CHAPTER IV

CONCLUSION

A series of five diester compounds were synthesized by reaction of carboxylic acids and five alcohols which were methanol, ethanol, isopropanol, butanol, 2-ethyl-1-hexanol in sulfuric acid. The carboxylic acids were obtained from ozonolysis of palm oil followed by oxidation with hydrogen peroxide and formic acid. These ester compounds were obtained in good yield(> 75 %). They were purified by silica gel column chromatography(20 % chloroform in hexane), characterized by GC-MS, FT-IR, ^{1}H-NMR, ^{13}C-NMR.

The mixed ester compounds were tested as marker in diesel fuel at concentration of about 400-500 ppm. Detection method was developed for field test by observing color formed from the reaction with hydroxylamine and ferric chloride. It gave violet color complex.

Gas chromatographic analysis indicates different pattern of each mixed ester compounds. This should imply finger print for this type of diesel marker by GC, GC-MS and GC-FTIR. Unfortunately, the retention times of these ester fall in the same region to those of diesel sample. Therefore, it obcures the detection of these esters. Moreover, the small treat rate of these esters to diesel fuel and low sensitivity of detection make these type of diesel marker not attractive. Even at 10000 ppm as in example of mixed butyl ester, the peak in GC chromotogram is barely seen.

suggestion for furture work

This resecrch provides primary information on the posibility of using palm oil as an oil soluble part in incorporating other functional groups as diesel marker. Further development should be done on finding suitable functional groups which their chemistry are well defined for qualitative and quantitative analysis. Such functional groups should be easy to obtain with reasonable price and provide unique pattern in laboratory analysis.