

Studies on deterioration of biochemical contents of *Adhatoda zeylanica* (Medic) due to fungal contamination

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ABSTRACT

Adhatoda zeylanica Medic. is a sub-herbaceous and evergreen medicinal plant viz. indigenous to India. The leaves and roots shows the presence of phenols, tannins, alkaloids, anthraquinones, saponins, flavonoids, amino acid and reducing sugars, etc. having great medicinal value in different Ayurvedic formulations to cure cough, rheumatism, malaria, fever, chronic fever, etc. This plant is contaminated by various fungal pathogens responsible for deterioration in biochemical contents which results not only in decline of medicinal value but also severe loss of this commercially important medicinal plant. Hence, investigation is carried to study in detail the decrease in different biochemical contents.

Key words: *Adhatoda*, *Adhatoda zeylanica*, medicinal plant.

INTRODUCTION

Adhatoda zeylanica Medic. (Adulsa) is an important evergreen medicinal plant belonging to the family Acanthaceae. Adulsa is an Ayurvedic medicine viz. is mostly used against bronchitis, leprosy, blood disorders, ear diseases, thirst, asthma, fever, vomiting, loss of memory, leucoderma, jaundice, tumors, etc. (Seema *et al.*, 2010). The plant contains proteins, sugars, lipids, fiber and Vitamin C. Along with these components vasicine and vasicinone i.e. alkaloids found accumulated in the roots and leaves of the plant (Muhammad *et al.*, 2006). This medicinal plant is contaminated by fungal pathogens i.e. *Aspergillus sp.* and *Penicillium sp.* etc. and causes reduction of biochemical components of the plant parts (Adriana *et al.*, 2006). Patale and Mukadam (2011) have also mentioned that different fungal diseases contaminates crop yield and their control is the major challenge to biologists. Hence, investigation is carried about deterioration of different biochemical contents in leaves of this plant.

MATERIALS AND METHODS

Isolation of fungal pathogens: The leaves of Adulsa from Parbhani district were collected in clean plastic bags. The infected leaves were collected, washed with distilled water and small beats of

diseased leaf spot pieces were cut with the help of scalpel and immersed in 0.1 % sodium hypochlorite solution for 30 sec. These pieces were inoculated aseptically on sterilized Potato Dextrose Agar (PDA) and incubated at 27±1°C temperature for 10 days. The fungal culture was purified by using single spore isolation technique viz. given by Reddy *et al.*, (2006) and the different fungal pathogens were isolated for further studies.

Preparation leaves sample: The leaves of Adulsa from Parbhani were collected in clean plastic bags and shade dried. The collected leaves were stored in polythene bags as per the method given by Muhammad *et al.*, (2006) and Kashyap *et al.*, (2007). The healthy and fungal infected leaves powder of *Adhatoda zeylanica* Medic. was prepared and supplied to Nikhil Analytical Laboratory, Sangli for the estimation of Proteins, Fats, Carbohydrates, Vitamin C, Iron, Manganese, Zinc, Copper, Molybdenum and Boron by the method described in AOAC (1990).

