

Investigation of Indicator Effect in FFA Content Determination of Corn Oil by Automated Flow Injection Analysis (FIA) Method

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The quality of edible oils is determined by various factors and free fatty acid (FFA) is one of the most frequently determined quality indices during production, storage, and marketing (price dictated by FFA content).

Currently, FFA is determined by official method (manual titration) of the sample against potassium hydroxide in hot 2-propanol solution, using phenolphthalein as indicator (AOCS-Ca 5a-40). As other official methods, this method also has some disadvantages such as *long time necessity, consumption of big amount of solvent, increased cost and danger* for environment.

The present work describes a automated flow injection analysis (FIA) system adapted to direct free fatty acid (FFA) content of corn oil samples. FFA is expressed as milligrams KOH required to neutralize free acids in 1g fat or oil sample [1].

In this study, Agilent HPLC system was modified by settling of reaction coil instead of analytical column and used for determining of FFA content in corn oil. To perform desired reaction, 3 μL of oil sample was injected between two reactive zone in μL level and n-propanol solution was used as carrier phase. The effect of two indicators, phenolphthalein (PHP) and bromothymol blue (BTB), was investigated and observed significantly effective parameter. Besides, some parameters were also optimized such as *selective of wave length, reaction coil, carrier flow rate and concentration of reagent in carrier phase*. Oil samples prepared between definite FFA value (according to AOCS method, FFA; $0,09\pm 0,02$ and $2,42\pm 0,02$ mg KOH/g oil) were used for exhibiting of ascendancy of flow injection. The proposed method is based on the linear relation between the %FFA content and the area of the FIA peak. The increase in the absorbance at 580 for PHP and 600 for BTB nm indicators is measured. Results are given as % oleic acid (9-octadecenoic acid).

References

[1] Tetsuo Fuse, Fumiyo Kusu, Kiyoko Takamura "Determination of acid values of fats and oils by flow injection analysis with electrochemical detection" Journal of Pharmaceutical and Biomedical Analysis 15 (1997) 1515-1519.