STUDIES ON SOME FUNCTIONAL PROPERTIES OF WHEY PROTEINS AND THIER APPLICATIONS IN SOME FOOD SYSTEMS

By

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B.Sc.Agric.(Dairy Sci. & Tech.) Al-Azhar Univ., 1981
M.Sc.Agric.(Dairy Sci. & Tech.) Ain Shams Univ., 1991

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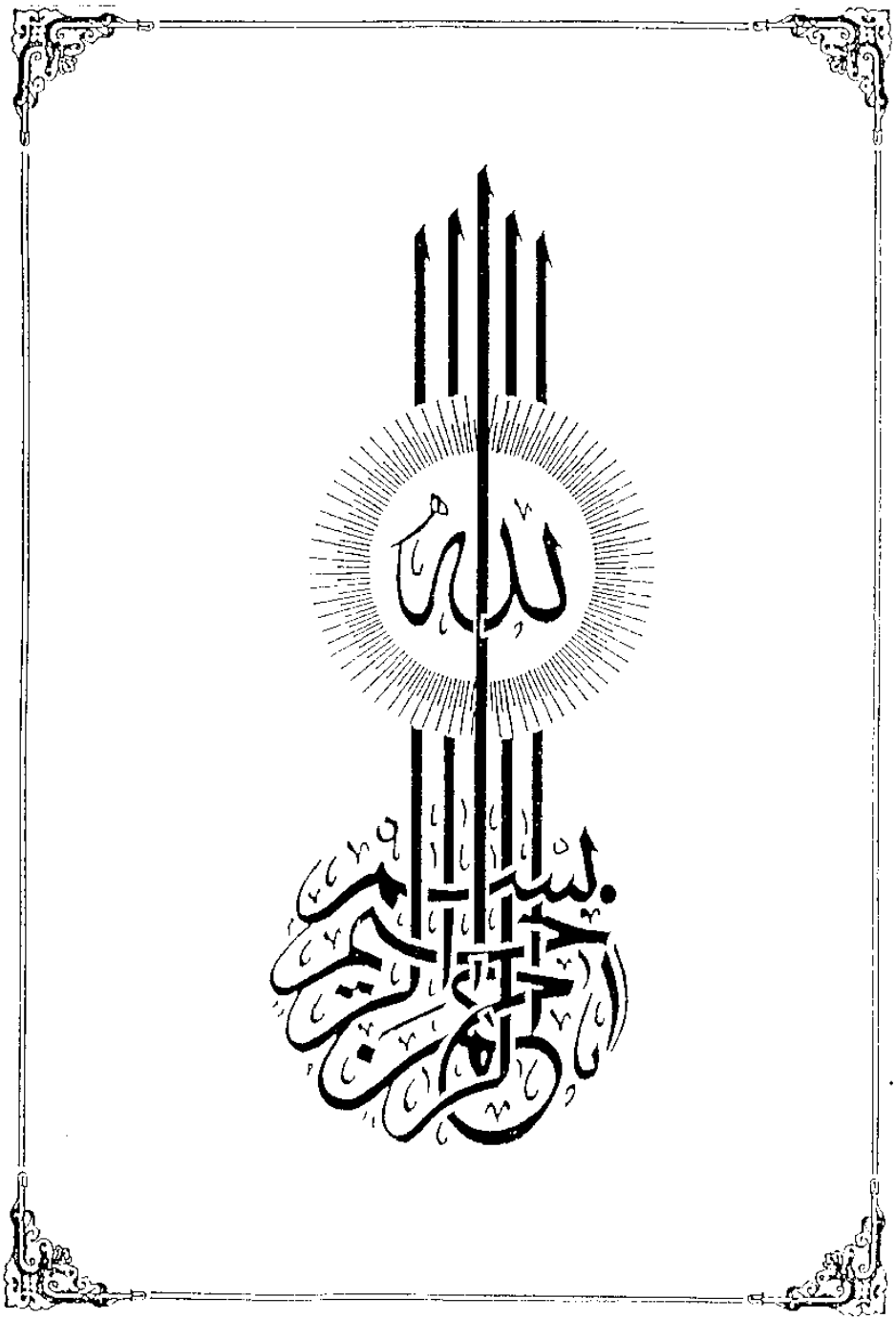

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Abstract

Atif Farrag Mostafa Farrag. Studies on some functional properties of whey proteins and their applications in some food systems . Unpublished Doctor of Philosophy dissertation, University of Ain Shams, 1996 .

In the present study the functional properties of whey proteins and their applications in some food systems were investigated. The denaturation of whey protein concentrate as affected by different factors, was followed after heat treatment by determining the soluble nitrogen at pH 4.6 and protein fractions were followed by HPLC separations :-

-The denaturation degree was increased with increase of heating temperatures and whey protein content.

- The maximum denaturation was shown at pH 7.5 while the lowest denaturation was found at pH 3.0 and to much less affected by calcium and lactose content.

-α-lactalbumin was much affected at low heating temperature than β-lactoglobulin and the reverse was observed at higher temperature.

Also the emulsifying capacity, stability and viscosity of whey proteins stabilized emulsions were followed:-

-The emulsion capacity was increased with heat treatments of WPC solutions and the emulsion stability was improved with the increase in the protein concentration

-The highest emulsion stability was shown at pH 7.5 while the lowest stability was found at pH 4.5.

-The emulsion capacity was improved with increase the oil volume in the emulsion but the further increase in the oil volume, decreased the emulsion capacity and stability.

-The addition of 0.2% pectin increased the emulsion stability and the reverse was observed with CMC and carrageenan.

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-The increase of casein content in blend with whey protein solutions improved both of emulsion capacity and stability.

-The emulsion showed increased viscosities with increase the protein concentration, heat treatment, presence of lactose, increase in the oil volume, presence of stabilizers and presence of whey protein in the blends between whey protein and casein.

Also the protein patterns of skim and standardized buffalo milk were modified by addition of variable aliquots whey protein solutions. The modified milks were acidified with GDL and the gelation time, viscosity and the curd firmness were determined:-

-The curd firmness (K_{20}) of skim milk decreased with increase in the percentage of added WPC and duration time of standardized milk was generally faster than that of skim milk.

-The curd firmness (K_{20}) decreased with increase in percentage of added WPC and heat duration .

Key words : Whey protein concentrate - Functional properties - Denaturation - ß-lactoglobulin - α-lactalbumin - Emulsion capacity - Emulsion stability - Casein - Food system - Viscosity - Gelation time - Curd firmness .

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