

# RAMAN MICROSCOPY: A VALUABLE TOOL FOR THE NON-DESTRUCTIVE SINGLE GRAIN ANALYSIS OF RAPE SEED

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Oilseed crops are widely applied in the area of food production, livestock feeding and industrial applications. The most important crop for vegetable oil production in Northern Europe, Canada and China is oilseed rape (*Brassica napus*) [1]. To meet the customer's demand the fatty acid composition in rapeseed is being modified using traditional breeding

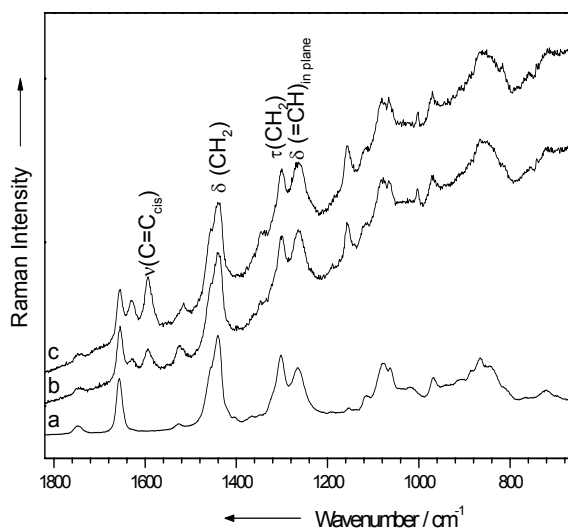


Figure 1: Raman spectra of rape oil (a) as well as Raman spectra of rape oil measured in oil seed (b, c). The unsaturation of the oil can be distinguished by statistical methods.

methods since the 1950s. This leads to rapeseed lines with negligible erucic acid content, high palmitic acid content, high and low content of linoleic acid and high oleic acid. Nowadays plant breeders also use genetic engineering techniques to change the fatty acid composition of rapeseed by introducing non-endogenous genes into rape [2]. It is important to check whether the attribute of the new cultured plant is present in every single seed that is used for further cultivation. Methods like GC-MS can be used to study the oil composition of single seed. The drawbacks of GC-MS are that there is no spatial resolution, it is time consuming and the seed might die as a part of the plant is destroyed (e.g. one cotyledone).

Raman microscopy provides a great potential for a biomedical analysis and quality control of plant tissue. It is possible to obtain structural

information of the tissue as well as information about structure and concentration of biochemical molecules within intact cells, tissues and even plants non-destructively, without extraction.

In this study single grain analysis has been performed by means of Raman microscopy. Figure 1 shows two Raman spectra taken in rape seed without destroying it. In combination with cluster analysis different rape species could be differentiated. Such an analysis can be performed on-site i.e. without removing the plant from its natural environment, therefore allowing to monitor the quality as well as annual fluctuations of the various components.

## REFERENCES:

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