



CHAPTER I

INTRODUCTION

At present, a large quantity of fuel oil has been used in several processes. Fuel oils provide power for automobiles, airplanes, factories, farm equipments, trucks, trains and ships. Fuel oils also generate heat and electricity for many hours and business places. The largest share of fuel oil used is mainly in the transportation related industries. Fuels for transportation include gasoline, diesel fuel, and jet fuel.

Before using, fuels have to be taxed according to the government rate. However it is learned that smuggling of untaxed oil or mixing high-rate taxed oil with lower rate or untaxed oil have been problems for a long time. For examples, there were reports on using smuggled diesel oil in fishing boat, mixing kerosene with lower-rate taxed in diesel oil or mixing of kerosene or diesel oil in gasoline, etc. The counterfeit fuels alter the quality of the specified grade of fuels and lower the amount of tax payment that the Government expected to receive. The Government, nevertheless, could not find way to solve this problem because of its inability to explicitly differentiate the oil.

At present, the physical quality of fuels have been used as a mean to identify grade or type of fuels. This is not sufficient to explicitly differentiate the oil. The chemical quality should be another mean to solve the problem by identifying the chemical substance within the fuels. The marker dye, as a chemical substance was used by adding into target fuels, i.e. high speed diesel oil, premium

grade gasoline, at low-level which have no effect to physical properties of fuels. It will be monitored and detected, with specific method, by authorized responsibility.

Purpose of Research

The purpose of this research is to study synthesis marker dyes made from cashew nut shell liquid coupling with chloroaniline and the effect of substituent of diazonium salt on the color of marker. Moreover, method for monitoring marker dyes in field test and laboratory, will be developed.

Scope of research

In this research, the coupling reaction of cashew nut shell liquid and 2-chloroaniline, 3-chloroaniline, 4-chloroaniline, 2,3-dichloroaniline, 2,5-dichloroaniline, 3,4-dichloroaniline were investigated. The marker dyes were characterized by FT-TR and NMR and quantified by UV-VIS-Spectroscopy.