

## A STUDY OF ALLELOCHEMICS OF NINE TROPICAL PLANT SPECIES

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Two aspects of allelopathic interactions have been reported, namely root exudates and leaf leachates; furthermore fruit pulp has also been studied for the following reason. As a slight extension of Molisch's definition we can also include the case of fruit pulp chemicals which inhibit the germination of seeds in ripe fruit fallen in the environment and is of great zoochoric/ecological interest. A total of nine species, three in each group, has been studied.

- (1) **Root exudates** – We have chosen two varieties of rice namely *Subarna* and *Pankaj*. i) Field experiments were conducted with different spacings of the rows/columns and the results revealed that both vegetative yield and grain yield of each variety are differentially affected at different spacing levels. Field experiments suggest an influence of root exudates of rice on the growth of other varieties. ii) Laboratory experiments revealed that root exudates (RE) of *Subarna* inhibit the germination and seedling growth of *Pankaj* and vice-versa. RE of both *Subarna* and *Pankaj* contain phenolics, amino acids and an organic acid, presumably a lower fatty acid(s). The synergistic effect of RE is inhibitory but when chromatographically separated, two inhibitors and three stimulators have been found in the RE of *Subarna*.

We have also studied the allelopathic activity of RE from *Leonurus sibiricus* L. (Labiatae), a roadside weed. RE of *Leonurus* show the stimulatory effect in a bioassay on rice, wheat and mustard and show a concentration-dependent inhibitory and stimulatory activity. Caffeic acid was identified as one of the allelopathic agents.

- (2) Since leaves are also known to be a source of allelochemicals, leaf leachate of *Tamarindus*, *Tectona* and *Chrozophora* have been studied. *Tamarindus indica* L. (Leguminosae) is a common economic tree in India which sheds leaves continuously in all seasons and vegetation under the tree is very sparse. In Tamarind one of the inhibitory molecules is of 368 mol. wt. with UV peak at 276 nm. In early stages (5 days onwards after germination) tamarind seedlings release inhibitors through their roots while in the mature stage, inhibitors are released from leaves.

Teak (*Tectona grandis*), one of the most important artificial forest trees in India sheds huge amounts of leaves on the ground and so a very thick layer of large leaves covers ground. *Tectona grandis* leaf leachate contains two inhibitors and two stimulators but the overall effect is inhibition.

*Chrozophora rotleri* (Euphorbiaceae) is a weed growing in uncared land and also at the edges of paddy fields. *Chrozophora* leaf leachate is both inhibitory and stimulatory depending on the concentration. One of the inhibitors is sinapic acid. Another has a mol. wt. 362, presumably a 26 carbon molecule, UV peak at 204 nm suggests that it is a nonphenolic, presumably an aliphatic acid.

We have studied the chemical nature of fruit pulp of three relatively less known tropical species, *Kandelia candel*, *Acacia erioloba* and *Sterculia foetida*. Pulp of these three contain inhibitors and stimulators and the synergistic effect is inhibitory. The ecological significance of fruit pulp inhibition has been discussed in connection with zoochory.