

Performance evaluation of Polyol esters from palm oil as a lubricant for bentonite suspension drilling fluid

ABSTRACT

This study evaluated the potential use of three polyol esters (POEs) derived from palm oil as a lubricant in bentonite suspension drilling fluid. Three different POEs were investigated, which are pentaerythritol ester (PEE), trimethylolpropane ester (TMPE), and neopentylglycol ester (NPGE). It was revealed that POEs reduced the coefficient of friction (COF) in bentonite suspension by more than 80%. However, TMPE and NPGE undesirably caused foaming and altered the gel texture of the suspension. PEE showed the best performance as it produced the highest lubricity and the lowest effect on the suspension texture. The decrease of COF might increase the drilling efficiency and prevent the lubricity-related drilling problems. The findings of this investigation will be used for future applications of POE from palm oil in wider mud formulation.

Keyword: Drilling fluid; Bentonite suspension; Polyol ester lubricant; Mud lubricity; Tribology