METABOLISM OF AUXIN IN ERIOPHYES INCITED ZIZYPHUS GALL GROWN IN CULTURE

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INTRODUCTION

It is now generally accepted that growth autonomy and hyperauxinity of plant tumor tissue is accompanied by abnormal growth hormone metabolism (1,2,3,). The change in nutritional requirements or increased synthesis and retention of growth regulators could lead to nutritional autonomy and hyperauxinity of the gall tissue. The literature shows conflicting reports on this aspect. The present paper deals with association of auxin-protectors, peroxidase, IAA-oxidase and polyphenol oxidase in abnormal growth hormone metabolism in Zizyphus gall tissue.

MATERIALS AND METHODS

Zizyphus jujuba LAMK. normal stem, stem galls incited by Eriophyes cernuus MASSEE and their tissue cultures were used. The experimental procedures used for estimation of IAA, total phenol, O-dihydroxyphenol, protein and assay of auxin protectors, peroxidase, IAA-oxidase, polyphenol oxidase are described elsewhere(4).

RESULTS AND DISCUSSION

In contrast to normal tissue, the gall tissue could grow on auxin-kinetin free MS medium and also on the same medium along with DL-tryptophan and converted more auxin. The in vivo gall tissue showed an increase in polyphenol oxidase activity upto the 30th day of growth. The oxidation of IAA by gall tissue extract occurred following a lag period. In plant tumor tissues the presence of IAA-oxidase inhibitors has been reported by several workers(5). Zizyphus gall tissues possess auxin protectors (O-dihydroxyphenol) that prevent peroxidase-catalysed oxidation of IAA by inducing a lag period(6). In the protector assay system the lag period prior to IAA oxidation was reduced by increasing the concentration of IAA. With incorporation of NAA and IAA in the medium the auxin content in the tissues decreased. Both normal and gall tissues showed a differential response to effectors such as NAA, IAA, 2,4-D, DL-tryptophan, GA, and cycloheximide, in terms of activities of peroxidase, IAA-oxidase and polyphenol oxidase. In general, the activity of polyphenol oxidase decreased and the activities of peroxidase and IAA-oxidase increased in the gall tissue. Both in vivo and in vitro gall tissues showed a higher protein content as compared to the normal tissues.

CONCLUSION

Polyphenol oxidase is the key enzyme in Zizyphus gall tissue that regulates the level of auxin protectors which in turn affect the activities of peroxidase and IAA-oxidase, responsible for the IAA destruction. This could explain the hyperauxinity and auxin autotrophy associated with Zizyphus gall tissues.

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