

A NEW GENERATION OF LIQUID CULTURE BIOREACTORS TO STUDY
PGR'S DURING PLANT ORGAN DEVELOPMENT

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Plant tissue culture protocols largely involve adjusting ratios of synthetic auxins and cytokinins on semi-solid media to stimulate formation of callus, somatic embryos, shoots and roots. Liquid culture creates a more dynamic exchange interface between tissue and media, but requires active management of water and oxygen. A new generation of simple bioreactors, introduced over the last decade, allows relatively simple, reliable and cost-effective means for growth of higher plants in liquid media. Traditional vessel sizes ranging from 50 to 500 ml were generally increased to the 2 - 20 l in these newer systems. Altering size and shape of plant tissue by adjusting the cytokinins and introducing gibberellin-inhibitors (e.g. ancymidol, paclobutrazol) facilitates aseptic handling of plant materials. The rate of solute transfer to the plant, particularly sucrose, was enhanced in liquid systems. Storage organ development, such as micro-tubers, micro-corms, micro-rhizomes, etc., is often promoted by jasmonic acid. The interaction between ancymidol and the increased availability of sucrose has been important to develop efficient systems. Similarly, increased availability of sugars and cytokinins is effective to increase shoot bud division during micropropagation.