

## EFFECT OF TOPSIN FUNGICIDE (METHYL THIOPHENATE) ON CHLOROPHYLL, PROTEIN AND PHENOL CONTENTS OF *HIBISCUS ESCULENTUS* AND *CAPSICUM ANNUUM*

SOALIHA AHMED AND Z.S. SIDDIQUI

Department of Botany,  
University of Karachi, Karachi-75270, Pakistan.

### Abstract

Effect of Topsin fungicide (Methyl thiophenate) on chlorophyll, protein and phenol contents of *Hibiscus esculentus* and *Capsicum annuum* was examined. Topsin showed an increase in all the biochemical parameters with differences in response in the two test species.

### Introduction

Topsin (Methyl thiophenate) a systemic fungicide based on thiourea, is used for the control of diseases such as smut, powdery mildew, gray mold, brown patch, *Botrytis*, *Cercospora* leaf spot, *Sclerotinia* rot, apple scab, brown rot, rice blast, downy mildew and post harvest decay (Thomson, 1985). Despite advantages of its usage, concern has been expressed at the potential phytotoxic effect caused by systemic fungicide. Benzinadizol which showed auxin induced elongation of etiolated leaf in young tobacco plant stimulates water uptake (Dyar, 1968). Benomyl stimulated chlorophyll formation and showed a reduction of ozone damage in pinto bean (Pellissier *et al.*, 1971). Benomyl has also been found phytotoxic resulting in irregular depression and chlorosis at the marginal tip and central portion of leaves of saffron (Reyes, 1975). In the present study the effect of Topsin on chlorophyll, protein and phenol contents of *Hibiscus esculentus* and *Capsicum annuum* was examined. Protein was selected as an indicator for changes in nutritive values, chlorophyll for changes in yield of crop and phenol as an indicator for the stress developed due to presence of fungicide.

### Material and Methods

Seeds of *H.esculentus* cv Pusa swami and *C.annuum* cv Ivala obtained from the seed market, Saddar Karachi were surface sterilized with 0.1% mercuric chloride for 10 min., and then washed with distilled deionized water. The seeds were sown in 16" earthen pots containing 15 kg soil mixed with cow dung manure in 3:1 ratio. Ten seeds were sown in each pot. The pot were regularly watered and kept in a glass house at temperature of 25-35°C and 35-45% R.H. Fifteen day old seedlings were sprayed with Topsin @ 7ppm with a hand sprayer. The spray was repeated when plants were 4 and 6 weeks old. Unsprayed plants were kept as control. Samples of leaves were collected randomly from 3,6,8 week old plants and changes in total protein content in leaves (Lowry *et al.*, 1951), total phenol (Swain & Hills 1959) and total chlorophyll content (Maclachlam & Zalik 1963) were determined. Three replicates were used for each analysis.

