11th International Rapeseed Congress / Copenhagen

Analytical Aspects

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Oral presentations

Sylvia Heift and co-workers investigated the composition of the polar lipids in a range of German B. napus cultivars. The polar lipids were isolated using a cyanopropyl SPE column to make fractions from the meal placed on top of the column and eluted with solvents of increasing polarity. HPTLC coupled with reflectance scanning was used to separate and quantify the subclasses from various polar lipid classes. The results were subjected to statistical treatment that yield a dendogram with clusters that might provide useful information to plant breeders.

Jens Sorenson and co-workers presented information on the use of supercritical fluid technology in lipid analysis. They investigated the use of supercritical fluid extraction to prepare triacylglycerols (TAGs) from seeds or with modifier to extract the more polar lipid components. The TAGs thus extracted could be analysed using enhanced supercritical fluid chromatography - a technique that adds modifiers to conventional supercritical fluid chromatography. The system used both conventional UV detection and evaporative light scattering detection to separate the TAGs. Good separation of unsaturated TAGs was achieved and the technique had promise to be used for determination of sterol esters as well as other lipid components.

Peiwu and coworkers presented information on a new instrument, developed in China, that was used to rapidly determine the level of erucic acid and glucosinolates in shipments of rapeseed. China grows about 50% HEAR and 50% canola type rapeseeds. Because of the system of small growers and many deliveries, it is necessary to test samples on receipt. The instrument, whose working principals were not explained beyond that the test was colorimetric, gave good results in the areas of 0.5 to 8% erucic acid and 25 to 60 micromoles per gram glucosinolates.

Golebiowski and Leong presented information on the use of spectral similarities as a means of predicting the efficiencies of NIR calibrations for the analysis of different sample sets. Different samples sets showed significant similarities suggesting that H distance could be used as a general guide for predicting the efficiency of an NIR calibration. The close association between H distance and oil content, however, suggested that it would be prudent to continue validating sample results using a range samples tested with the reference method. Using the latter method, it is more accurate to correct sample results by any bias found from the validation set than to make corrections to the NIR calibration and then re-predict results.

Posters

Brül, Mattäus and Graf presented a poster on the analysis of volatile compounds in cold pressed rapeseed oil by dynamic headspace gas chromatography. Influence of the plant cultivars, the areas of cultivation and the processing were investigated.

Ochodzki and Sorensen showed application of capillary electrophoresis in analysis of sinapine content in seeds of cruciferous crops. High performance capillary electrophoresis technique is fast and relatively cheap, and might improve effectiveness of searching for the breeding plant materials. Seeds of 18 different crucifers were tested for sinapine content. The content of sinapine ranged from 1.5% in spring type rapeseed to 3.0% in B. juncea.

Bouchtane et al. described a process for production of glucotropaeolin as standard for analysing glucosinolates by liquid chromatography in oilseed rape. The purity obtained was 99%.

To complement to their oral presentation, **Leong and Golebiowski** presented a poster on the analysis of individual glucosinolates content in intact B. juncea seed by NIRS. Good calibrations have been obtained for sinigrin and gluconapin.

The formal session (oral and poster presentations) was followed by a workshop consisting of two formal presentations and a review of the other papers and posters dealing with Analytical Aspects.

The first formal presentation by: **James Daun** was entitled "Use of rapid screening tests for quality and composition in variety screening for rapeseed". The use of rapid screening tests for quality factors in canola began in the 1960's with GC methods for the fatty acid composition and glucosinolates and rapid extraction methods for oil content. In the 1970's, GC methods coupled with the use of spot tests were refined; NMR became a key tool for the determination of oil content; and initial investigations started on the use of NIR. In the 1990's NIR technology came into its own with the widespread use of whole seed scanning instruments. The Dumas procedure was introduced for rapid measurement of nitrogen. At present, the development of biotechnological methods is being coupled with the use of sophisticated testing methods such as H^1NMR to determine simultaneously oil content and fatty acid composition. Rapid methods for analysis of other factors such as phytate, sinapine, tocopherols and other minor components are also being developed. NIR has been accepted as a routine method in plant breeding for oil, protein, glucosinolates and for certain fatty acids.

The second formal presentation by **Jens Christian Sorensen** dealt with analytical techniques applied in quality control and to study th effects of processing on rapeseed products. The focus was on selected methods and techniques considered to be of special importance in relation to quality control of rapeseed and rapeseed products. The analytes selected were oil or lipid constituents, triacyglycerols, vitamins and provitamins, phytosterols, phospholipids, glycolipids, glucosinolates and glucosinolate products, protein types and properties, choline esters, phenolics, antioxidants, carbohydrates, dietary fibres and oliosaccharides. The potential value of new methods and techniques as SFT (SFE, SFC,EFLC), HPCE-MECC, Isoprime and new trends in liquid chromatography (LC) were discussed with respect to efficiency, simplicity, speed, price and environmentally friendly techniques.