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### **Abiotic factors affecting accumulation of betaine in sugarbeet leaves and roots.**

Environmental stresses stimulate accumulation of osmoregulators in plants, including sugarbeet (*Beta vulgaris* L.). Betaine is a compound synthesized in response to abiotic stresses, including high soil saline content and drought. The application of growth regulators implicated in abiotic stress responses, methyl jasmonate (MeJA) and salicylic acid (SA), stimulate increased betaine levels in many plant species. Little information is currently available regarding the effects of abiotic stresses and SA and MeJA on sugarbeet betaine levels. Research, therefore, was conducted to determine betaine levels in sugarbeet seedlings and roots in response to abiotic stress and exogenously applied MeJA and SA. Drought stress significantly increased root betaine concentrations by 156% and 148% in roots of 16-week-old plants at harvest and after 12 weeks in storage, respectfully. In seedlings, betaine concentrations were elevated by 520% in response to drought and 321% in response to high saline conditions. When sugarbeet seedlings were treated with 0, 0.1, or 1 mM SA or 0, 0.1, or 10 µM MeJA, only the SA treated beets had significantly higher betaine than the untreated controls. Overall, these results demonstrate that sugarbeet betaine concentrations increase in roots and seedlings in response to drought, and in seedlings in response to salt stress and exogenous application of salicylic acid.