

Mineral nutrition of jojoba explants *in vitro* under sodium chloride salinity

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Abstract

Jojoba (*Simmondsia chinensis* (Link) Schneider) explants were cultured *in vitro* on a basal medium supplemented with sodium chloride up to 169 mM during the proliferation stage. At the second and third month of salinity stress, the mineral nutrition (macro- and micro-elements) of the explants was assessed. Explants accumulated significant amounts of sodium and chloride (jojoba is an ‘includer’) while potassium, manganese, phosphorus and nitrate concentration was reduced. The concentration of the other elements did not exhibit significant changes. Each level of salinity stress affected the nutrient status of the explants distinctively. Jojoba explants tolerate salinity up to a level of sodium chloride concentration (113 mM), without showing any stress symptoms. Above this level, the salinity stress impact was observed as succulence and chlorosis of leaves and shoots.

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1. Introduction

Salinity limits the production of agricultural lands all over the world, so that salinization of the soil has become an increasingly important topic (Watanabe et al., 2000; Flowers and Flowers, 2005). Few crop plants can be grown successfully in saline soil, where other crop productivity is markedly low, so saline land is rarely used as farmland. Research is driven by the hope of improving crop yield and performance in afflicted areas (Rout and Shaw, 2001). Therefore, there is absolute need for salt-tolerant cultivars or species to bring the poorly utilized saline lands into proper cultivation (Khan et al., 2000).

Since many years renewed interest in commercial cultivation of jojoba has begun due to the useful properties of its liquid wax in the pharmaceutical, cosmetic and lubricant industry together with some other important plant characteristics (Botti et al., 1998; Mills et al., 2001). Among the various characteristics of this species is its drought and salt tolerance,

which make this crop a profitable alternative for arid and semi-arid zones around the globe (Mills et al., 1997).

Although jojoba’s salt tolerance is widely recognized little is known about the relative influence of salinity on ion uptake. Before an important step to be made, it is necessary to understand the biochemical functions and molecular mechanisms of salinity tolerance in plants, so that this property can be introduced in the future in species of interest through genetic engineering, if possible (Rout and Shaw, 2001).

In the present study, the relative response of jojoba explants to various levels of sodium chloride salinity *in vitro* is examined, regarding ion uptake. *In vitro* nodal segments of jojoba respond to salinity in a similar way as the whole plant (Mills and Benzioni, 1992). Based on this fact, it is possible to examine the species response and adaptation reactions to salinity *in vitro* and use this information in an open land cultivation. It is well known that *in vitro* culture is an efficient and fast plant propagation technique. Therefore, tissue culture technique could be used in experiments with abiotic stress factors on jojoba, as the forthcoming plant response is stated to be the same of a mature outdoor growing plant, spending though much less time in order to be leaded to valuable conclusions.

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