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Potentized Sucrose alters growth, sugar, protein and chlorophyll content in cowpea seedlings

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Background: Plants produce sugars through photosynthesis. Sugars influence many vital functions like embryogenesis, seedling development, root and leaf morphogenesis, flowering and stress responses in plants . Sugars act as signalling molecules which control gene expression and development in plants in a way similar to plant hormones [1]. The most abundant disaccharide in plants is sucrose. Altering sucrose levels affect plant growth, development , sucrose-derived metabolites and sucrose-specific signalling [2] .

Objectives: To see whether potentized *Sucrose* influence the development of cowpea seedlings in terms of morphology and such biochemical changes as chlorophyll, sugar and protein content in the embryos.

Materials and methods: Cowpea seeds were surface sterilized and allowed to germinate in petri dishes over moist filter papers. Immediately after germination they were divided into two groups. While one group was treated with *Sucrose* 30CH diluted with distilled water 1:500, the other group was treated with *Ethanol* 30CH, diluted with water 1:500. After treatment the seedlings were transferred to separate petri dishes and allowed to grow for 72 hours. Samples of seedlings from each treatment group were weighed, kept at 70^{o} C for 24 hours and weighed again. Another sample from each group was analysed for their sugar content and protein content following Anthrone and Lowry's method, respectively [3]. Chlorophyll content was measured *in situ* by a chlorophyll-meter. Leaf and cotyledon sections were examined under a scanning electron microscope to see any changes in the epidermal cells of cotyledons and density and morphology of stomata.

Results : Data between the treatment groups were compared by the student t-test . *Sucrose*30CH induced significant changes in water content , chlorophyll , sugar and protein content in the seedlings as compared to *Ethanol* 30CH ($p < 0.05$) . *Sucrose* 30CH increased stomata density in the leaves significantly as compared to the *Ethanol* 30CH control ($p < 0.05$). There was a marked change in the structure of epidermal cells of cotyledons following treatment with *Sucrose* 30CH .

Discussion: *Sucrose* 30CH might have interfered with the signalling process of sucrose in seedlings and thus produced the observed effect. Increase in stomata density indicates higher transpiration rate in the leaves of sucrose-treated seedlings. Water content in the seedling was higher with *Sucrose* 30CH than with *Ethanol* 30CH.

Conclusion: Potentized *Sucrose* altered growth in the cowpea seedlings and their sugar, protein, water and chlorophyll content . The drug also changed the morphology of epidermal cells of cotyledons and increased the density of stomata in the seedlings.

Keywords: Sucrose, homeopathic potency, cowpea , stomata , sugar , chlorophyll , protein

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