

**TISSUE CULTURE AND NITROGEN FIXATION IN LEGUMES AND NON-LEGUMES**

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The process of biological nitrogen fixation has not been studied in detail because of the complex interactions among the plant system, rhizobia and environmental factors. Somatic cell and protoplast culture technology has helped a lot in the understanding of nitrogen fixation process. In vitro symbiosis has been established between tissues of legume and non-legumes with homologous and heterologous rhizobia in terms of nitrogenase activity and inter and intracellular incorporation. Once rhizobia are inside the cell irrespective of legume or non-legume, these can express, hence the barrier of specificity is at the level of infection. The addition of root exudates enhances infection thread formation and nitrogen fixation. Expression of bacterial genes is highly influenced with the host produced factors which are diffusible in nature. The inclusion of TCA intermediates into the culture medium have also shown appreciable increase in the enzyme activity. Therefore, concerted efforts are being made to introduce symbiotic and free living bacteria into protoplasts and to see their fate in the protoplast derived calli and finally whole plants.