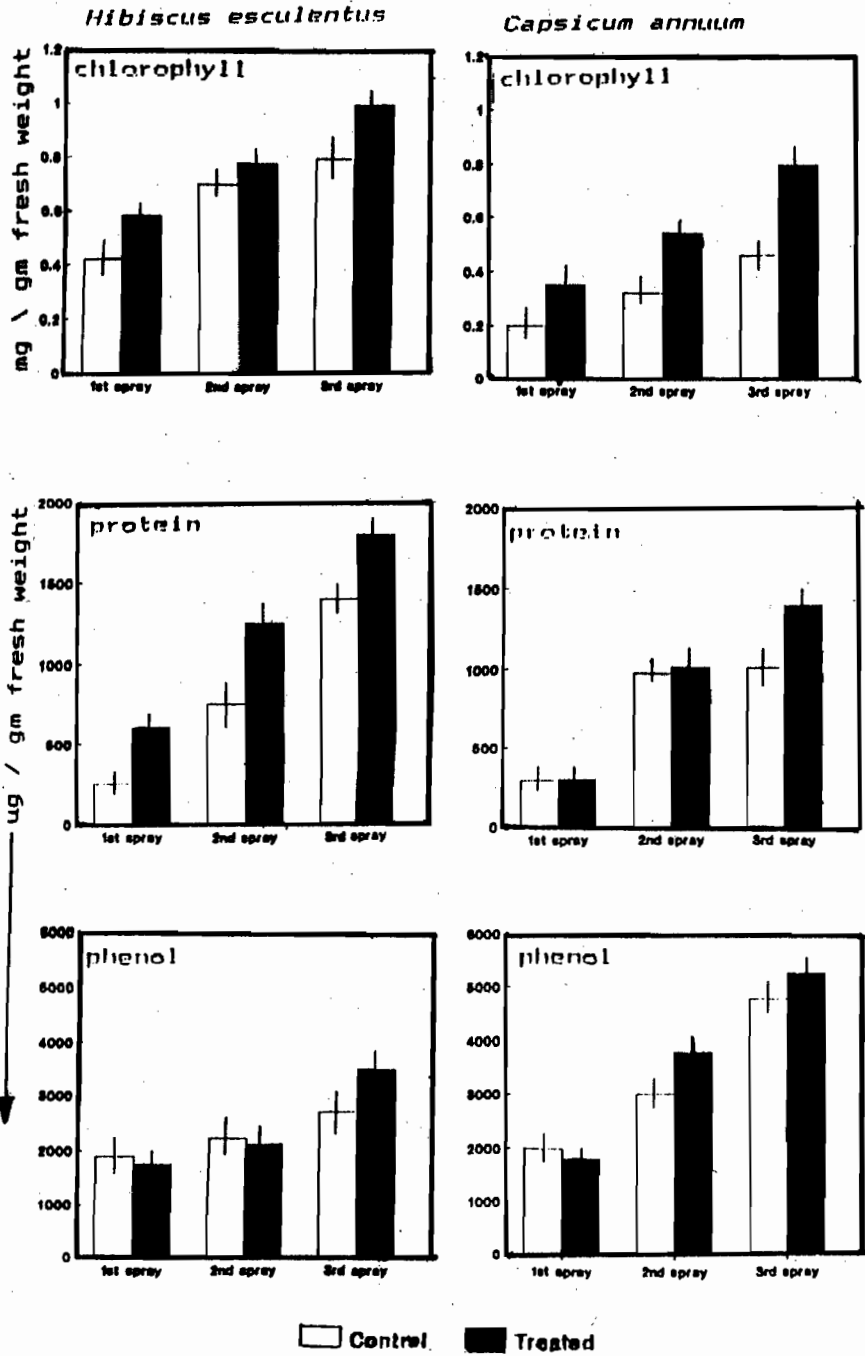


Fig.1. Effect of Topsin fungicide on chlorophyll protein and phenol content of *Hibiscus esculentus* and *Capsicum annuum*.

## Result and Discussion

Application of Topsin fungicide showed maximum increase in chlorophyll content in *H. esculentus* (57%) and *C. annuum* (18%) after 3rd spray when plants were 8 week old as compared to control (Fig.1). Increase in chlorophyll content by the use of systemic fungicide has also been reported in wheat (Wangd & Waywood, 1968). This is suggested to be due to an increase in the number of grana and intergrana space of chloroplast (Klingensmith, 1961). Presence of systemic fungicide increases the  $K^+$ ,  $Mg^+$ ,  $Ca^{++}$  and other ion uptake which participate in the regulation of transpiration (Dyar, 1968; Klingensmith, 1961) which may affect photosynthesis and chlorophyll synthesis, resulting in an increase in chlorophyll content of tobacco plants.

Maximum increase in protein content was observed in *C. annuum* (4.9%) after 2nd spray when plants were 6 week old whereas in *H. esculentus* (4.6%) maximum increase was observed after 3rd spray when plants, were 8 week old (Fig 1). An osmotic shock effect of systemic fungicide results in the release of protein and loss of membrane transport ability in the leaf cells (Amar & Reinhold, 1973). Benomyl fungicide has been found to increase NAD and NADP ratios (Godvary & Waywood, 1970) and increase in NADP and ATP level (Mishra & Waywood 1968) by inducing a change in the enzyme systems which may result in the conservation of leaf protein and chlorophyll in detached wheat leaves (Person *et al.*, 1957).

Maximum increase (5.6%) in total phenol was observed in *H. esculentus* after 3rd spray when plants were 8 week old. In *C. annuum* maximum increase (9.2%) in total phenol was observed after 2nd spray when plants were 6 week old (Fig 1). Stress condition cause abnormalities in biochemical pathway due to which toxic phenolic compound like flavone are formed in maize (Reid *et al.*, 1992). A correlation has been reported between phenolic content of healthy tissues and resistance in various host/parasite system like potato/*Verticillium* sp., (McClellan *et al.*, 1961) and cotton/*Alternaria macrospora* (Prasad & Lal, 1977; Bashan, 1986). It would suggest that plants sprayed with Topsin fungicide are under chemical stress and phenolic compound produced as a result of stress may act as a protective compound against invasion of pathogenic fungi (Friend, 1977).

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