

## TISSUE-CULTURE STUDIES OF THE WINGED BEAN

(*Psophocarpus tetragonolobus* (L.) D.C.)

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Tissue culture studies on the winged bean were carried out with the variety UPS-122. In order to produce aseptic explants, stored seeds were sterilized for 15 minutes in 0.3 percent mercuric chloride when 90–95 percent of the embryos germinated *in vitro*. Physiologically mature isolated embryos, embryonic axes, hypocotyls of *in vitro* seedlings and epicotyl segments were used as initial explants for plantlet regeneration.

The formation of normal *in vitro* seedlings was observed in isolated embryos within 15–20 days after culturing on agar medium (full strength Murashige—Skoog (MS) mineral nutrients + 3.0% sucrose), whereas on impoverished medium (half strength MS mineral nutrients + 1.0% sucrose) seedlings showed a slower growth rate. The differentiation of numerous adventitious buds occurred on the surface of hypocotyl explants on MS medium supplemented with 1.0–5.0 mg l<sup>-1</sup> BAP (6-Benzylaminopurine) and 0.1 mg l<sup>-1</sup> IAA (Indole-3-acetic acid) within 20–25 days of culture.

When these adventitious buds were isolated and transferred to a medium containing IAA (0.1 mg l<sup>-1</sup>) and GA<sub>3</sub> 0.1 mg l<sup>-1</sup> they continued normal growth and shoot formation. Rooting was also observed in the presence of IAA and the absence of cytokinins.

The optimal concentrations of some biologically active substances (thiamine—HCl, pyridoxine—HCl, nicotinic acid, calcium pantothenate, folic acid, biotin, riboflavin, glycine, myo-inositol, adenine sulphate and GA<sub>3</sub>) were determined through a mathematical design technique (FFE 3(11)27), using zygotic embryos cultured *in vitro* (measurement of seedling height, number of axillary buds). These findings will be used to optimize the media for vegetative micropropagation from buds.

Three forms of epicotyl segments were tried as explants to obtain callus proliferation: 1 mm thick discs, 3.5 mm-long whole segments, and 3.5 mm-long split segments. Of these, the split segments gave the best proliferation on MS medium enriched with 1.0–5.0 mg l<sup>-1</sup> and naphthaleneacetic acid (NAA). This callus will be used for trials to differentiate shoots.

### Micrografts

Micrografts within winged bean variety UPS-122 were possible. In heterograft trials, winged-bean scions were micrografted on *Sesbania grandiflora* root stock. Exudates often displaced the scion. Callusing of *S. grandiflora* stock surface displaced winged-bean scion later; but the scion remained fresh and green for a long time.