

CLA-rich Soy Oil Production and Quality

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Conjugated linoleic acid (CLA) is an anti-cancer, anti-heart disease, anti-inflammatory agent that can delay the onset on these major diseases. Dairy and beef products contain less than 1% CLA which is insufficient to supply the proposed 3g a day needed for optimum effect without an undesirable increase in the amount of saturated dietary fat. We have developed a pilot plant method of producing a ~20% CLA-rich soy oil by soy oil linoleic acid photo-isomerization with an iodine catalyst. Iodine has been shown to be removed from the oil by a commercial magnesium silicate adsorbent. The following are the highlights of our recent research. The effect of degree of soy oil processing and minor components on CLA yield was investigated. It was found that more highly refined oils produced the highest CLA yields but the effect of various minor components varied. Phospholipid, free fatty acids and lutein levels up to 1100ppm, 1200ppm and 30.8ppm, respectively, produced CLA yields comparable to that of the control RBD soy oil, while tocopherol levels up to 1400ppm increased CLA yields. However, increasing levels above these thresholds reduced CLA yields. The processing technology is now patented and a new start up company, Ultra V Technologies is moving towards commercialization of the CLA-rich oil production. The change in triacylglyceride (TAG) fatty acid distribution and structure after linoleic acid isomerization to CLA was determined by non-aqueous reverse-phase HPLC chromatography with ELSD and UV detectors. New UV absorbing CLA TAG peaks were found adjacent to linoleic acid bearing TAGs after photo-isomerization, with a corresponding reduction in TAGs peaks containing linoleic acid. Not surprisingly, CLA isomers were found predominantly in those fractions that originally contained most linoleic acid. FTIR has been studied as a rapid QA tool to rapidly determine CLA isomer composition and as a possible online QA device. We have developed reliable predictive models that will provide a useful non-invasive means of monitoring CLA composition during processing.