

**Theme: The application of the FTIR Spectroscopy and Chemometric tools in the quality control of petroleum products marketed in Morocco.**

**Name : BARRA Issam**

## **Abstract**

Today, petroleum products represent one of the main human needs. Consumers are increasingly demanding higher quality products that meet their specific needs.

Certifying the quality of oil derivatives and meeting the regulatory requirements involves the completion of about twenty physic-chemical tests that require specific devices known for their expensive price, sophistication and their distracting nature.

The interest in Fourier Transformed Infrared Spectroscopy (FTIR) has been growing thanks to improvements in instrumentation, the development of the ATR accessories that simplifies the spectra recording and computing advances.

Chemometric tools that use mathematical and computer methods to visualize, extract and process the information contained in the infrared spectra have shown great ability to provide powerful models for classifying and predicting the quality parameters of petroleum products.

The aim of this thesis was to set up chemometric models of classification and prediction based coupling of Fourier transform infrared spectroscopy and chemometric tools.

On the one hand the two classification models (PLS-DA), the first for the detection of smuggled diesels and the second to authenticate diesel samples from four suppliers, demonstrated a great selectivity and the classes was predicted without error. On the other hand, the calculated prediction models generate, in all cases, good regression results. They were characterized by very significant  $R^2$  values, and low RMSEP prediction errors.

### **Keywords:**

Chemometrics; Analytical chemistry; petroleum products; quality control.