ICAR-NRM-CCARI-Protocol-2024-076
CCARI/Certified Technologies/2024-8

PROTOCOL FOR SALINITY STRESS PHENOTYPING OF RICE USING SPECTROSCOPY AND MACHINE LEARNING MODELS
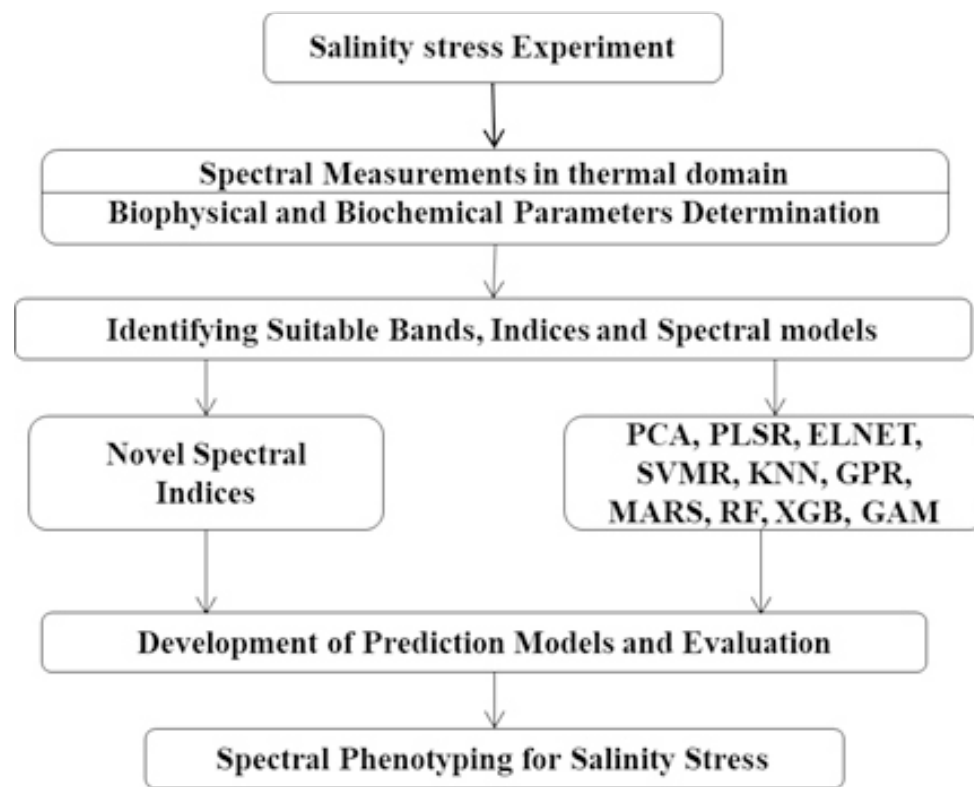
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TECHNOLOGY DETAILS

- Spectral signature of leaf samples from 56 salinity stress tolerant and sensitive rice genotypes were collected at maximum tillering and flowering stage in visible and near-infrared (VNIR) domain
- The spectral reflectance data and rice leaf potassium, sodium, calcium, magnesium, iron, manganese, zinc and copper concentration were analyzed for optimum index identification and multivariate model development
- Solo partial least square regression (PLSR), PLSR- and principal component analysis (PCA)-combined machine learning models were tested
- The correlation of best performing model predictions with observed data varied from 0.823 to 0.934 with Ratio of performance to interquartile distance (RPIQ) ranging from 2.193 to 4.467
- This will lead to fast, nondestructive characterization of large number of rice germplasms for salinity stress. The identified salt tolerant genotypes can be incorporated in salt stress breeding programme in future

PUBLICATION

- Das, B.*, Manohara, K. K., Mahajan, G. R., & Sahoo, R. N. (2020). Spectroscopy based novel spectral indices, PCA-and PLSR-coupled machine learning models for salinity stress phenotyping of rice. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 229, 117983. https://doi.org/10.1016/j.saa.2019.117983 (NAAS Rating: 10.83)

Steps in salinity stress phenotyping of rice

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INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

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of

ICAR-CCARI, Goa

has developed the technology

Protocol for salinity stress phenotyping of rice using spectroscopy and machine learning models

16th July, 2024
New Delhi

(Rajbir Singh)
Assistant Director General (AAF&CC)

(S.K. Chaudhari)
Deputy Director General (NRM)