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# EFFECT OF BENZIMIDAZOLE ON GROWTH AND ACCUMU-LATION OF CERTAIN METABOLITES IN PHYLLANTHUS URINARIA<sup>1</sup>

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#### ABSTRACT

Various concentrations of benzimidazole were applied on *Phyllanthus urinaria* plant as foliar spray. Increase in plant height, branch length, fresh and dry weights and fruiting percentage was observed. It also favoured the accumulation of protein, total phenolics, total free sugars, vitamin 'C' and keto acid.

### INTRODUCTION

Benzimidazole, a synthetic analog of kinetin has aroused much interest among plant physiologists in recent past for its kinetin like activities (Person et al., 1957; Wang and Waygood, 1959; Yamada et al., 1964; Mishra and Waygood, 1968; Dyar, 1968 and Mishra and Samal, 1973). Most of these studies are concerned with the senescence of detached leaves. Only few reports are available on its effect on standing plants (Dyar, 1968; McCorquodale and Duncun, 1957; and Mishra and Mohanty, 1967). In the present investigation effect of benzimidazole was observed on the growth performance and accumulation of certain metabolices in the shoots of Phyllanthus urinaria Linn., an important plant of folkmedicine (Kirtikar and Basu, 1935).

### MATERIALS AND METHODS

the height of 5-6 cm., they were transplanted in earthenware pots. In each pot 25 plants were raised. Three pots were taken for each treatment. The plants were sprayed with 10<sup>-5</sup>M to 10<sup>-2</sup>M aqueous solutions of benzimidazole (BZI) at weekly intervals. One set was sprayed with distilled water as control. After four sprays the morphological as well as biochemical changes were studied.

For morphological studies, plant height, primary root length, branch lenth fruiting percentage, fresh and dry weights were taken into account. Estimation of protein, total phenolics, vitamin C, keto acid and total free sugars were made following the methods suggested by Lowry *et al.* (1951), Singh *et al.* (1978), Roe and Kuether (1943), Freidemann (1957) and Dubois (1956) respectively.

### **RESULTS AND DISCUSSION**

BZI exerted profound effect on growth

## The seeds of *Phyllanthus urinaria* were raised in wooden trays having garden loamy soil. When the seedling attained

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parameters and variability of metabolites in P. urinaria plants. There was a considerable increase in the plant height, branch

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length (Fig. 1), and tresh and dry weights (Fig. 2) from  $10^{-5}$ M to  $10^{-2}$ M concentrations. Dyar (1968) after treating roots of the young tobacco plants for 28 days with 0.5 M solution of BZI also noted rise in fresh and dry weight. However, reduction in plant height and pod number was reported by Mishra and Mohanty (1967) in cowpea. In the present investigation an initial increase in fruiting percentage was observed, followed by reduction at higher doses (Fig. 3). BZI suppressed the primary root elongation (Fig. 1). Such inhibition was also recorded by Mishra and Mohanty (1967).

BZI treatment induced significant accumulation of protein (P<0.001) and total phenolics (Fig. 4) in P. urinaria plants at all the concentrations. Mishra and Samal (1974) reported 23-28% rise in protein content in barley leaves and concluded that long term application of BZI increases the pace of protein synthesis. BZI treatment upto 10<sup>-3</sup>M favoured significant (1% level) accumulation of total free sugars, vitamin 'C' (ascorbic acid) and keto acids (Fig. 5). Slight decline at  $10^{-2}$ M appears to be the start of texicity. The BZI induced accumulation in sugars might be due to its influence on chlorophyll synthesis and enhanced photosynthesis as postulated by Mishra\* and Samal (1973). Increase in Ascorbic acid by BZI was also reported by Mishra (1963) in detached wheat leaves. This may be either due to availability of its precursor (glucose) or due to increased level of phenolics which acts as antioxidant for ascorbic acid (Damodaran and Nayar, 1938). BZI has been shown to decrease the level of glutamic acid during detachment of Khapli wheat by Klingensmith (1954). This may be accounted for the increase in the concentration of keto acids by transamination. Thus from the above finding it is obvious that BZI treatment is

beneficial for the yield and accumulation of certain metabolites in *Phyllanthus urinaria*, a medicinal plant.

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