

Mineral Metabolism in *Cestrum diurnum* Lin under Pathogenesis

Ingavale Dipali , Wantmure Shireen , Subramanayan N.N.** T.G. Nagaraja*

Department Of Agrochemicals and Pest Management,

Shivaji University Kolhapur-416004.India

**Sanjay Ghowdawat University, Kolhapur.

Abstract:- This paper comprises mineral analysis of *Cestrum diurnum* lin leaves infected by powdery mildew fungus *Oidium* sp. The dried leaf samples of healthy and infected leaves were subjected to tri-acid digestion, according to method prescribed by Toth et al., (1948). The digested sample were used for analysis of minerals by atomic absorption spectrophotometer (Thermo scientific AAS 2003 model). The elements such as sodium, potassium and calcium were estimated by flame photometer, while phosphorous by Sekine et al., (1966) method. The elements such as iron, manganese, calcium, sodium and phosphorus were considerably enhanced in the infected leaves while potassium, zinc, copper and sulphur were reduced in infected leaves, reveals a great metabolic shift.

Keywords:- *Cestrum diurnum* L minerals, *Oidium* sp., AAS Spectrophotometer, Flame photometer.

I. INTRODUCTION

Cestrum diurnum L as ornamental evergreen shrub cultivated in gardens, commonly called “Day Jasmine”, native of tropical America with numerous leaf branches. Flowers creamy white, trumpet shaped fragrant during day time. The plant is cultivated in India and other parts of the world. The plant is used on folk medicine as well as Chinese traditional medicine in order to cure burns and swellings (Mimaki et al., 2002). The plant possess several alkaloids such as Cestrumoside, ursolic acid, some steroidal saponins known as diurnosides, cesdiurins , liriiodendrin, lyonirasinol, glucopyranoside etc. Again plant also possess hepatic protective antioxidants anti-microbial properties, therefore, such a important plant during autumn season get affected by powdery mildew fungus *Oidium* sp. Hence an attempt was made to study mineral contents under pathogenesis.

II. MATERIALS AND METHODS

The fresh healthy and infected leaves were harvested from Ambai Defence Colony, Kolhapur for experimental study. The collected sample were brought to the laboratory washed with distilled water and blotted to dry. This material was kept for drying in an electric oven for 1-3 days, maintained a temperature of 60 degree Celsius. The dried sample 500 mg were acid digested according to method of Toth et al., (1948). The acid digested sample

were used for estimation of minerals in atomic absorption spectrophotometer (Thermo scientific AAS 2003 model). The elements such as sodium, potassium and calcium were estimated by flame photometer while phosphorous was established by the method of Seikine et al., (1966).

III. RESULTS AND DISCUSSION

The result were depicted in Table 1. The element sodium helps ion regulation of transport of amino acids and controls over the synthesis of nucleo proteins. It is also known to be a cofactor of ATPase and many enzymes (Evans and Sorger 1966). Many workers studied sodium content under pathogenesis. The present investigation reveals (Table. 1) sodium content get enhanced in the infected leaves 90.01 mg of sodium content get enhanced to 402.5 mg in infected leaves indicates more metabolic shift by pathogen. A parallel report was published by Nagaraja (1994, 1998 and 2001) under pathogenesis in *Mallotus philippinensis* , *Dioscorea bulbifera* , and *Woodfordia floribunda* . The potassium content reveals reduction in infected leaves (Table 1) the reduced content of potassium reflects its essentiality to the pathogen, similar findings were documented by Kapur et.al., (1978) and Nagaraja (1998 and 2005). The element calcium plays important role in plant metabolism and it influences non- nutritional role in iron antagonism against certain toxic monovalent cations, again it forms integral part of cell wall pectin. Calcium content considerably amplified in the infected leaves of *Cestrum diurnum* Lin , Sasikumar et al., (1979) and Nagaraja (1988 and 1996) reported elevated content of calcium during infection in several medicinal plants.

Phosphorous nonmetal influence the fungal growth and forms all integral part of nucleic acid as well as energy ATP molecules a contradictory result available during pathogenesis, the present investigation shows phosphorous content get accumulated in the infected leaves of *Cestrum diurnum* Lin (Table 1). Similarly Mogle and Mayee (1981) shown enhanced condition. The element zinc required for the formation of mitochondria and on an energy source as well as a metallo enzyme (Riordan, 1976) get consumed by the pathogen (Table .1). Same condition was documented by Nagaraja (1995, 2001, 2003, 2005, 2007, and 2018) .Iron content also utilized by the pathogen (Table.1). Because it is associated with various enzymes such as cytochrome, cytochrome oxidase, catalase etc. As well as forms integral part of protoplasm of the fungi. .Nagaraja

(2018) found reduced content of iron during pathogen in medicinal plants.

The element copper greatly declined in the infected leaves of *Cestrum diurnum* Lin (Table.1) which stimulates enzymes of Pectin. Methyl esterase (PME) and Polygalacterase(PG). A parallel reduction of copper content was recorded by Nagaraja,(2001) under infection. The non-element sulphur requires in minor quantities as part and

parcel of several proteins in fungi and host, get considerably reduced in the infected tissue (Table 1) while manganese element act as activator of large number of enzymes required for fungal metabolism. The manganese content get hoard in the infected leaves of *Cestrum diurnum* (Table 1) shares the findings with Sasikumar et al.,(1979).Thus minerals forms an integral part in metabolism of fungi during pathogenesis.

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Sr.No.	Minerals	Healthy leaves	Infected leaves
1	Sodium	90.01	402.5
2	Potassium	65.50	45.50
3	Calcium	29.0	81.5
4	Phosphorus	0.136	0.200
5	Sulphur	2.484	2.404
6	Zinc	41.03	35.41
7	Iron	200.65	381.55
8	Copper	11.44	0.1
9	Manganese	37.12	59.12

Table 1:-Mineral composition of *Cestrum diurnum* Lin under pathogenesis

*Expressed as mg/g⁻¹ of dry tissue.

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