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Comparison of the growth of *in vitro* propagated *W. somnifera* with seed raised plants

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Withania somnifera is an important medicinal plant used in Ayurveda. Vegetative propagation methods are not successful thus tissue culture protocol has been developed for mass propagation.

In vitro plants are often compared with seed-raised plants in order to minimize physiological or morphological disorders, which could be appeared in *in vitro* propagated plants. The objective of this study was to compare the growth and active chemical components (Withanolides / steroids) present in tissue cultured plants of *W. somnifera* with those of seed raised plants in order to confirm that the tissue cultured plants are true to type.

Tissue cultured and seed raised plants of *W. somnifera*, which were in the same size (4-5 cm) were grown in black polythene bags (12'' height and 6'' diameter). They were kept in a greenhouse. Plants were watered regularly and maintained carefully applying fungicide when necessary. There were twenty replicates in each type of plants. Growth, anatomy and physiology of those two plant types were compared over a period of six months and the comparative chemical analysis was done after ten months.

The results indicated that the growth of tissue cultured plants are comparable with those of seed raised plants. Rate of photosynthesis was higher in tissue cultured plants than those of seed raised plants (6.20±0.52, 5.85±0.24 respectively) but the stomatal resistance was low in tissue cultured plants compared to those of seed raised plants (2.01±0.30, 4.72±0.40 respectively). Due to high photosynthetic rate in tissue cultured plants they are more productive but less developed leaf structures has to adapt to control the rate of transpiration. However tissue cultured plants were hardier than seed raised plants thus may have more resistance to drought etc. Chemical composition of the tissue cultured plants was comparable with those in seed raised plants and found that Withaferin A – the active secondary metabolite of medicinal importance is present in high quantities in tissue cultured plants.

From all of the above observations it could be suggested that tissue culture protocol could be used successfully for large scale production of *Withania somnifera* as plants produced through tissue culture are comparable with seed raised plants in growth and chemical identities.

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