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THE ROLE OF SOME SALINITY RELATED GENES AND THEIR EXPRESSION IN RICE (ORYZA SATIVA).

V. ARIYA SUMANASINGHE

Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya, Sri Lanka

Salinity has become a serious problem in the rice cultivation in Sri Lanka, especially along the Southern coastal belt.

The expression of several salinity related genes which will be valuable in breeding programmes was evaluated by Northern hybridisation.

Three genes, SOD (superoxide dismutase), P5CS (pyrroline-5-carboxylate synthatase) and ERD5 (early response to dehydration) were subjected to investigation. Four rice varieties with different reactions to salinity, Pokkali, Nona Bokra, Bankat and IR 28, were grown in a hydrophonic culture and, 24 day-old seedlings were treated with an appropriate saline solution to obtain the salinity level EC=12 dSm^{-1}. The leaf samples were harvested at 0, 6, 12, 24, 48 and 72 h intervals after subjecting varieties to salinity stress. Ten μg of total RNA was electophoresed on a formaldehyde-denatured agarose gels and hybridised with the relevant DNA probes. The probes were prepared by PCR using their specific primers, cloning in the pBlueScript and, then subjecting to polyethylene glycol purification after restriction digestion from the vector. Signal detection was on the basis of chemifluorescence (CDP-Star, Amersham, UK).

In general, the expression of the genes was strong with tolerant varieties Pokkali and Nona Bokra and poor with the susceptible variety IR 28. The transcript appeared at 12 h and reached a peak between 24-48 h with P5CS, and Zn SOD. The strongest expression was observed with Zn SOD, and specifically with Pokkali. No transcript was detected with ERD5, a proline metabolic gene, in any variety or at any stress level.

It is suggested that increase of proline production by P5CS and stimulation of oxygen detoxification by Zn/Cu SOD are mechanisms to defend rice plants against salt stress.