

## Substrate availability in germinating *Pinus radiata* D. Don

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Somatic embryogenesis of *Pinus radiata* is being developed as a plant propagation system. Somatic (*in-vitro*) embryos will be encapsulated in an artificial megagametophyte for somatic seed production. Until somatic embryos are present in sufficient numbers, zygotic embryos are being used to test substrates for a synthetic megagametophyte. Substrates normally used in tissue culture of excised embryos allowed normal development of radicles but not cotyledons. Subsequent growth of plants in soil is probably limited by cotyledon size.

A key component in the production of quality embryos is the food reserve of the megagametophyte. During natural seed germination, proteins, carbohydrates and lipids are hydrolysed in the megagametophyte and the mobilised products are consumed by the embryo. In this study, amino acids and carbohydrates surrounding the embryo in the megagametophyte fluid were determined during germination and seedling emergence. Soluble sugars were more abundant during the germination phase whereas changes in amino acid composition predominated during the seedling emergence phase. These compounds are being applied *in vitro* to determine which substrates are necessary for inclusion in an artificial megagametophyte for somatic seed.