

## SIIC076

### APPLICATION OF ARTIFICIAL NEURAL NETWORK ON PREDICTION OF MICROBIAL POPULATION AND SPECIES DURING SPONTANEOUS FERMENTATION OF CARICA PAPAYA LEAF

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#### **Abstract:**

Microbial population and species during spontaneous fermentation process of Carica Papaya leaf was unpredictable. Therefore, the Artificial Neural Networks (ANNs) method was used in this research because of the non-linearity pattern of the experimental data obtain. The parameter involve are the day of fermentation (1-100) days and the volume of water sample used (5L and 50L) as the input. The suitable of transfer function were used which are Levenberg Marquardt (trainlm) as training function and hyperbolic tangent sigmoid (tansig) as activation function to get the best performance model. The number of hidden layers to use was maximize into two hidden layers (multiple hidden layer) and the number of neurons was specified as seven neurons where can achieved the optimum model with using of the feedforward algorithm. The parameter of the output layer as the experiment data was the microbial population and the species of the C. Papaya leaf. Lastly, determining the best performance model were referring to their lower relative error percentage with correlation coefficient (R value) approach to one (1) and the least number of Mean Square Error (MSE).

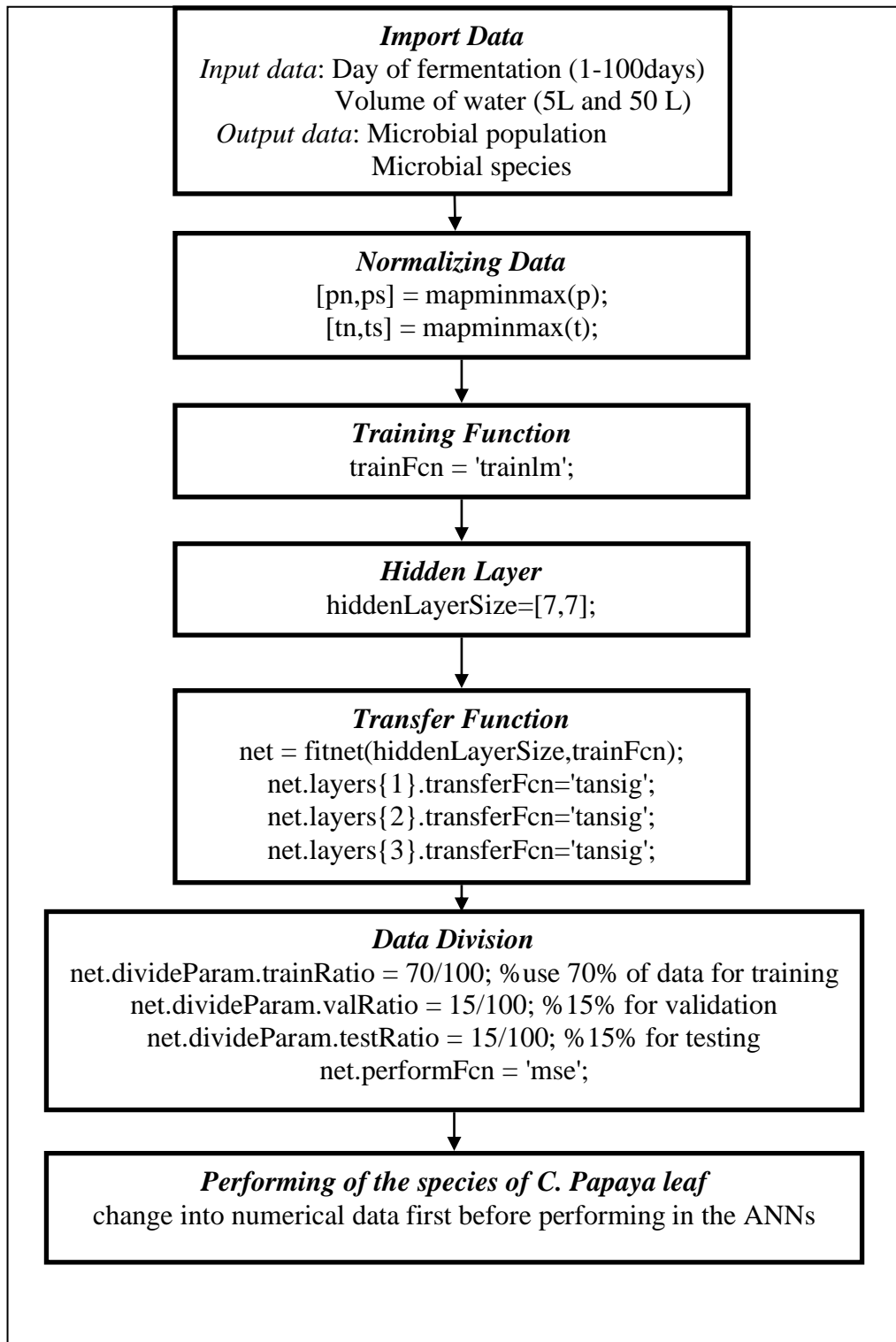
#### **Keywords:**

Artificial Neural Network, Levenberg Marquardt, Hyperbolic Tangent Sigmoid, Correlation Coefficient (R value), Mean Square Error (MSE)

