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Somatic embryogenesis has been reported anecdotally several times in sugarbeet. However, development of procedures for maximum production of somatic embryos is needed if they are to be used in gene transfer or even in artificial seeds. In model clone REL-1, a low frequency of somatic embryogenesis (about one embryo per ml of suspension) was elicited following a plating-out onto hormone free MS medium of fresh suspension culture cells grown with hormone free MS medium. The inclusion of 0.1 or 0.3 mg/l ABA in the plate out medium increased the number of somatic embryos in this system. The highest average somatic embryo yield achieved was 15/ml of suspension plated out on the combination of NAA (1mg/l) and ABA (0.1 mg/l). After 22 to 40 days, various stages from globular, heart, or torpedo shaped embryos to mature opaque white embryos with cotyledons and radicles were present at the surface of the callus tissue. The external morphology of several somatic embryos was examined by scanning electron microscopy. The somatic embryos developed into normal plantlets, including betalain pigmentation on hypocotyls, after being transferred onto hormone free MS medium. The conversion rate of somatic embryos of different lengths (1, 2, 3 mm) into complete plantlets was 78%, 81% and 85%, respectively. Secondary embryogenesis, helpful for the use of embryoids in gene transfer, was not observed in this study.

