

## EFFECT OF HARD LEWIS ACIDS ON TANNIN SYNTHESIS IN PLANTS - RELATIONSHIP OF TIN, BISMUTH AND IRON IN ACACIA CATECHU

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An earlier investigation carried out on the relationship between the uptake of manganese a hard Lewis acid, and biosynthesis of tannins in the tannin-rich plant Acacia catechu grown in culture solution indicated the existence of a definite correlation (Kapel and Karunanithy 1977). This paper reports the results of a study extended to three other hard Lewis acids, namely: tin, bismuth and iron, on tannin synthesis in the same plant grown under similar conditions.

The composition of the culture solution, the conditions for growing A. catechu in this solution, the controls for the plants grown under these conditions containing various levels of the metals, the collection and processing of plant materials for analysis and determination of tannin were similar to those described in our paper referred above. Tin trials were conducted in 7 test batches, each of which consisted of 12 x 4 plants in 12 jars containing, 5, 10, 20, 30, 40, 50 and 60 mg of tin (II) chloride dihydrate per litre of culture solution, respectively. Bismuth and iron trials were carried out in the same solution using bismuth sodium tartrate and iron (III) citrate pentahydrate, respectively, in place of tin (II) chloride dihydrate. Tin was determined by the catechol violet method as modified by Newman and Jones (1966). Bismuth was determined by the iodide method of von Oettingen (1930). Iron was determined by the 1:10-phenanthroline method (Bandemer and Schaible 1944).

The effects on biosynthesis in the plant produced by 30 mg of the respective salts per litre are presented in Fig. 1. They show that tin and bismuth too have the effect of stimulating the biosynthesis of tannins, though there is some indication that a maximum value is reached. Iron does not seem to be endowed with this property. The increase in tannin synthesis associated with the presence of these metals may serve to protect the plant against an accumulation of uncomplexed metals capable of exerting toxic effects.

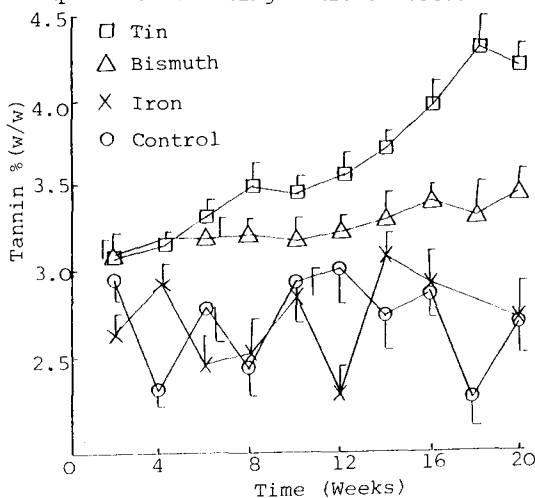


Fig. 1 : The effects of tin, bismuth and iron at 30 mg/l of the appropriate salt in the culture solution on tannin biosynthesis in A. catechu. The points on the graph represent the mean  $\pm$  s.e.m. of analysis of 4 separate plants performed in duplicate.

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