

USING WHEY PROTEIN GEL AS A MODEL FOOD TO STUDY DIELECTRIC HEATING OF SALMON

Abstract

by Yu Wang
Washington State University
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Chair: Juming Tang

The dielectric constant (ϵ') and loss factor (ϵ'') of whey protein gel with the addition of D-ribose (0.5%, 1%, and 1.5%, wet basis) and at different salt contents (0, 0.1%, 0.2%, 0.3%, 0.4%, and 0.5%, wet basis) as well as that of pink salmon fillets (*Oncorhynchus gorbuscha*) were investigated over the frequency range of 1-1800 MHz at temperatures ranging from 20 to 120 °C. D-ribose was added as a component of the whey protein gel model as a substrate for chemical marker formation, based on the knowledge that the color changes resulting from Maillard browning reactions involving ribose can be used to predict the location of cold spots in dielectric heated products subjected to commercial sterilization treatments (Kim and Taub 1993). The results show that in the Radio Frequency (RF) and Microwave (MW) ranges, the dielectric properties of whey protein gel containing 1% D-ribose and 0.2% salt were similar to the dielectric behavior of salmon fillets. The salt content had a major impact on the dielectric constant for salmon and whey protein at the lower frequencies. Whey protein gel after its composition has been adjusted to reflect properties of muscle foods or other products has potential to serve as a model food in terms of dielectric properties. Information obtained from this model food can be used for process development to predict the locations of cold and hot spots in real food systems during microwave and RF sterilization processes.

Key words: dielectric properties, salmon, whey protein gel, D-ribose, RF, microwave sterilization