

CHANGES IN CARBOHYDRATE CONTENTS AND HYDROLYSING ENZYMES IN ROOT KNOT OF *VIGNA RADIATA* INFECTED BY *MELOIDOGYNE INCOGNITA* *IN VIVO* AND *IN VITRO*.

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Changes in total soluble sugar and starch contents and alpha-amylase activity in *Vigna radiata* root gall caused by *Meloidogyne incognita* were investigated. Root galls of *Vigna radiata* showed an increase in total soluble sugars and alpha-amylase activity compared to its normal counterpart, both *in vivo* and *in vitro* conditions. However there was no appreciable difference in the starch content of the gall and normal tissues

Keywords : *Vigna radiata*; Root knot; *Meloidogyne incognita*; *in vitro*; *in vivo*.

Vigna radiata root gall induced by *Meloidogyne incognita* are widely distributed in India. The infected roots are swollen at the point of invasion and develop into gall of various shapes and sizes. The root gall may appear as small scattered tubercle like outgrowth or as irregularly shaped extensive swellings. The present study was undertaken to work out the changes in total soluble sugars and starch contents and alpha-amylase activity both *in vivo* and *in vitro* conditions.

Root galls and its normal counterparts were collected from the sick plots developed in fields of Botany Depart-

ment, University of Rajasthan, Jaipur. Fresh material was used for analysis of gall and normal tissues *in vivo* conditions. For *in vitro* biochemical estimation of normal and gall tissues, forty days old cultures were used. Gall tissues from root galls of *Vigna radiata* infected by *Meloidogyne incognita* and normal root tissues were isolated and maintained on Murashige and Skoog's (MS) medium (Murashige and Skoog, 1962) supplemented with 1.0 mg/l naphthalene acetic acid (NAA) and 0.5 mg/l kinetin.

Total soluble sugars and starch contents were estimated by the method of Dubois *et al.*, (1951) and alpha-

Table 1.

	in vivo		in vitro	
	Normal root	Gall	Normal callus	Gall callus
Total soluble sugars (mg/g fresh weight)	20.0	28.0	21.5	30.0
Starch (mg/g fresh wt.)	17.5	16.0	16.5	15.5
Alpha-amylase (mg starch hydrolysed/h/mg/protein)	2.5	6.0	1.0	4.0

amylase activity by the method of Schuster and Gifford (1962) with slight modification.

Table 1 shows high total soluble sugars and alpha-amylase activity in gall tissues compared to the normal tissues, both *in vivo* and *in vitro* condition. No appreciable difference in the starch content in the gall and normal tissues was observed. Similar results were reported by Agarwal *et al.* (1985) in nematode infected root galls of okra.

Increase in watersoluble sugar may be due to its accumulation as a result of disruption of normal phloem transport or its translocation from the neighbouring healthy tissues (source) to

the physiological "sink". Reduction in the starch content in the gall tissues may be due to utilization of these substances by the nematode for its growth and development. Alpha-amylase activity was found to be more in gall tissues. The increase in sugar content was parallel to the activity of this enzyme.

References

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