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## Effect of different coagulants on textural characteristics of Paneer

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### Abstract

Paneer is a heat cum acid coagulated milk product which is very popular all over India. The physico chemical, sensory and textural properties of Paneer vary significantly with the type of coagulants used during the manufacture. Texture is an important property of Paneer from the viewpoint of consumer acceptance and satisfaction. In the present study, buffalo milk was standardized on the level of fat (6 percent milk fat, 9 percent SNF) and different coagulants of organic and inorganic nature were used for paneer manufacture. The method employed here was the direct acidification process. Texture profile of the prepared paneer samples was checked to know hardness, cohesiveness and gumminess by texture profile Analyzer.

**Keywords:** Paneer, texture, coagulants, hardness, cohesiveness, gumminess

### 1. Introduction

Paneer often referred to as Indian soft cheese, is a heat acid coagulated milk product and is a rich source of high quality animal fat, proteins, vitamins and minerals like phosphorus and calcium. The main factors that affect the different sensory and physico-chemical characteristics of Paneer are type and concentration of coagulants used. Commonly used coagulants are citric acid and lactic acid. Several newspaper reports published in the recent times (Times of India 22<sup>nd</sup> August 2018) reveals the unscrupulous addition of inedible non food grade coagulants like sulphuric acid, HCl etc. for paneer preparation which is a matter of great concern.

Texture is an important property of Paneer from the viewpoint of consumer acceptance and satisfaction. The textural properties of Paneer vary significantly with the difference in coagulants used. The work of some researchers showed that among the several coagulants used for the preparation of Paneer, ascorbic acid is the best coagulant for providing best texture properties as well as chemical and organoleptic attributes (Karadbhajne and Bhoysarkar, 2010) [4].

So, in view of the facts stated above, the present study was under taken to check the textural characteristics of Paneer prepared with organic as well as inorganic coagulants.

**Table 1:** Table shows mean average value

Paneer samples	Hardness (N)	Cohesiveness	Gumminess (N)
citric acid	3.6969	0.3869	0.9659
1% sulfuric acid	4.2111	0.3625	1.5242
conc. Sulfuric acid	2.8105	0.3802	1.0612
lactic acid	4.3231	0.4397	1.9048
1%HCl	3.9055	0.4186	1.6503
conc. HCl	3.4385	0.3413	1.5157

## 2. Materials and Methods

### 2.1 Sample Preparation

Fresh pooled Buffalo milk was collected from University Livestock Farm, Mannuthy and standardized to 6% fat and 9% SNF. Buffalo milk was preferred since it gives a soft body and smooth texture to the product. Organic coagulants like citric acid and lactic acid as well as inorganic coagulants like sulphuric acid and hydrochloric acid were used at level of 1 percent. Paneer was prepared from buffalo milk by standard procedure (Bhattacharya *et al.*, 1971) [3]. Prepared Paneer samples were then analyzed for texture profile analysis.

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## 2.2 Texture profile analysis of paneer samples

Analysis was carried out on Texture Analyzer (TA-HD plus, Stable Micro Systems, Surrey, UK) and characteristics such as hardness, cohesiveness and gumminess for the different treated Paneer samples were observed.

## 3. Results

The textural parameters of the different Paneer samples were analyzed to obtain textural responses *viz.*, hardness, cohesiveness and gumminess. (Table 1 and Figure 1).

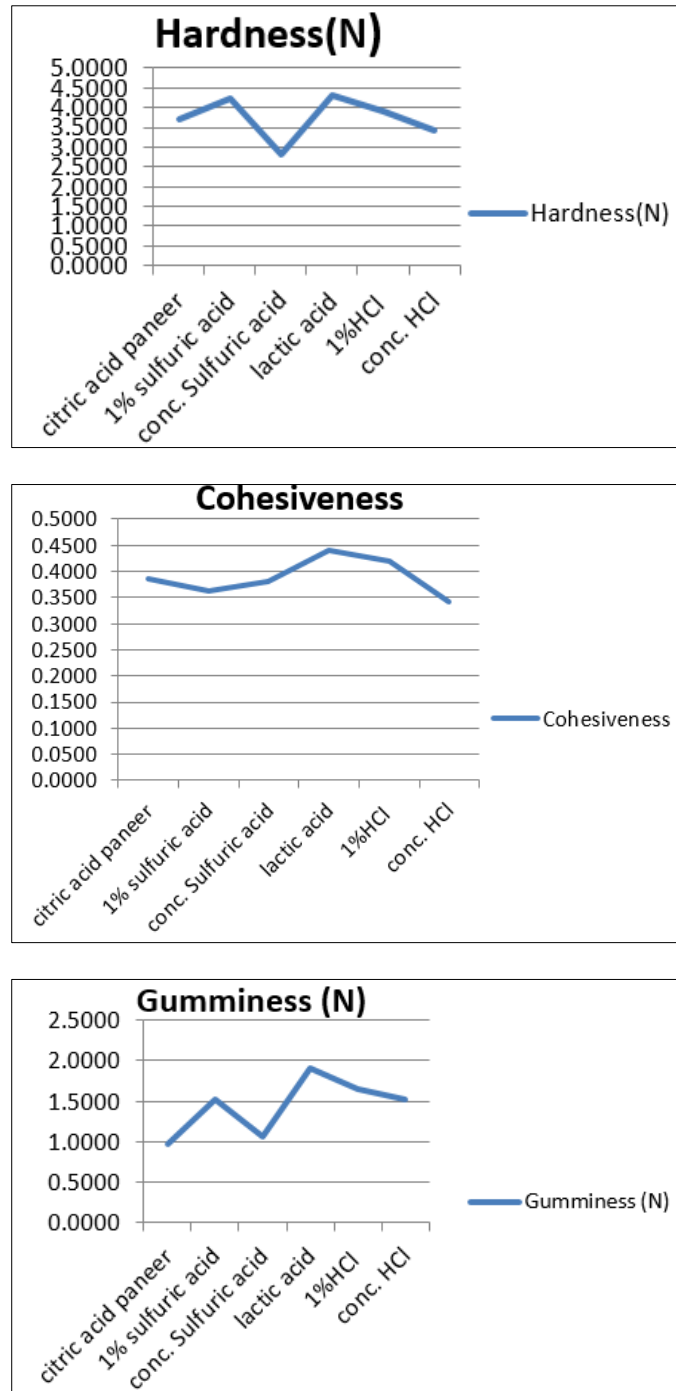


Fig. 1: Textural characteristics of paneer

## 4. Discussion

The difference in the coagulants used directly affects the temperature of coagulation as well as fat and moisture content of Paneer samples which in turn impacts its textural attributes.

## 4.1 Hardness

Paneer samples treated with lactic acid and concentrated sulphuric acid had significantly higher and lower hardness respectively when compared to other samples. Decrease in hardness with increase of fat content may be attributed to the less compact protein matrix (Ashokrao, 2015). The concentrated sulphuric acid treated sample had the highest fat content and hence the lowest hardness value. Hardness of paneer is directly related to the calcium content and inversely related to the moisture content (Desai *et al.*, 1991) [2].

## 4.2 Cohesiveness

Lactic acid treated sample exhibited the highest cohesiveness value with the lowest for concentrated HCl sample. The nature of protein matrix and extent of fat dispersion may contribute to cohesiveness.

## 4.3 Gumminess

Gumminess value was highest for lactic acid treated sample with lowest for sample treated with citric acid. According to Singh G *et al.* 2015 [1], coagulation temperature had significant ( $P < 0.1$ ) effect on gumminess at linear level. He reported that gumminess increased with the coagulation temperature.

## 5. Conclusion

Textural parameters of Paneer had strong influence on its consumer acceptance and satisfaction which is influenced by several factors such as nature and type of coagulant used, temperature of coagulation, fat and moisture content of Paneer, etc. A significant difference was observed in the textural properties with the difference in coagulants used. The results obtained for the textural responses indicated that lactic acid treated sample had the maximum value for hardness, cohesiveness and gumminess. The lowest hardness value for concentrated sulphuric acid sample may be attributed to its higher fat content. The gumminess of the samples is affected by the coagulation temperature.

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