

Abstract

Red fruit oil (RFO) can be extracted from fruits of *Pandanus conoideus*, Lam., an endogenous plant of Papua, Indonesia. It is a commonly used essential original traditional medicine. By applying a newly developed quantitative ^1H NMR (qNMR) spectroscopy method for quality assessment, a simultaneous determination of the saponification value (SV), acid value (AV), ester value (EV), and iodine value (IV) in RFO was possible. Dimethyl sulfone (DMSO_2) was used as an internal standard. Optimization of NMR parameters, such as NMR pulse sequence, relaxation delay time, and receiver gain, finally established the ^1H NMR-based quantification approach. Diagnostic signals of the internal standard at $\delta = 2.98$ ppm, SV at $\delta = 2.37$ – 2.20 ppm, AV at $\delta = 2.27$ – 2.20 ppm, EV at $\delta = 2.37$ – 2.27 ppm, and IV at $\delta = 5.37$ – 5.27 ppm, respectively, were used for quantitative analysis. The method was validated concerning linearity ($R^2 = 0.999$), precision (less than 0.83%), and repeatability in the range 99.17–101.17%. Furthermore, this method was successfully applied to crude RFO, crude RFO with palmitic and oleic acid addition, and nine commercial products. The qNMR results for the respective fat values are in accordance with the results of standard methods, as can be seen from the F - and t -test (< 1.65 and < 1.66 , respectively). The fundamental advantages of qNMR, such as its rapidity and simplicity, make it a feasible and existing alternative to titration for the quality control of RFO.

Keyword: Quantitative ^1H NMR - Saponification Value - Acid Value - Ester Value - Iodine Value - Red Fruit Oil