Process Design For Ethyl Lactate Production

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Goal 1: Literature Review

- Going through literature to find existing processes and ideas
- Get preliminary understanding of kinetics and VLE

Goal 2: Kinetics Study

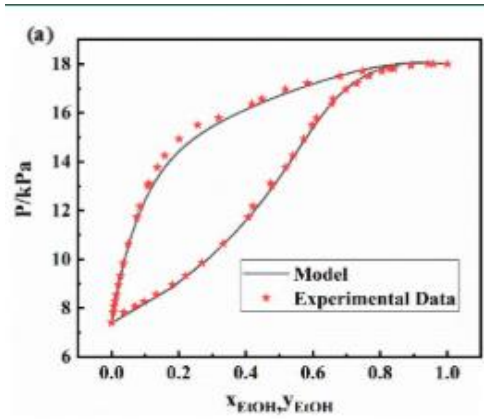
- Experiments on lab scale in batch and continuous reactors to get actual kinetics

Goal 3: Modelling & Optimization

- Proposal of a new and simpler process
- Use of Aspen to model and Optimize the process of Reactive Distillation

GOAL 4: Implementation

- Startup of a pilot scale unit
- Experiments to ensure equality at pilot scale and modelling scale



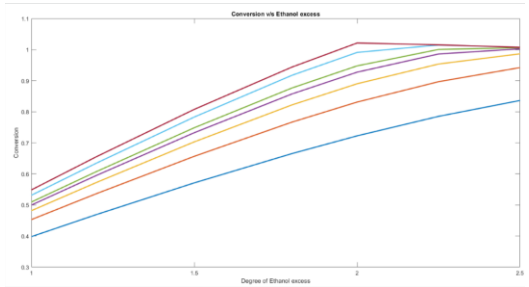
$$L_1 + EtOH \underset{k_1/K_1}{\overset{k_1}{\rightleftharpoons}} L_1E + H_2O \quad (1)$$

$$L_2 + EtOH \underset{k_2/K_2}{\overset{k_2}{\rightleftharpoons}} L_2E + H_2O \quad (2)$$

$$L_3 + EtOH \underset{k_3/K_3}{\overset{k_3}{\rightleftharpoons}} L_3E + H_2O \quad (3)$$

$$L_2 + H_2O \underset{k_4/K_4}{\overset{k_4}{\rightleftharpoons}} 2L_1 \quad (4)$$

$$L_3 + H_2O \underset{k_5/K_5}{\overset{k_5}{\rightleftharpoons}} L_1 + L_2 \quad (5)$$



Note: Some images are cropped while others are representative due to confidentiality reasons

Image Source: (Sakhre, 2019)