Analysis of Fatty Acid Content in Oilseeds

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Fatty acids obtained from oilseeds are used for several purposes including biodiesel and human consumption. Fatty acid content and abundance can be influenced by environmental factors, particularly during seed development. The objectives of our project were to determine the cold press oil yield, total oil content, and fatty acid content of oilseed crops from camelina seed samples produced in field trials across the Pacific Northwest.

Camelina seed samples of the varieties Blaine Creek, Calena, Celina, Cheyenne, and Columbia were provided by other researchers from Pendleton, Washington (2010), Corvallis, Oregon (2010), and Pullman, Washington (2009, 2010). The oil yield for each sample was determined using an oil extractor, delivering data to estimate industrial scale yields. University of Idaho determined total oil content by nuclear magnetic resonance (NMR). Fatty acid composition was determined by application of methyl-esterification process and subsequent gas chromatography/flame ionization detection (GC-FID), with verification by gas chromatograph/mass spectrometry (GC-MS).

Camelina varieties harvested in Pullman during 2010 have similar percent oil content by weight. GP48 had the lowest percent oil and Ligena had the highest. Location and variety influenced yield of acid content. The least variation was in linoleic acid content (difference of 0.2 %) in the Celina variety at Corvallis. The greatest variation was in linolenic acid content (difference of 5.25%) in the Cheyenne variety at the Pullman 2009 site. Average oleic acid content was highest (19.4%) in the Blaine Creek variety from the Pullman 2010 study, and samples taken from Pendleton in 2010 had overall highest average oleic acid content (18.92%). Camelina varieties were ranked differently in the two harvest years for the Pullman site (2009 and 2010) by order of the varieties' percent oleic acid content. Concentrations of linoleic acid were highest in the Blaine Creek variety, except at Pendleton in 2010. All varieties at Corvallis had decreased linoleic acid production (average of less than 16%) compared to other sites, possibly due to more summer moisture. The decrease is countered in the concentration of linolenic acid (highest average of 32.5%), where it is highest at Corvallis compared to other sites. Linolenic acid is present in comparatively high concentrations across all four sites. Eicosensic acid content was consistent and low across varieties and sites. Further analysis of these data will provide growers a more informed plan for optimizing fatty acid production based on variety selection and location of production.

Rotational Influence of Brassica Biofuel and Other Crops on Winter Wheat

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Growing Brassica oilseed crops in eastern Washington must fit within the regional rotational cropping systems. When grown, broadleaf crops usually precede winter wheat in rotation and studies worldwide have shown the benefit to winter wheat when following a broadleaf crop. The potential economic benefit of these crops should include the rotational effect of these crops on winter wheat.

These studies are two year crop sequence studies on eight spring crops (spring wheat, spring barley, dry pea, lentil, camelina, yellow mustard, oriental mustard, and canola) planted in year 1 followed by winter wheat (year 2) grown

2012 Rotation study spring crops planted to winter wheat for 2013 at Cook Farm, Pullman, WA