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Title: Starch Structures and Physicochemical Properties of a Novel ß-glucan-enriched Oat Hydrocolloid Product with and without Supercritical Carbon Dioxide Extraction[5]

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Abstract: Starch structures and physicochemical properties of C-trim30, a ß-glucan-enriched oat product (32% ß-glucan), with or without supercritical carbon dioxide extraction (SCD) were studied to evaluate suitability for commercial applications and potential to degrade starch to increase ß-glucan concentration. Scanning electron micrographs showed C-trim30 was composed of 200-300 µm long, porous particles. HPSEC equipped with MALLS and RI detectors showed C-trim 30 had three peaks, corresponding to amylopectin with weight-average molecular weight (M_w) of $1.0x10^8$, breakdown amylopectin product (M_w $1.1x10^7$) and amylose (M_w $1.7x10^6$). ß-glucans were not observed due to HPSEC column absorption. C-trim 30 amylopectin M_w and gyration radii increased after SCD suggesting aggregation of molecules occurred. No thermal transitions were observed for C-trim 30 heated 0-150°C. C-trim 30 pasting properties, measured using Rapid ViscoAnalyser, showed high peak viscosity (291 RVU) at 30°C, high breakdown (200 RVU), final (273 RVU) and setback (183 RVU) viscosity after heated to 95°C while stirred. SCD increased peak (423 RVU) and breakdown (318 RVU) viscosity. C-trim 30 heated from 15 to 110°C showed higher water-holding capacity occurred without SCD. SCD oil fatty acid composition of 82% unsaturated was apposite for health-food applications. Study suggests C-trim 30 with and without SCD could function as fat substitutes.

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Oat bran, starch, ß-glucan, physicochemical, lipid extraction and hydrocolloid