

Temperature Mediated Changes in Agrobacterium-Groundnut Transformation System

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ABSTRACT

Agrobacterium-Groundnut was selected as a model transformation system in order to study abiotic stress; tolerance in higher plants. Co-cultivation with a good transformation frequency (75%) supported temperature mediated acclimation of the system in terms of stress related proteins and amino acid proline as well.
Keywords: Agrobacterium transformation, Groundnut, temperature stress.

Plants are seldom exposed in nature to only one type of stress. In arid and semi-arid environments, chilling and heat stresses on the seed-bank are often coupled with the impact of microbes in the soil and/or on emerging embryos and growing seedlings. While there is a plethora of studies on the effect of either thermal or Agrobacterial infection on plants, investigations of the combined effect of the two stresses are rare. Thermal stress (Whether chilling or heating) and/or microbial infections are known induce a number of physiological responses in plants, including changes in protein pattern, amino acid profile of the stressed plants, which ultimately affected the growth. Abiotic stress cause deleterious changes in many enzymes and structural proteins such as denaturation and aggregation of non-native proteins [1].

'In vitro' cultured Agrobacterium- plant co-cultures of transformation system can be induced to undergo developmental switch by certain physical and chemical stress treatments. Our knowledge about the metabolic profiles of stress induced co-culture is still restricted. A more detailed insight could be highly beneficial to resolve co-culture reprogramming

difficulties in so-called recalcitrant species. . About 95% of the cultivated areas of Groundnut (*Arachis hypogea* L.), one of the principal oilseed legume are in semi- arid tropics, where day time temperature often exceed 35°C, during flowering and appears an ideal system for studying temperature fluctuation related response. Physiological changes in development can, amongst other methods, be assisted by metabolic profile. it allows quantitative and qualitative measurement of low molecular weight compounds or specific metabolic pathways in cells, tissues or in the whole plant [2]. The influence of heat and drought was studied on Arabidopsis by analyzing both differential gene expression and metabolic profiles. About 50 transcripts were specifically expressed and plants accumulated high levels of sucrose and other sugars [3].

In the present study an 'in vitro' experiment was designed to stimulate the thermal conditions of arid and semi-arid environments by exposing Agrobacterium - groundnut co-cultures to chilling or heating in order to investigate the effects of these stresses on transformation frequency and to obtain a more integral understanding of the cellular reprogramming in

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