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Effect of some food hydrocolloids on the rheological properties of typical soft ice cream

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Objectives: The rheological properties of gums are important when they are used in the formulation of foods for its effect on the textural and sensory attributes. Furthermore, rheological data of fluid and semi-solid foods are required for designing and modeling purposes in any food process involving fluid flow (e.g. pumping, mixing, and filtration) and play a key role in the analyses of flow conditions in processes such as pasteurization and aseptic processing. In this research, the effect of two novel hydrocolloids known as Balangu seed gum (BSG) and palmate-tuber salep (PTS) with corresponding CMC on the rheological characteristics of a typical soft ice cream was studied.

Methodology: Ice creams mixes were formulated to contain 10% milk fat, 15% sugar, 11% MSNF and 0.3-0.5% selected hydrocolloids as stabilizers. Rheological properties of mixes were measured using the Bohlin rotational viscometer, which were subjected to a programmed shear rate logarithmically increasing from 14.2 to 501.7 s⁻¹.

Results and conclusions: The power law model well described the flow behavior of mixes with high correlation coefficient (r). The flow behavior index was in the range of 0.450-1.154, while consistency coefficient varied from 0.051 to 6.822 Pa.sⁿ. All mixes showed pseudoplastic behavior except the mix containing 0.3% PTS with a slightly dilatant characteristic. An increase in concentration was accompanied an increase in pseudoplasticity and consistency coefficient.