SAUNDERS, JOSEPH W.[1*], CHIA-JUNG TSAI[2], and ENRIQUE SAMPER[2], USDA, Agricultural Research Service, Sugarbeet, Bean and Cereal Research, and [2] Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824. - Alternative nitrogen and carbon sources for sugarbeet tissue culture.

Conventional plant tissue culture media contains sucrose as a carbon (C) source and a mixture of nitrate and ammonium as nitrogen (N) sources. In order to identify media for selection of biochemical mutants, we examined the ability of the endogenous beet trisaccharide raffinose and one of its constituent monosaccharides, galactose, to serve as sole C source, and of nitrate, ammonium, glutamine, glutamate, proline, urea, choline and glycine betaine (GB) to serve as sole N source for several modes of culture of clone REL-1 in vitro. Raffinose was similar to sucrose in support of suspension culture plate-out (SP) growth, callus initiation with shoot regeneration from leaf discs, and shoot culture (SC). Galactose was moderately supportive of SP growth but was inadequate for leaf disc callusing and SC. Nitrate, ammonium, glutamine, glutamate, and urea, all at 60 μM N, were moderately supportive of SP and SC growth compared to the nitrate-ammonium mix in Murashige-Skoog medium. Proline was poorly supportive, and choline and GB were nonsupportive. Tissue ability to utilize raffinose, glutamine and glutamate may preclude their use as N source in media to select for biochemical mutants that accumulate less of these processing impurities. GB utilizing mutants, might, however be selectable with GB as sole N source.