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PROCESSING CHARACTERISTICS OF TOOTHPASTE IN CAPILLARY DIES

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A commercial toothpaste is investigated in this work as a model paste system to study its processing characteristics in capillary flow using various dies. Its rheological behaviour has been determined as that of a yield-stress, thixotropic material with time dependent behaviour. The rheological data obtained from a parallel plate rheometer were used to formulate a constitutive equation that is a Herschel-Bulkley model with a structural parameter which obeys a kinetic equation, typically used to model thixotropy. The predictive capabilities of this model is tested against capillary data for a variety of capillary dies having different length-to-diameter ratios (L/D), contraction angles (2) and contraction ratios (, where Db is the diameter of the barrel of the capillary rheometer.