



Effects of moderate electric fields on aggregation of whey protein solutions and properties of edible films made thereof

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Thermal processing may result in disruption of the native conformation of whey proteins, thus affecting their structure and functional properties. The aim of this work was to evaluate the effects of moderate electric fields on thermal aggregation of whey proteins and its subsequent effects on properties of edible films made from ohmic heated whey protein film forming solutions. Thermal aggregation of whey protein isolate was studied at 85 °C up to 30 min through ohmic heating, under the presence of moderate electric fields ranging from 4 to 20 V/cm; this treatment was compared with conventional heating under identical temperature profiles. Results show that whey protein aggregation (measured by dynamic light scattering in terms of aggregate size) was found to decrease with the increase of electric field applied during ohmic heating; a maximum increase in whey protein aggregation of 45 nm was observed for treatments at 18 V/cm, while treatments at 4 V/cm and 0 V/cm (conventional heating) produced a maximum increase of 70 nm and 75 nm, respectively. Edible films prepared from ohmic heated film forming solutions present a decrease of about 10 %, when compared with films produced through conventional heating, for water vapor permeability. The presence of moderate electric fields during heating, apparently influences the denaturation and aggregation of whey proteins thus modifying the mechanisms of protein interactions in films formed from whey protein film forming solutions. Ohmic heating presents itself as a novel method for production of protein films.