterilised glucose peptone broth (Glucose : 40 g., Peptone 10 g., Distilled water - 1 litre) at 100 rpm in O.S.I. for different incubation period (7, 14, 21 days) and temperatures (28 ± 1°C & 30 ± 1°C). CFCF (Cell free culture filtrate) was obtained asceptically by filtering the metabolised growth medium through preweighed Whatman filter paper no. 1, centrifuged at 4000 for 10 min. (Walker & Templeton, 1978). These were again passed through 6.25 µm millipore sartorius filter to obtain the final CFCF.

Shoots of the weed of equal size were cut in sterilised distilled water and were sterilized by dipping in 1% NaOCI solution for 3 min and then, in 1% $HgCl_2$ for 30 sec. followed by serial washing in sterilized distilled water. Lower portion of the shoots were dipped in tube containing 5.0 ml CFCF. Control shoots were placed in sterilized distilled water and incubated in plant growth chamber. Observations were recorded in accordance with Wall *et al.* (1992).

Leaves detached from the plants were surface sterilized with 90% ethanol followed by serial washing with sterilised distilled water. Sterilized leaves were placed in moist chamber. A drop of CFCF was then, placed on each leaf and incubated in plant growth chamber, control leaves received only sterilised distilled water. Leaves and shoots were observed daily for the phytotoxicity as per Walter & Templeton (1978).

Phytotoxicity of CFCF varied greatly with the production, temperature, incubation time and exposure duration (Fig. 1). It was maximum when the shoots were placed in CFCF obtained from 21 days fermented broth grown at 28 ± 1°C. Phytotoxicity was comparatively lesser when the fermentation was carried out at 30 ± 1°C. Similarly, toxicity was also gradually increased

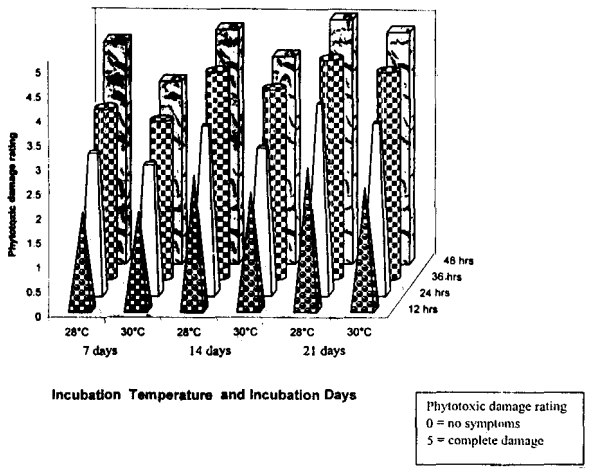

Fig. 1. Phytotoxicity of CFCF against *Lantana camara* by shoot cut assay

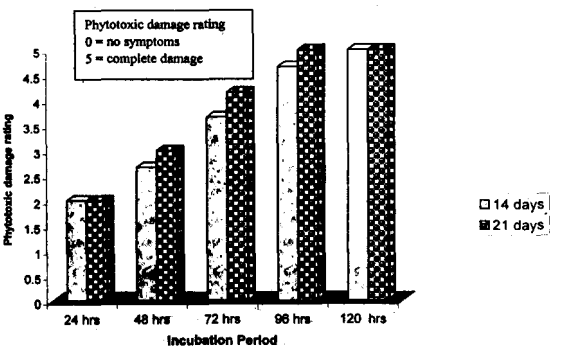

Fig. 2. Phytotoxicity test of CFCF on *Lantana camara* by leaf drop assay

with the exposure time and reached to the maximum after 48 hrs. of treatment where severe chlorosis followed by curling, yellowing, epinasty and finally death of the shoot were observed. Phytotoxic damage was more rapid at lower leaves and gradually advanced to the upper leaves. It was also observed that the chlorosis initially started from the margin to back (Strobel *et al.*, 1987; Microch *et al.*, 1991).

In contrast to shoot cut leaf drop bioassay, the apparent toxicity was slower and first evidence was recorded after 24 hrs (Fig. 2). There was no much apparent difference in the toxicity of the CFCF obtained from 14 and 21 days of incubation period. Delayed toxicity may be because of decay in the absorption of toxin by the leaves. Similar observations have also been made by Strobel *et al.* (1987). They recorded rapid and severe toxicity when leaves were superficially punctured before placing droplets of toxin.

On the basis of above discussions, it can be concluded that the CFCF of the present isolate i.e. *Streptomyces* sp. WC # 150 have very high promising herbicidal activity. However, thorough investigation regarding its mode and site of action and optimization of fermentation conditions are to be needed before reaching on any final recommendations.

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Bioefficacy of Certain Insecticidal Formulations Against Bean Aphid, *Aphis craccivora* Koch.

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The bean aphid *Aphis craccivora* Koch is a serious pest of leguminous crop which besides infesting bean also attacks cowpea (Sarup, *et al.*, 1960) and pea (Sarup *et al.*, 1969). The nymphs and adults mostly confined to the underside of leaves and inflorescence and suck the sap from tender shoots, inflorescence and pods in large numbers resulting in dry up of tender shoot premature fall of flower buds, flowers and tender pods. In the present investigations, bioefficacy of some pesticides was evaluated in the laboratory and the results are reported in this communication.

Proprietary insecticidal formulations were obtained from different firms *viz.*, imidacloprid (confidor 200 SL M/s Bayer India Ltd.), profenfos 40% + cypermethrin 4% (polytrin 44% EC, M/s Hindustan Ciba Giegy Ltd.), ethion 40% + cypermethrin 5% (colfos 45% EC, M/s Pesticides India), ethofenprox (nukil 10% EC, M/s Dhanuka Pesticides Ltd.) and triazophos (hostathion 40% EC M/s AgrEvo India Ltd.). Different concentrations of insecticidal emulsions representing various treatments were prepared by using tap water for the dilution of commercial emulsifiable concentrate. Inflorescence and pods from bean crop infested with aphids were collected from the field of I.A.R.I., New Delhi and kept in rearing jars (15 x 15cm) for preconditioning of the pest at 27±1°C in the laboratory. 10-15 apterous insects were placed in each Petridish (10 cm dia) and sprayed directly under Potter's tower with 1 ml of insecticides at 24 cm Hg pressure. The sprayed Petri dishes containing the aphids were dried under ceiling fan for about 5 min. The treated insects were then, transferred to separate glass tubes (10 x 4 cm) containing fresh, uninfested, untreated twigs and pods of bean and covered with pieces of muslin cloth. These tubes were then, kept at 27±1°C and mortality counts were taken 24 hrs after the treatment. The moribund insects were counted as dead, replicated thrice. Six concentrations of each pesticides were tested to obtain the concentration - probit curve. The data so obtained were subjected to Probit analysis (Finney, 1971) for calculating regression equation and relative toxicity of pesticides considering LC_{50} value of triazophos as unit.