



# Evaluation on the effects of wax inhibitor and optimization of operating parameters for wax deposition in Malaysian crude oil

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## ABSTRACT

The complex phenomenon of wax deposition subject to thermal gradient in crude oil is one of the biggest challenges in petroleum industry. In this comparative study, two inhibitors which were poly(ethylene-co-vinyl acetate) (EVA) and xylene were investigated in terms of rate of wax deposition in Malaysian crude oil using one-factor-at-a-time (OFAT) approach and cold finger methods. Stirring rate and cold finger temperature were optimized using response surface methodology (RSM) after being investigated using OFAT. It can be concluded that EVA had higher capability of reducing wax in two different conditions where the minimum point of wax reduction was found at 400 rpm with 63.5% paraffin inhibition efficiency (PIE) and 10°C with 64.7% of PIE. The amount of waxes collected for each parameter were 0.35 and 0.49 g, respectively. To minimize the wax deposit amount, RSM approach was applied using rotatable central composite design (CCD). The result shows that the amount of wax deposit decreased significantly with the increase of temperature and the stirring rate which were set at 400 rpm and 19°C, respectively. The amount of wax deposit was successfully reduced to the minimum value of 0.0095 g after the optimization.

## KEYWORDS

wax deposition; cold finger; response surface methodology; paraffin inhibition; poly(ethylene-co-vinyl acetate)(EVA); xylene; optimization