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The characterization of the functional properties of
three cold alkali extracted meat protein concentrates
and the relationship between functional properties
determined using model systems and the properties
of an emulsion-type sausage in which
they were incorporated

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ABSTRACT

The feasibility of marketing three meat protein concentrates (MassMPC, MyoMPC and SarcoMPC) on the commercial protein market was studied. Solubility, heat gel strength, water binding and emulsification properties of these proteins were investigated under different temperature, protein to water ratio and salt treatments using model systems.

Model systems were designed so that they approximated the physical and chemical conditions found in an emulsion-type sausage. The properties of the meat proteins were compared to those exhibited by a soy concentrate (GL750) and three sodium caseinates (SV07, SV02 and CasN) measured under the same conditions. In addition the performance of the meat, soy, and caseinate proteins in an emulsion-type sausage was evaluated.

MassMPC and MyoMPC exhibited superior heat gelling properties compared to the commercial protein products, while SarcoMPC was more soluble and exhibited foaming properties similar to these products. All three proteins could be used successfully in sausages which had 3% of the total protein replaced with additive protein. At a 30% replacement level the addition of MassMPC and SarcoMPC produced undesirable effects on sausage properties. MyoMPC did not adversely affect the characteristics important in a commercial sausage, at this replacement level. However, in terms of overall functional properties and performance in a food system, MassMPC, MyoMPC and SarcoMPC were inferior to the commercial protein products.

Data collected from this study were analyzed using the Pearson's correlation test to identify relationships between: functional properties assessed using model systems; sensory and instrumental measurements of emulsion-type sausage rheological properties; and model system functional properties of proteins and the properties of sausages

incorporating these proteins.

A negative correlation between emulsion stability moisture loss and water binding capacity was identified but this relationship was dependent on the methods used to measure these properties. Solubility was found to be negatively related to the water binding capacity of proteins.

The Warner Bratzler Shear test, multiple compression test and extrusion test were the most useful instrumental measurements for evaluating textural properties considered important in a commercial emulsion-type sausage. However, the relationships between sensory properties and these instrumental measurements were dependent on the level of incorporation of protein additives in the sausages.

Important correlations were identified between functional properties of proteins measured in the presence of 2% salt, and properties of sausages which had 30% of the total protein replaced by additive proteins. The usefulness of these relationships are discussed, the reasons why some relationships were not significant are suggested, and a new approach to studying the functional properties of proteins is proposed.

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