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## Amelioration of Salt and Drought Stress Through Application of Exogenous Melatonin in Rice (*Oryza sativa* L.)

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### [Introduction]

Rice (*Oryza sativa* L.) is one of the major staple food and widely cultivated throughout the World, and about half of the World population depends upon rice. Climate change is one of the major notable problem that alters the climate pattern, resulting in droughts and extreme weather events. Soil salinity is an environmental factor growing in Magnitude in the rice growing areas due to the combine effects of high temperature, drought, sea level rising and inferior agriculture practices. Melatonin is a common biological hormone that has an effective strategy to induce crop tolerance against abiotic and biotic stresses, especially drought and salt stress.

### [Materials and Methods]

Rice seeds of Ilmi cultivar were sterilized with 0.5% sodium hypochlorite for 10 min and then washed 3 time with distilled water. The seeds were soaked for 5 days and then transferred to plastic pots. After 2 weeks 100 $\mu$ M of melatonin was applied to the seedlings, and then 100mM of salt and 10% PEG were applied after 1 week of the treatment of melatonin. Samples were taken at 0, 6, 12, 24, and 48 hours to check the gene expression.

### [Results and Discussion]

A total of 8 samples were taken including control, melatonin, salt, drought, salt+drought, salt+ melatonin, drought+ melatonin and salt+drought+melatonin. RNA was extracted and the cDNA was synthesized for PCR. Two drought stress genes (*OsHAL*, *OsDREB*) and two salt stress genes (*OsNHX*, *OsSOS*) were selected for gene expression.

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