

WOZNIAK, CHRIS A.\* and LOWELL D. OWENS. USDA, Agricultural Research Service, P.O. Box 5677 - University Station, Fargo, ND 58105 and Building 006, BARC-West, Beltsville, MD 20705 - Modification of basic tissue culture methods increases regenerative potential of sugarbeet leaf discs.

A comparison of media gelling agents and preparation methods was performed in an effort to enhance the yield of reproductive structures from in vitro leaf disc cultures. Regenerative structures represent plant formation through both organogenesis and somatic embryogenesis from callus produced at the disc periphery. Bacto-agar (0.9%), HGT Agarose (0.7%), ME Agarose (0.7%), Phytagar (0.3%) and Gelrite (0.3%) were used to solidify RV basal medium (Freitag et al.) medium supplemented with 1 mg/L BA. Leaf discs of 7 mm diameter were punched from shoot cultures of clone 'REL-1' and cultured 5/plate. Gelrite and the two agaroses were superior in yield of regenerative structures (300 to 500% increase) and callus dry weight (37 to 155% increase) when compared to Phytagar and Bacto-agar at the given concentrations. Preliminary experiments comparing filter sterilized vs. autoclaved media indicate increases in organogenic callus formation of >70% for filtered medium when culturing leaf discs.

OWENS, LOWELL D.\*, and C. A. WOZNIAK. USDA, Agricultural Research Service, Plant Molecular Biology Laboratory, Beltsville, MD 20705 (Present address of second author: USDA-ARS, P.O. Box 5677, Univ. Stn., Fargo, ND 58105. - Measurement and effect of gel water potential on growth of sugarbeet leaf disks and production of morphogenic callus.

During studies to optimize the production of regenerable callus from cultured leaf disks of sugarbeet (*Beta vulgaris*, line REL-1), we observed large differences associated with the gelling agent employed. The water potential of the gel was found to be a major determining factor. A simple method was devised to measure the relative matric potential of different gels. A precisely moistened filter-paper disk is placed on the gel surface, allowed to equilibrate, removed, and weighed. The relative gain or loss of water from the paper disk is a measure of the matric potential of the gel and varied with both gel type and concentration. Water availability also was affected by the ease with which water is expressed from gels in response to localized pressure caused by expansion and contortion of the leaf disk during growth. Water expressibility was measured with a weight and capillary pipette and shown to also vary with gel type and concentration. By optimizing water availability, more than 150 callus-derived embryos and shoots were produced in a single dish of cultured sugarbeet leaf disks.