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Properties of hydrothermally treated maize starch with stearic acid

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Starch is a common food ingredient widely used in the food industry. The current consumer reluctance trend is towards clean label starches. Hydrothermal treatment of starch can increase the relative crystallinity of starches. Wet heat processing of starch with fatty acid can promote the formation of amylose lipid complexes. Both treatments can modify starches for 'clean labelling'. This study determines the effects of hydrothermal treatment in combination of fatty acid on the functional properties of maize starch. This study was carried out with stearic acid (0 and 1.5 %) and hydrothermal treatment (110°C for 16 hours for maize starch with 20% moisture, 55 C for 24 hours for maize starch with 70% moisture and no hydrothermal treatment). The pasting properties, textural properties, thermal properties, x-ray diffraction, *in vitro* starch digestibility of the treated starches were determined. Hydrothermal treatment in combination with stearic acid reduced the breakdown and setback viscosities compared to stearic acid and hydrothermal treatment alone. Hydrothermal treatment of maize starch with stearic acid further increased the relative crystallinity of pasted starches and this decreased the *in vitro* starch digestibility. Stearic acid reduced retrogradation and resulted in non-gelling pastes. The same effect was observed with hydrothermally treated maize starch with stearic acid. Hydrothermal treatment of maize starch with stearic acid resulted in starch that is non-gelling, increased thermal stability, increased crystallinity, and reduced *in vitro* digestibility.

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The potential health implications of the consumption of thermally oxidized cooking oils

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Cooking oils are integral part of human diet as they are used in almost all type of culinary practices. They serve as sources of lipid with significant nutritive value and health benefits which can be attributed to their fatty acid compositions and biological antioxidants. However, cooking oils are usually subjected to thermal oxidation which occurs when fresh cooking oil is heated at high temperatures during various food preparations. Repeated use of cooking oils in the commercial food industry is also common to maximize profit. Thermal oxidation of edible oils had attracted great attention of nutritionist and researchers given the deteriorative effect such as generation of very cytotoxic compounds, loss of carotenoid, phenolics and vitamins thus reducing the overall antioxidant properties of the oils. Furthermore, several *in vivo* studies had suggested that consumption of thermally oxidized cooking oils might not be healthy as it might negatively influence the lipid profile [increased low density lipoprotein (LDL), decreased high density lipoprotein (HDL) and elevated cholesterol level], haematological system [alteration in concentration of heamoglobin (Hb), packed cell volume (PCV), white blood cell (WBC) count, neutrophil and lymphocyte counts], kidney function and induce lipid peroxidation and oxidative stress which have been associated with the pathogenesis of various degenerative diseases. Therefore, thermal oxidation seems not to provide any health benefit, as it deteriorates cooking oils and the consumption of the oils may predispose consumers to various disease conditions that may ensue from free radical generation, thereby having deleterious effect on human health.

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