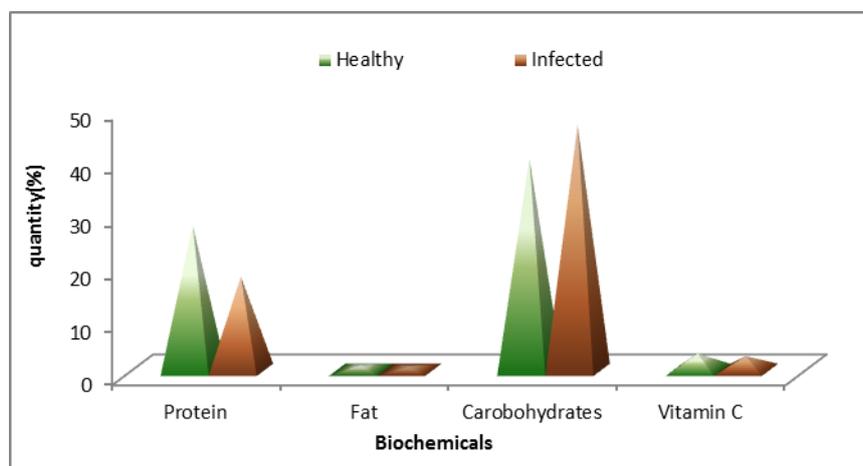
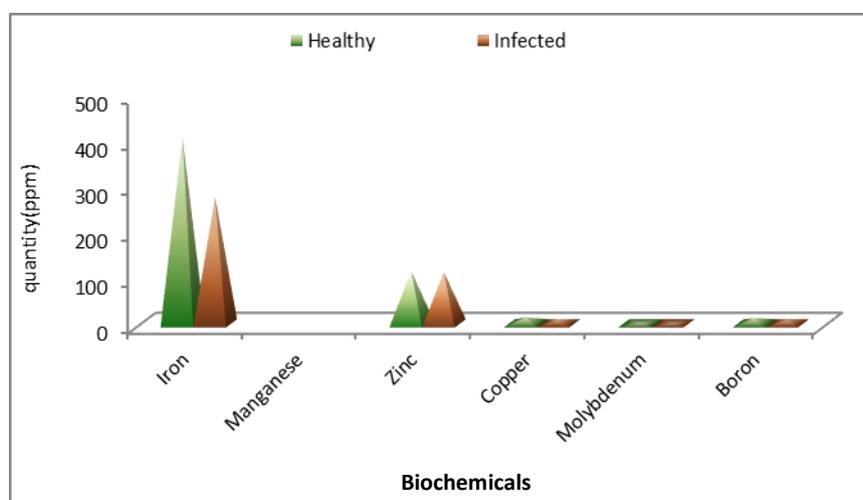
RESULTS AND DISCUSSION

As this plant is considered as chemical factories for synthesizing various biochemicals, hence it is important to detect the factors responsible to decrease them.

Table: Biochemical changes in different components.

Sr.No	Parameters	Unit	Healthy	Infected
1.	Appearance		Green Powder	Green Powder
2.	Protein	%	27.32	17.62
3.	Fat	%	1.007	0.666
4.	Carobohyrates	%	39.92	46.21
5.	Vitamin C	mg/100gm	3.10	2.60
	Minerals			
6.	Iron	ppm	407.2	276.2
7.	Manganese	ppm	BDL	BDL
8.	Zinc	ppm	114.2	111.8
9.	Copper	ppm	13.35	9.56
10.	Molybdenum	ppm	0.12	0.06
11.	Boron	ppm	12.0	8.20

(ppm - parts per million , BDL – bellow detactable level)

Figure1: Changes in biochemical contents**Figure2: Changes in biochemical contents**

The contamination of different fungal pathogens causes deterioration in different biochemical components of this plant. During the study of healthy and infected leaves powder sample, all chemical contents were found to be decreased in fungal infected samples of *Adulsa* i.e. protein-17.62, fats-0.666, iron-276.2ppm, Zinc-111.8, Copper-9.56 Molebdenem-0.06, Boron-8.2. However, the quantity of Carbohydrate was increased in infected leaves sample i.e. carbohydrate -46.21 indicated in table & Figure.

Dubey *et al.*, (2008) studied the microbial contamination of the raw materials of *Ahatoda vasica*. It was reported that microbial contamination especially of fungus, affects the chemical components of this medicinal plant and results in degradation of alkaloids. Shivanna and Mallikarjunsamy (2009) also observed the effect of fungal diseases on phytochemical constituents of medicinally important *Terminalia sp.* in Bhadra Wildlife Sanctuary, Karnataka, India. They found

that during quantitative estimation there is drastic decrease in alkaloid and steroid contents in diseased leaves; however, flavonoids and phenolic contents increased significantly in diseased leaves. Similer results were observed by Pandey and Roy (2012) in case of *Catheranthus roseus*. They observed the decrease in sugar and alkaloid content of *Catharanthus roseus* after the infection by fungal pathogen i.e. *Colletotrichum gloeosporoides*. Haripriya *et al.*, (2009) conducted the study of influence of vesicular arbuscular mycorrhizal (VAM) fungus inoculation to *Withania sominifera*, They observed that mycorrhizal infection affect the biochemical contents of plant, resulting in increase in sugars and carbohydrates concentrations.

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