

Development of model for the prediction of moisture content of wheat using artificial neural networks

Narayana Saibaba K.V¹, P. King², D. Appala Naidu², R. Gopinadh¹, Ravi Vital Kandisa¹ and D. K. N. Lakshmi³

¹Department of Biotechnology, GITAM University, India

²Department of Chemical Engineering, Andhra University, India

³Gayatri Vidya Mandir, India

Wheat is one of the important staple foods in all over the world because of its agronomical adaptability; ability of its flour to be made into various food materials and ease of storage. Based on FAO information, wheat is the second most produced food among the cereal crops in the world. Knowledge of various physical properties of wheat grains is essential for the designing of efficient equipment for handling, harvesting, aeration, drying, storing, grinding and processing. These physical properties depend on factors such as size, form, and moisture content of the grains. Knowledge of the heat and mass transfer properties of food grains also is important in the analysis and prediction of their behavior during processing, handling and storage. Optimum utilization of heat and mass transfer processes is very critical in processing operations such as steeping, blanching, cooking, washing and drying of food grains. Some of these operations such as malting involve hydration and some involve dehydration such as drying. Moisture present in food grains also influence the growth and reproduction of most bacterial and fungal plant pathogens so a forecasting model needs to estimate moisture characteristics on food grain surfaces. Control of this process may be improved with better knowledge of moisture level within the wheat kernel. In designing of equipments for the above said operations requires the knowledge of moisture level in the grain as a function of time and temperature. Hence, in the present study an attempt is made to predict the moisture content in grains with the change in temperature and drying time. Soaking characteristics of wheat grains and kinetics of liquid water sorption was also studied. Optimization of any process requires good model. Thus, Artificial Neural Network (ANN) was developed for the modeling to predict moisture level in the grain at different temperatures and time. The developed ANN was trained and tested with the experimental data obtained and results of ANN obtained during training and testing were based on SOS. Based on error analysis results, the prediction capability of ANN model is found to be good. The results were compared with experimental data and it was found that the estimated oil yield from ANN model was able to predict the yield accurately with R value as 0.92.

Biography

Narayana Saibaba K.V. has completed his B.Tech in Chemical Engineering with Biotechnology as specialization from Andhra University and Masters in Chemical Engineering with Petroleum Refining Engineering as elective from Andhra University. He also completed MBA with dual specialization in HRM and Finance. He is currently pursuing his Ph.D under the guidance of Prof. P. King. He has published more than 15 papers in international journals of repute. His papers also published in the CHEMCON. Prof. P. King published more than 100 papers in reputed journals and serving as editorial boardmember of several repute journals.

kvnsai@yahoo.com