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ISOENZYME VARIATION IN DIFFERENT PLANT PARTS AND AT DIFFERENT STAGES OF LEAF DEVELOPMENT IN *PIPER NIGRUM* L.

Isoenzyme variation in different plant parts and at different stages of maturity of leaves of *P. nigrum L.* var. Panniyur-1 was studied to find out the ideal plant part for analysis of the enzyme and also to find out the variation in enzyme activity in different plant parts / at different stages of leaf maturity. The study was conducted as a prelude to isoenzyme variation analysis in the genus *Piper*. The enzymes analysed were, peroxidase and esterase. These enzymes were selected because they are common plant enzymes. The enzymes were analysed in different plant parts like leaves, stem and root. In the leaves, different maturity stages such as very tender (first two leaves of a flushing shoot) tender (third and fourth leaves from the tip), mature (leaf that had already turned green with a light texture but not much brittle), dark green (leaves which are dark green and thick) were analysed. The activity of peroxidase in stem was very weak (Fig. 1). The tender and very tender leaf showed only negligible activity of peroxidase. In these case only first three anodal isoenzymes were present (PRX-1 to 3). There was an increase in the activity of this enzyme with advancement of maturity of leaf. However, the roots were found to be the most ideal part for the analysis of peroxidase enzyme. Roots showed better clarity for peroxidase isozyme separation. This was probably due to lack of chlorophyll interference in roots. Dark green leaf was found to be the second best for peroxidase assay and was used as the sample

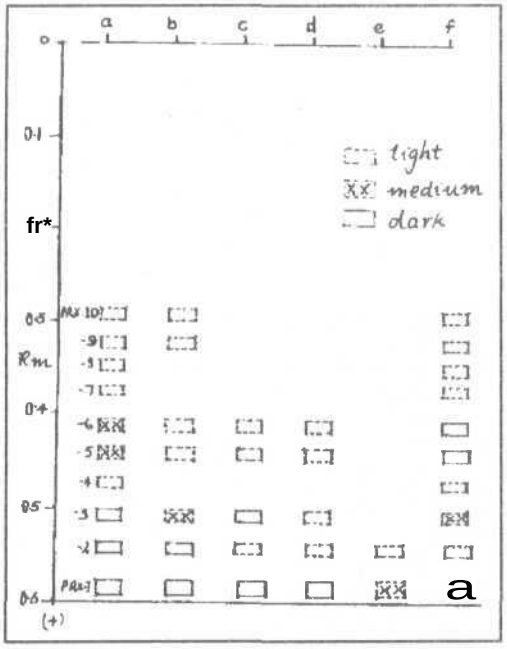

Fig 1. Peroxidase zymogram in root, stem and at different stages of leaf development in *Piper nigrum* var Panniyur-1 (a, b, c and d = dark green, mature, tender and very tender stages of leaf respectively; e = stem; f = root)

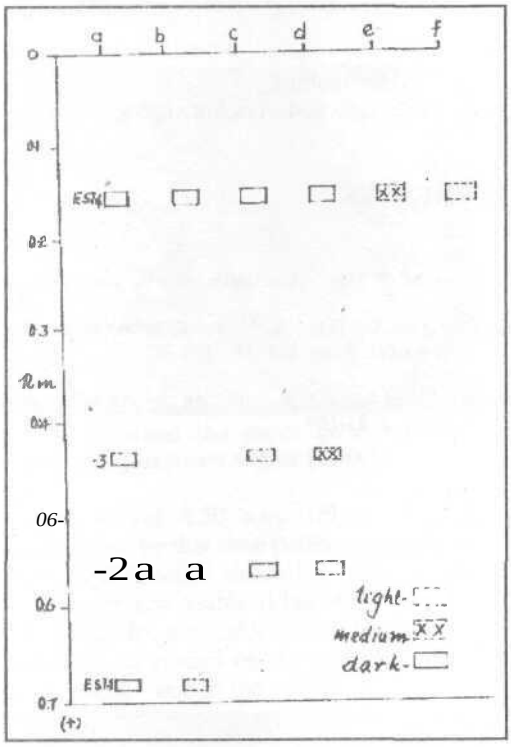

Fig 2. Esterase zymogram in root, stem and at different stages of leaf development in *Piper nigrum* var Panniyur-1 (a, b, c and d = dark green, mature, tender and very tender stages of leaf ; e = stem, f = root)

material, wherever destructive sampling and collection of root was not possible.

In the case of esterase enzyme, its activity was found to be highly varying at different stages of maturity and in different plant parts (Fig. 2). In the case of stem and root, EST-4 only was present. But the activity was weak. EST-1 was visible only in mature and dark green leaves. However, the activity was not predictable hence was not suitable for taking as a marker. The activity of EST-2 was observed to be increasing with the maturity of leaf. Activity of EST-3 was also very much unpredictable and was very rarely observed in mature leaves. However, EST-4 was observed at all stages of leaf. Considering all these tender leaf was selected as sample for esterase.

Based on the different zymograms root was found ideal for peroxidase assay and tender leaf for esterase. The results of the study was utilised in further studies on isoenzyme variations in *Piper*.

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