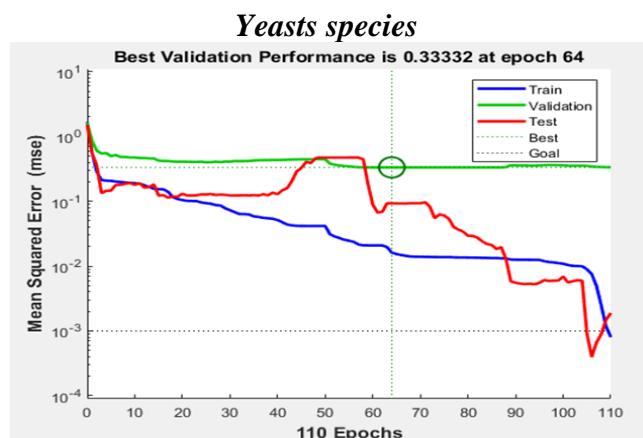
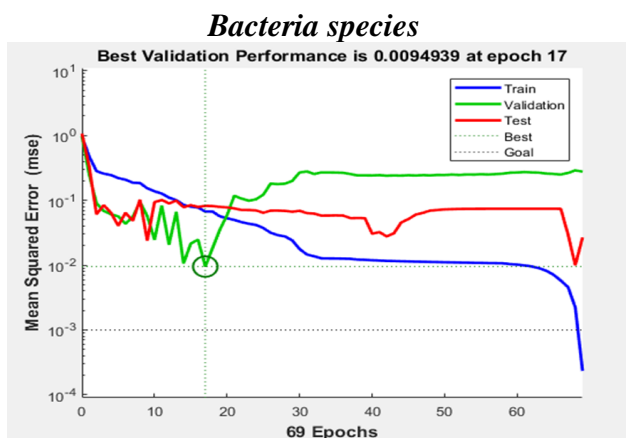
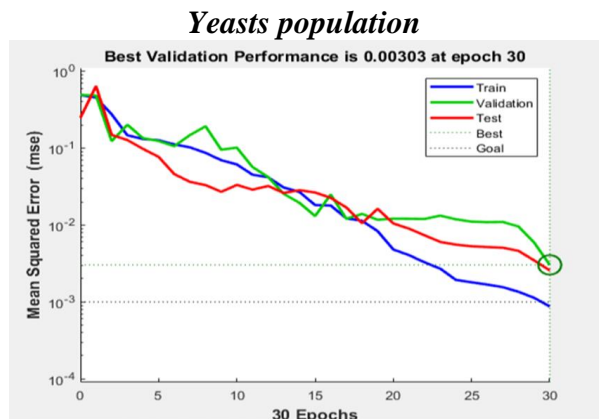
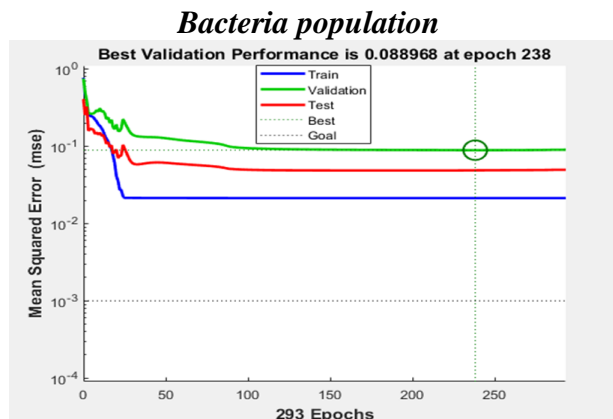
#### **Objectives:**

- To develop Artificial Neural Network (ANN) models for the prediction of microbial population and species during spontaneous fermentation of C. Papaya leaf.
- To compare the statistical performance of different Artificial Neural Network (ANN) architecture for the prediction of microbial population and species during spontaneous fermentation of C. Papaya leaf.

**Methodology:**



**Results:**



**Conclusion:**

Feedforward multilayer artificial neural network was successful become effective tool to predict the microbial population and species of Carica Papaya Leaf during spontaneous fermentation. There are two hidden layers with the optimum number of nodes which is seven nodes was achieved the best performance model for population and species case. This performance was proving that nonlinear data with bigger data of input and output is suitable by using multiple hidden layer which optimize in shorttime and faster for convergence better than using single hidden layer. Hence, the using of Levenberg Marquadt (TRAINLM) as training function and hyperbolic tangent sigmoid (tansig) as transfer function also related to the performance of neural network which refer to the Mean Square Error (MSE), correlation coefficient (R-value) and relative error.