

## Introduction:

Jetropha Seeds are an excellent source of oil to be used in the production of Bio-Diesel. Not suitable for human or animal consumption, Jetropha Seeds are considered a noxious weed in many parts of the world. However the plant is faster growing and survives in poor quality soil with extremes of weather conditions. In Indonesia, Cambodia, Vietnam, Laos and Myanmar, the cultivation and harvesting of Jetropha Seeds offers a potential windfall for many farmers.

This simple study was conducted to investigate whether NIR Spectroscopy could be used to analyse Jetropha Seeds for oil content.

## Description:

A bag of Jetropha Seeds, approximately 50, was provided. The seeds are black to dark brown in colour and have a dark shell with a white meat. The first test as to place the 50 seeds into a 28mm pathlength sample cell and load the cell into a Cropscan 2000B Whole Grain NIR Analyser. Due to the dark shell there was no discernable spectra generated through the seeds. Half of the seeds were then ground in a mortar and pestle and then cut in a knife blender. The resulting pulp was relatively dry but slightly oily to the touch. The hulls were left in the mix and ground along with the meat. The pulp was placed into a 10mm pathlength Squeeze Cell and loaded into the Cropscan 2000B.

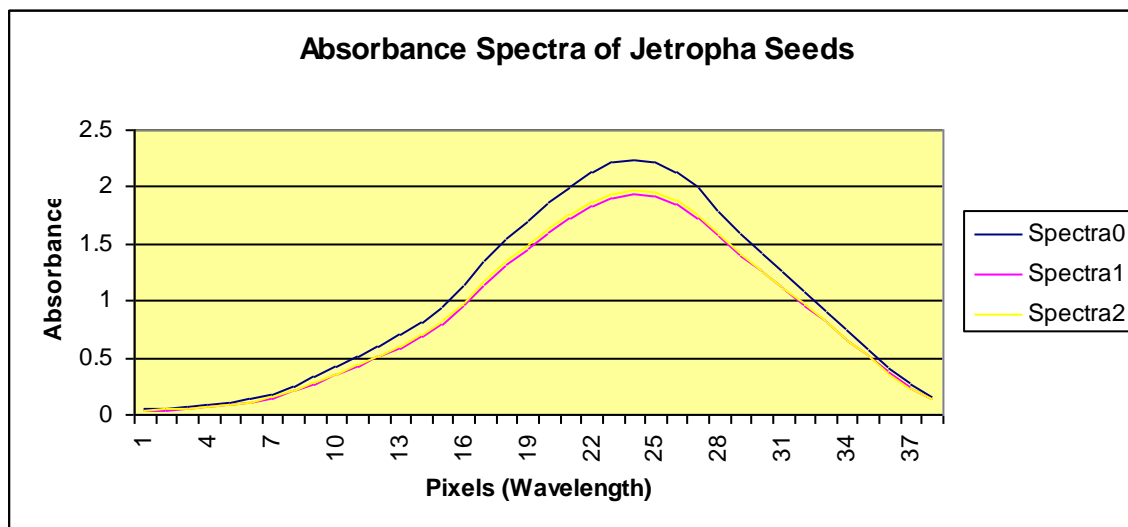


Cropscan 2000B NIR Analyser

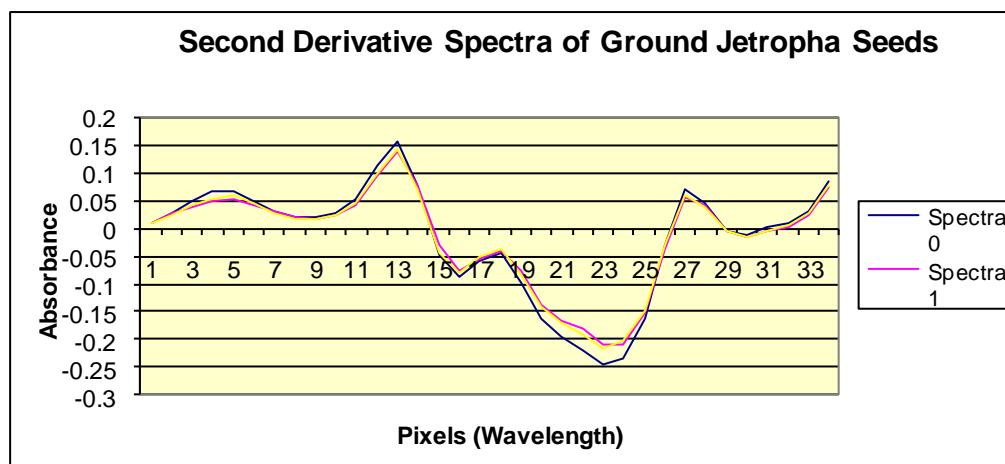


10mm Pathlength Squeeze Cell

Three spectra were collected and are shown below.



It is often beneficial to convert the spectra into the Second Derivative transformation of the Absorbance spectra. The Second Derivative spectra remove the effects of scatter and highlight the absorbance bands.



#### Discussion:

Since there is only one sample of seeds, it is not possible to determine the accuracy of the measurement of oil, protein or moisture in Jetropha Seeds, however the spectra collected shows that the Cropscan 2000B can collect NIR spectra through a sample of ground Jetropha Seed and that the oil and moisture bands are clearly observed in the Second Derivative spectra.

It is therefore considered that a calibration for oil and moisture could be developed for Jetropha Seeds. Approximately 50 samples of seeds need to be analysed for oil and moisture so that a NIR calibration can be developed.

A suitable and rapid grinder would need to be found in order to make the procedure quick and reproducible.