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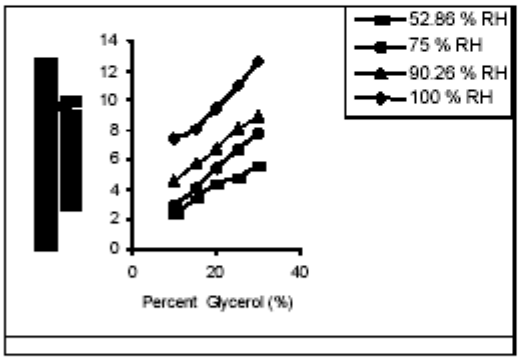
Water vapor permeability properties of the plasticized Soy protein edible films.

This paper presents the studies on water vapor permeability (WVP) of plasticized Soya Protein Isolate (SPI) film. Soya Protein has a high film forming ability. The best film was obtained by dissolving Soya Protein in distilled water (1g in 10ml) at pH 2. The film was dried at 110°C for 5 hours. A series of films were prepared by using different concentrations of glycerol as a plasticizer.

One of the most important properties of an edible film is WVP. Effects of plasticizer concentration on WVP of SPI films were examined in the presence of different relative humidities (RH). Determining the effects of RH on WVP for plasticized SPI films help to predict the film behavior under any water vapor partial pressure gradient. WVP rate was studied by the modified method of ASTM 96-0 desiccant method.

52.86%, 75%, 90.26% and 100% RH's were selected for the experiment since food materials are commonly stored in this RH environments. Constant RH environments of 52.86% and 90.26% were established inside desiccators, using saturated salt solutions of $Mg(NO_3)_2$ and $BaCl_2$. 100% RH was established inside desiccators, using distilled water. The specimens were also tested at the normal RH condition (75%). The results show that the prepared SPI film has relatively high WVPs. Lower WVP was observed for films cast from solutions with 10% glycerol. When plasticizer concentration of film forming solution was increased, the WVP of the film was increased. The increase in plasticizer concentration probably powered protein mobility and reduced the interconnectivity among protein molecules resulting in the higher WVP. With increase in RH, the WVP was increased due to the pressure gradient. At 100% RH, the anomalous values for WVP may be due to the hydrophilic nature of the SPI films, as well as the presence of inhomogeneities in their film structures. These results suggest that the prepared SPI films are suitable for food packaging.



Water vapor permeability of SPI: Glycerol film containing different Glycerol concentrations in the presence of different relative humidities