



***MENTHA PIPERATA* : AN ENIGMA FOR UV-B RADIATION**

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Mentha piperata is a well known plant of Lamiaceae. It was exposed to UV-B radiation singly and with various concentrations of ascorbic acid and plant height was recorded. UV-B promoted the height and a further enhancement was recorded when exposure was given simultaneously with 100 ppm concentration of ascorbic acid. However, a fall in plant height was recorded in UV-B + 200 ppm and UV-B + 500 ppm ascorbic acid treatments.

Key words : ascorbic acid, *Mentha piperata*, UV-B radiation.

Mentha piperata is an aromatic perennial herb, 100-120 cm tall with wide spreading under-ground rhizomes and erect branched stems. It is widely grown in temperate areas of the world. Now it is commercially cultivated in large area of U.P. mainly in Baraut, Bareilly, Moradabad, Rampur, and Hapur. *Mentha* is propagated by stem cuttings. India is second largest country in production of *Mentha* oil and its derivatives. *Mentha* or menthol is specially used in digestive pains, balm, massage oil and as cooling agents. It is bactericidal, antifungal and antiseptic, reduce nausea and helpful in travel sickness.

Many European scientists have focused their researches on UV-B radiation and its various effects on several plants. Most of the UV-B radiations are absorbed by ozone layer. Excess of UV-B damages DNA, proteins and membranes, alter transpiration and photosynthesis, changes growth and morphology of plants (Teramura 1994).

The research work was conducted at the Botanical garden and research lab of Post Graduate Department of Botany of S.S.V. (P.G.) College, Hapur. Portable polythene growth chambers were used for long term exposure of UV-B radiation to experimental plants. Wooden frames of 100 x 100 x 100 cm. dimensions were covered on all sides (except base) by 0.25 mm. thick transparent

polythene sheet. These chambers had a volume of 1m³. UV-B radiation exposure was given by one Philips (Holand) TL 40/12 Fluorescent tube, fixed at the ceiling frame of the growth chamber. The tube was wrapped with 0.133 mm thick Cellulose Diacetate film to avoid UV-C radiation. Filters were replaced weekly to avoid aging effect. These growth chambers were placed in shade free area with no reflecting objects around it. The control plants were kept at about 2 m distance from UV-B frames. The ascorbic acid was applied as spray treatment at weekly intervals.

Present study deals with the measurement of height of *Mentha piperata* with 3 hrs daily exposure of UV-B radiation on plants. They were divided into 5 categories - Control, UV-B, UV-B + 100 ppm ascorbic acid, UV-B + 200 ppm ascorbic acid and UV-B + 500 ppm ascorbic acid.

The observations show two major findings on this plant species. One, the UV-B has resulted in a 32.90% increase in plant height in contrast to only 8.97% in control. Secondly, the impact of UV-B + 100 ppm ascorbic acid was tremendous, showing 64.90% growth in 30 days. Therefore with reference to our first finding, it can be claimed that *Mentha piperata* is an enigma for the impact of UV-B on plant height as a large number of researchers have shown the inhibitory role of UV-B on plant

Table 1:

Treatments	Plant Height (After 30 days of treatment)		
	Height (in cm.)	% Increase in 30 days	% In- crease over control
Initial	13.82	–	–
Control	15.06 ±2.181	8.97%	–
UV-B	18.38 ±2.880	32.90%	+22.4%
UV-B + 100 ppm AA	22.80 ±1.040	64.90%	+51.3%
UV-B + 200 ppm AA	19.00 ±3.473	37.48%	+26.2%
UV-B + 500 ppm AA	15.50 ±2.081	12.15%	+2.92%

height. Tevini and Teramura (1989) reported reduction in plant height due to destruction of IAA and production of IAA photo-products. Ros and Tevini (1995), Ballare *et al.* (1996), Pal *et al.* (1997), Deckman and Impens (1998), Varalakshmi *et al.* (2003), reported reduced plant height due to solar UV-B radiation.

However the present findings on *Mentha*

piperata are reverse to those of earlier workers. This plant species shows increased plant height. This is against all the previous scientists who used plant height as index to assess the degree of UV-B radiation sensitivity.

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