INTRODUCTION

Initially, most private households used to dispose of their used cooking oil by flushing it down the sink while used cooking oil in industry was transported to the manufacturer as raw material to produce feed to be used in farming or soap. All too often used cooking oil is improperly disposed of by washing these messy, greasy residues down the kitchen plumbing system or by dumping it down the storm drain system. Improperly disposing of leftover used cooking oil may cause property damage, health hazards and environmental problems. Pipes may be blocked by oils poured directly into the sink, even if diluted with hot water. Polluted storm water runoff can lead to excessive and costly maintenance and
cleanup and could result in severe fines from State and Federal regulatory agencies. Stringent Malaysian legislation promotes the application of novel recycling technologies capable of absorbing large amounts of waste inclusive waste cooking oil.

The aim was to determine the properties of used cooking oil using some selected techniques for consideration of future potential as raw material for biofuel production.

**EXPERIMENTAL**

**Raw Material**

Used cooking oil (palm oil) was obtained from Faculty of Hotel and Catering, Universiti Teknologi MARA. The sample was first heated in the oven at 100-110 °C for 10 minutes to remove the moisture. Meanwhile, other sample was heated in the furnace at temperature 550 °C for 4 hours to determine the ash content.

**Analysis of Heavy Metal**

The sample was analyzed using Atomic Absorption Spectrometer (Perkin Elmer) to determine the heavy metal content using Cadmium, Chromium, Nickel and Plumbum lamp. The level of detection is ppm range. The standard were prepared at 1ppm, 2ppm, 3ppm, 4ppm and 5ppm. The samples were prepared according to MPOB Test Method.

**Calorific Value**

The samples was placed in the autosampler and analyzed by Bomb Calorimeter (IKA_Werke; Adibatic Mode for 25 minutes).

**RESULTS AND DISCUSSION**

**Proximate Analysis**

- Fixed carbon= 100-(%ash + %moisture + %volatile matter)
- volatile matter and moisture= 0.078
- ash content= 0.003
- fixed carbon= 99.919

Low moisture and volatile content indicates the used cooking oil doesn’t need pretreatment to remove the moisture prior processing and high fixed carbon indicates it rich with carbon content.

**Calorific value**

Calorific value (CV) for used cooking oil= 38.314MJ/kg

CV of used cooking oil higher than municipal solid waste (~14 MJ/kg), biomass (~17MJ/kg), empty fruit bunch/ free fruit bunch (~23MJ/kg)

**AAS Analysis**

Standard concentration: 1-5 ppm
- Cr: absence
- Ni: absence
- Pb: absence
- Cd: present at 0.041ppm (Fig. 1)

*Fig. 1: Concentration of Cd in the used cooking oil*
Fig. 2: GCMS Analysis of used cooking oil

Fig. 3: n-Hexadecanoic acid properties obtained from GCMS library
Further analysis need to be done to detect Cu, Ca, Hg, As and trace metals at ppb level using ICP.

From the Least-square fit procedure, the calibration graph was plotted. It was found that $R^2$ is somewhat close to 1, indicating relative correlation coefficient between the data point.

The used cooking oil was rich with n-Hexadecanoic acid and Oleic acid. This suggested that the cooking oil is subjected as potential raw material for producing biofuel via catalytic cracking. The idea of 'cutting' the long hydrocarbon to the short chain chain using chemical process is however still under way.

CONCLUSION

Besides biomass, used cooking oil is a very potential feedstock for production of bio-oil via pyrolysis regardless on cost perspective. It has high calorific value, low heavy metal content and low moisture. With long chain of n-hexadecanoic (palmitic) acid and oleic acid, it has the potential to be cracked to form shorter chain of hydrocarbon.

REFERENCES