

Role of Earthworm Lectins in the Legume Formation in Leguminous Plants

Telphy Kuriakose

Dept of Biotechnology

This study was carried out to find out the effect of earthworm lectins on the nodulation and growth of roots of pea plants grown hydroponically. The hydroponic solution was extracted from garden soil which contained existing strains of *Rhizobium*. Infection and subsequent root nodulation is important as it provides the pea plants with essential nitrogen. This in turn affects the growth of the plants and subsequent fruiting. In this study it was found that earthworm lectins initiated profuse rooting in the pea plants. The earthworm lectins were isolated from coelomic fluid extracted by cold shock method. Vermilectin was isolated by extraction from vermicompost. Vermilectin (0.28-0.3 µg/mL) in nutrient solution also induced nodulation on the fourth day of culture, but only profuse rooting was observed in case of concentration of 0.56 µg/mL of vermilectin. This has thrown light on the significance of vermilectin in nodulation and its future use in agriculture to obtain high quality yields of *Leguminosae* plants. These lectins can help in the induction of rooting in plants cultured *in vitro*. Vermilectin can be isolated from vermicompost, which is economically feasible.

The enzymes involved in nitrogen fixation were estimated quantitatively. Glutamine synthetase is the key enzyme responsible for glutamine biosynthesis. It catalyzes the incorporation of ammonia into glutamate to generate glutamine with concomitant hydrolysis of ATP, and plays a crucial role in the assimilation and re-assimilation of ammonia into amino acids. Thus it is a key enzyme for nitrogen metabolism. Nitrate reductase represents a short, soluble electron transport chain localized in the cytosol, catalyzes the NAD(P)H reduction of nitrate to nitrite and plays a key role in the regulation of nitrate assimilation in lower and higher plants.