Response to Letter to the Editor: Artificial Neural Network or Common Sense Based on Insight?

Noor Morad · Rohani Mohd Zin ·
Khairiyah Mohd Yusuf · Mustafa Abd Aziz

Dear Editor,

In response to the Letter to the Editor (Artificial neural network or common sense based on insight), the authors identified two issues being raised by Dr. Albert Dijkstra:

1. The relatively high dosage for phosphoric acid being used by the authors, 0.5–1.0 wt%.
2. Process flow diagram practiced in the palm oil industry for combined degumming and bleaching.

In response to this, the authors would like to confirm the following:

1. The dosage of phosphoric acid in the industry is between 0.05 and 0.1 wt%, with an acid strength of between 80 and 85%. Phospholipids are present in relatively small quantities of about 5–130 ppm in palm oil, with a typical level in commercial crude palm oil of between 20 and 80 ppm.

    However, the design of the experiments in this work was done based on 0.5–1.0 wt% with 85% acid concentration. Admittedly, there was an error in the decimal point by a factor of 10 in the design of the experiments of this work involving the dosage of phosphoric acid. This error was unintentional and was only noticed when pointed out by Dr. Dijkstra.

    The method of optimization used and the idea to optimize using artificial neural networks is original and, in the authors' opinion, remains valid.

2. Figure 1 of the manuscript for the combined palm oil degumming and bleaching process is referred. Figure 2 shows the typical palm oil degumming and bleaching process in Malaysia. In principle, the general practice is the pre-mixing of crude palm oil (CPO) with phosphoric acid and bleaching earth in separate pre-mixers prior to entering the degumming and bleaching vessel. There are slight variations in pre-mixing practice from one refinery to another. In some refineries, the acid is being mixed and agitated inside the pipeline. There are static mixers inside the pipeline.

    These methods of mixing, in the authors' opinion, have sufficiently addressed the dispersion of phosphoric acid in palm oil during degumming. However, the

N. Morad (✉)
Mechanical Engineering,
Universiti Teknologi Malaysia (UTM), Skudai, Malaysia
e-mail: azian@ic.utm.my

R. Mohd Zin
Chemical Engineering,
Universiti Teknologi MARA (UiTM), Selangor Darul Ehsan,
Malaysia

K. Mohd Yusuf
Chemical Engineering,
Universiti Teknologi Malaysia (UTM), Skudai, Malaysia

M. Abd Aziz
Faculty of Chemical and Natural Resources Engineering,
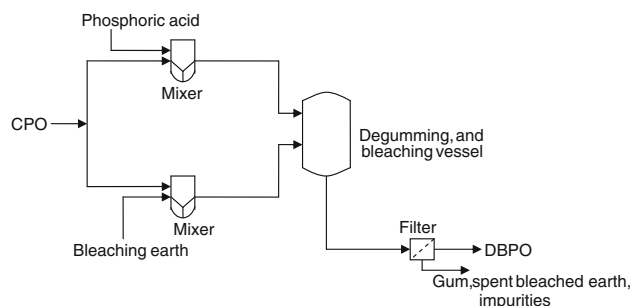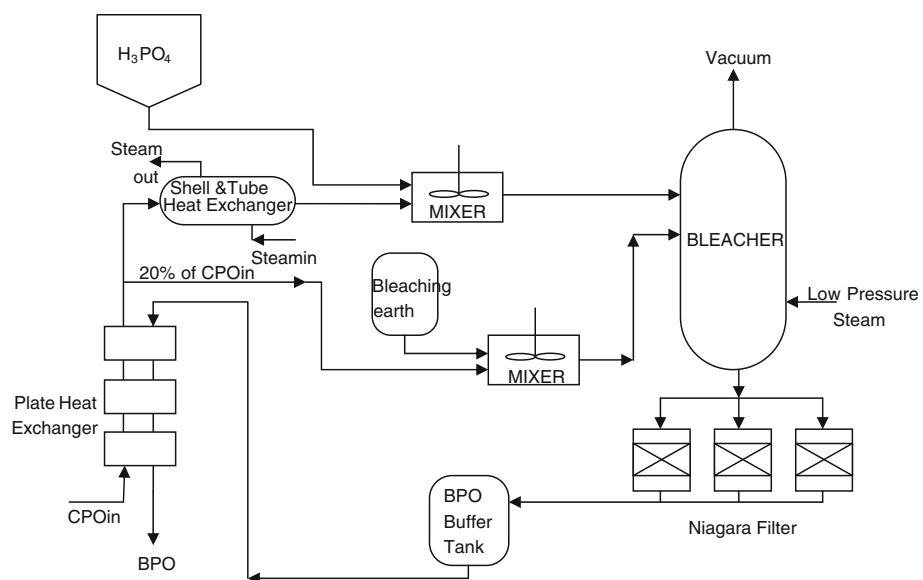Universiti Teknologi Malaysia (UTM), Skudai, Malaysia

Fig. 1 Combined degumming and bleaching process of palm oil

Fig. 2 Typical palm oil refining process

dispersion of phosphoric acid in palm oil is not the subject of our study.