RHEOLOGY OF RENNET CURD MADE FROM BUFFALO MILK: A COMPARISON WITH COW,S MILK

I. Hussain, A.E. Bell, A.S. Grandison

Department of Food & Nutritional Sciences, University of Reading, Reading, UK

imtiaz.hussain@reading.ac.uk

Mozzarella cheese curd is usually made from buffalo and cows' milk. Buffalo milk contains 40-60% more fat, protein and calcium as compared to cows' milk. Due these compositional differences, buffalo curd has quite different rheology.

In this study, rennet induced curds were made from both milks at the gelation temperature of 39˚C and pH value of 6.5. The dynamic moduli (G', G") were increased sharply with the time after the addition of chymosin due to fusion and packing of casein micelles. The values of dynamic moduli were higher in buffalo curd as compared to cows' curd. Buffalo curd has more strength and firmness due to higher milk solids. The viscoelasticity (Tan δ) of cow curd was higher than buffalo curd. It may be due difference of milk solids. After 90 minutes of chymosin addition, frequency sweep (0.1-10HZ) was recorded, and samples showed the weak viscoelastic gel system predominating the storage modulus over the loss modulus. Both milk samples were found to be frequency dependant.

After 95 minutes of chymosin addition, both curd samples were subjected to fracture stress to break curd system; yield stress was higher in buffalo curd as compared to cows' curd. More forced is required to break the buffalo curd than cows' curd. Due to higher protein contents in buffalo milk which gave thicker strands during curd formation process. When, milk solids of cows' milk were increased by ultrafiltration process right up to buffalo milk. The dynamic moduli and loss tangent were remained similar but yield stress was still lower than buffalo milk. It may due to differences in size of casein micelles and fat globule of both milk types. Buffalo milk contains higher size of casein micelles and fat globule than cows' milk. It is quite clear that these two components play a vital role in curd formation and finally give higher curd strength. It is assumed that if milk solids were similar within same specie, then, it can be extraplotted that milk samples behave similar with respect to rheological properties.

Dynamic rheology is a good technique to measure the curd strength and firmness from different milk samples and compare them; it is very good indication and assessment of curd cutting and coagulation time which could be determined by measuring storage modulus (40-60Pa for curd cutting time & 1Pa for curd formation time) during curd formation process instead of visual measurement. The precise cutting time at maximum curd firmness gave better curd yield, moisture & fat retention and minimum fat & protein losses.