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SUCROSE/H^+ AND GLUCOSE/H^+ SYMPORTS AT THE PLASMA MEMBRANE OF LATICIFEROUS CELLS AND PROTOPLASTS OF *HEVEA BRASILIENSIS*

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Polyisoprene synthesis in ethylene stimulated laticiferous cells of *Hevea brasiliensis* requires an exogenous supply of sugar. Plasmodesmata are absent from these non chlorophyllian cells. The transplasmalemmal electrical gradient recorded at steady state was about-115 mV for laticiferous cells and -36 mV for laticiferous protoplasts. Sucrose and glucose depolarize the plasmalemma of laticiferous cells by about 15 to 25 mV and by about 1 to 7 mV of laticiferous protoplasts. Results show that with depolarization due to sucrose (1 mM) or glucose (1 mM), a slight alkalinization (0.1 to 0.2 pH units) can be detected on the outer surface of the cell. Fructose and 3-0-methyl-glucose have no such effect. The extent of depolarization due to the addition of sugars is lower than the electrogenic component of the membrane potential produced by the functioning of the H^+-excretion pump (vanadate sensitive-ATPase). Furthermore, in presence of vanadate or DNP, no shift in pH value was observed with glucose or sucrose. The effect of phlorizin on the shift of the membrane potential due to sugar uptake across the plasmalemma has been tested. Neither sucrose nor glucose demonstrate any depolarization and alkalinization in the presence of phlorizin. Stimulation of the H^+-pump by ethylene hyperpolarizes cells by approximately -40 mV and increases the extent of the depolarization induced by sugar transport. Even without the cellwall, with laticiferous protoplast, glucose and sucrose induce depolarization of plasmalemma. On these protoplasts, sugars do not induce any depolarization in the presence of DNP. These results suggest an active transport of the sugars from the apoplasm towards the cytosol. Evidence for the existence of H^+ cotransport with sucrose and/or glucose at the plasmalemma is discussed.

Key words: *Hevea brasiliensis*, Ethylene, Phlorizin, Membrane potential, Proton/sugar symports, Laticiferous cells, Laticiferous protoplasts.

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INTRODUCTION

The exogenous supply of sugar necessary for the polyisoprene synthesis in laticiferous cells could be a limiting factor in the production of rubber (Backhaus, 1985, Tupy, 1985). During tests conducted in plants with labelled molecules, it was shown that following the application of ^{14}C-sugars (sucrose, glucose and fructose the label appeared rapidly (<30 min) as sucrose in laticiferous cytosols. Ethylene was found to stimulate this incorporation and subsequently the production of rubber (Lacrotte *et al.*, 1985). Since plasmodesmata are

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