

SCREENING PROPYLENE DERIVATIVES IN SAUDI ARABIA USING A LINEAR PROGRAMMING MODEL

Adnan M. Al-Amer*

Abstract

A binary linear programming model has been formulated for the purpose of feasibility screening and planning of petrochemical opportunities. This model incorporates the relevant objective function to the region of maximizing the added value, new and different variables and constraints, and more accurate estimates of production costs based on local conditions. This model has been applied for the screening of propylene derivatives in Saudi Arabia. The model was solved using Hyper Lindo software.

The input data to the model include petrochemical derivatives from propylene with their relevant production technologies, capacities, local production costs, and selling prices.

Production costs based on Saudi conditions for propylene derivatives using various technologies have been calculated and results are reported. The solution of the model gave the recommended derivatives under different scenarios of available capital investment and feedstock and the results are presented. The selected opportunities include polypropylene, propylene oxide, and acrylic acid.

Sensitivity analysis revealed the range of available capital and raw material under which the results from the model were valid.

Introduction:

One of the unique characteristics of the petrochemical industry is the great interaction among feedstocks, technologies, and products and byproducts. For the production of many petrochemicals, there may be more than one process technology involving different combinations of feedstocks and by-products. Several alternative derivatives (with different capacities) can be derived from a certain petrochemical feedstock. The supply/demand situation and competitive production depend on the specific opportunity and is sometimes location-specific.

* Department of Chemical Engineering, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia