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# STUDIES ON SHELF LIFE OF CHHANA

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*Chhana* is an acid and heat coagulated milk product used as a base for the preparation of variety of sweetmeats like *rasogolla, rasmalai, sandesh, chum chum* etc. *Chhana* is a high moisture product with soft and smooth texture. It is common knowledge that the product does not keep longer than a day at room temperature. De *et al.* (1971) and De (1980) have reported that Chhana has a shelf life of 3 days at 24°C and 6 days at 10°C. These temperatures are, however, difficult to achieve without refrigeration in most parts of the year. No efforts to improve the shelf life of *chhana* were made in past, although its demand has always been growing. *Halwais* prefer to convert fresh milk into *chhana* just prior to sweet making

**TABLE I**

**Shelf life of *chhana* under different treatments**

| Sample | Treatment | K.Q. at 30±1°C day | Remarks |
|---|---|---|---|
| Control | — | 2 | Not fresh |
| Control + Water | — | 2 | Not fresh, soft |
| Control + Water | Steamed 10 min | 2 | Slightly hard |
| Chhana + Whey (Lactic) | — | 2 | Fresh/good |
| Chhana + Whey (Lactic) | Steamed 10 min | 3 | Slightly hard |
| Chhana + Whey (Citric) | — | 2 | Fresh/good |
| Chhana + Whey (Citric) | Steamed 10 min | 2 | Slightly hard |
| Chhana + LA* (1) | — | 3 | Good/fresh |
| Chhana + LA (2) | — | 3 | Good/fresh |
| Chhana + CA** (1) | — | 2 | Good/fresh |
| Chhana + CA (2) | — | 2 | Good/fresh |
| Chhana + LA (1) | Steamed 10 min | 6 | Hard, brittle. Good flavour |
| Chhana + LA (2) | Steamed 10 min | 5 | Hard, brittle Good flavour |
| Chhana + LA (1) | Sterilized 15 lbs/15 min | 8 | Brown/hard/brittle, Paneer like texture, cooekd flavour |
| Chhana + CA (2) | Steamed 10 min | 3 | Hard/brittle Good/flavour |
| Chhana + CA (1) | Steamed 10 min | 3 | Hard/brittle Good flavour |
| Chhana + PS***(1) | — | 4 | Slimy, fruity flavour |
| Chhana + PS (2) | — | 4 | Slimy, fruity flavour |
| Chhana + PS (1) | Steamed 10 min | 6 | Hard, Oxidised flavour |
| Chhana + PS (2) | Steamed 10 min | 6 | Hard, Oxidised flavour |
| Chhana + LA (0.5) + PS (0.5) | — | 8 | Hard, Oxidised flavour |
| Chhana + LA (1) + PS (1) | — | 9 | Slimy, Oxidised flavour |

* LA — Lactic acid.

** CA — Citric acid.

*** PS — Potassium sorbate.

Figures in parentheses are percentages.

**TABLE 2**

**Effects of intermittent steaming on shelf life of chhana**

| Treatment | Number of Steaming | K.Q. at 30±1°C day | Remarks |
|---|---|---|---|
| Chhana Water | Once | 2 | Soft/good flavour |
| | Twice | 2 | Soft/good flavour |
| | Thrice | 3 | Hard, brittle/paneer like texture |
| Chhana Lactic whey | Once | 2 | Soft/good flavour |
| | Twice | 3 | Slightly hard |
| | Thrice | 3 | Hard/brittle/paneer like texture |
| Chhana Citric whey | Once | 2 | Soft/fresh |
| | Twice | 3 | Slightly hard |
| | Thrice | 3 | Hard/brittle/paneer like texture |
| Chhana Lactic acid (1%) | Once | 4 | Good/slightly hard |
| | Twice | 5 | Slightly hard |
| | Thrice | 5 | Hard/brittle/paneer like texture |
| Chhana Citric acid (1%) | Once | 3 | Good flavour, slightly hard |
| | Twice | 3 | Slightly hard |
| | Thrice | 4 | Hard/brittle/paneer like texture |

for the obvious reason of quality. This is an expensive practice as the product has to bear high transport cost of milk from the villages to city. An attempt was, therefore, made to develop a technology for improving the shelf life of *chhana* at 30°C applicable in village conditions by employing the food grade organic acids, antimycotic agent like potassium sorbate, steaming and sterilization.

*Chhana* was prepared from boiled cow's milk cooled to 80°C before coagulation with the help of 2% citric acid and 2% lactic acid solutions separately. Fresh whey lots obtained from acid coagulation were used as preservative. citric acid whey tested 0.32% acidity and lactic acid whey 0.26% acidity. Diluted lactic acid, citric acid and potassium sorbate were also tried as preservative in concentration of 0.5, 1 and 2% in potable water. These preservatives were used singly and in combination. Steaming and intermittent steaming were tried after 8 hr storage in the presence of whey and organic acid solutions. *Chhana* was immersed in acid solutions in conical flasks, cotton plugged and sterilised at 15 lbs/sq inch for 15 min in an autoclave.

The shelf life of *chhana* was determined at one day interval with the help of standard sensory evaluation technique. Perceptible defects in flavour and texture developed during storage at 30±1°C were recorded by a panel of five semitrained judges.

The control samples of *chhana* (not treated with any preservative) were not acceptable beyond two days at 30°C. Ordinary steaming of *chhana* in water had no beneficial effect on the shelf life. Intermittent heating improved the keeping quality upto three days apparently due to the destruction of the germinated spores. *Chhana* kept fresh for two days in whey obtained from acid coagulation and its steaming for 10 min increased the shelf life upto three days. Lactic acid whey offered greater protection than citric acid whey. In the presence of 1 and 2% lactic acid solutions, the product had a keeping quality of three days compared with two days in citric acid solution, or citric acid whey. Slight mould growth was observed on the fourth day and afterwards. Steaming of *chhana* for 10 min in the presence of 1 and 2% lactic acid concentration, increased the shelf life upto six days and the presence of citric acid upto three days (Table 1). Sterilization in the presence of 1% lactic acid improved the shelf life of *chhana* to eight days.

The texture of the product became hard as a result of steaming and sterilization, resembling that of *paneer*. *Chhana* kept well for three days in the presence of 1 and 2% potassium sorbate solution and its steaming further improved the shelf life upto five days. Potassium sorbate combined with lactic acid solution enhanced the shelf life upto six days. This product developed oxidized flavour defect on subsequent storage.

The steaming of *chhana* in ordinary water did not offer any advantage. Three successive steamings in water, or in the presence of citric acid improved the life of *chhana*, upto three days (Table 2) and 5 days with 1% lactic acid solution. In general, steaming resulted in the hardening of texture not suitable for *rasogolla* making. Sterilization of chhana resulted in browning and cooked flavour. These methods of preservation will be useful for *chhana* to be used for *sandesh* making and for improving the shelf life of paneer.

## REFERENCES

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