

Qualitative Comparative Assay of Different Paneer Samples

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ABSTRACT: Paneer has great value in diet because it is rich source of high quality proteins, fat, minerals and vitamins. Paneer has a short life span of about 5-7 days at refrigeration storage without much deterioration in the quality but freshness of the product is lost after 3 days. So, the present study was carried out to compare the quality parameters of differently packaged and non-packaged paneer samples at Mother dairy foods processing ltd., Pataparganj, New Delhi. Four branded well packaged samples and two non-packaged local samples were comparatively assessed for the following quality parameters: I. Physical parameters: whey separations, color, texture, flavour II. Chemical analysis: fat %, acidity%, total solids % III. Microbiological analysis: Presumptive Coliform test, Standard Plate Count, Coliform test, yeast and Mould count It has been revealed from the study that whey separation is the major problem during storage and packaging of paneer samples as it greatly affects the total solid per cent of the product. Adding salt in appropriate percentage acts a preservative agent and ultimately helps in increasing the shelf life of the product. Packaging in high intensity poly styrene (HIPS) grade trays also protects the product from the attack of microbes. Although the present scenario suggests that India is the second largest producer of milk in the world but still surplus amount of improvisations like better packaging, more hygienic environment during its production, good manufacturing techniques etc. have been made to bring out utmost quality product in Indian market.

I. INTRODUCTION

Paneer refers to the milk solids obtained by the acid coagulation of hot milk and subsequent drainage of whey. The acids commonly used are citric, lactic, acetic, etc. and sour whey or cultured whey can also be used for coagulation of milk. Paneer is also defined as a pressed variety of chhana obtained by acid coagulation of milk about 85°C followed by removal of whey and pressing. Paneer has a short life span of about 5-7 days at refrigeration storage without much deterioration in the quality but freshness of the product is lost after 3 days. Yadav et al (1989) carried out work on indigenous dairy products. They found that half the milk produced in India was used for the manufacture of indigenous milk products. The indigenous milk products discussed were: chhana, paneer, frozen products, lassi, mishti doi. The various aspects of these products and their manufacturing procedures were investigated.

II. MATERIALS AND METHOD

The present study was carried out to compare the quality parameters of differently packaged and non-packaged paneer samples at Mother dairy foods processing ltd., Pataparganj, New Delhi. Four branded well packaged samples and two non-packaged local samples were comparatively assessed for the following quality parameters:

- [1] Physical appearance of all Paneer samples (color, texture and flavor)
- [2] Chemical analysis (fat %, acidity %, total solids %, moisture %)
- [3] Bacteriological analysis (standard plate count, coli form count-identification of *E.Coli*, yeast and mold count)

General information about the paneer samples:

- Four branded samples (**A, B, C, D**) and two local samples from Laxmi nagar market, Delhi, are taken for the physical, chemical and microbiological analysis.
- All samples are tested after two days of the manufacturing date.
- **Paneer sample C** contains 0.2% salt, which helps in increasing its shelf life because salt act as a preservative agent in paneer.
- **Paneer samples A, B & D** are packed under laminates which give protection from the microorganisms and **sample C** has a very protective packaging, which consist of a HIPS grade tray and covered with aluminum foil. Sample C has best packing among other samples.
- Local Paneer samples from the market are without packaging.

I. Physical appearance

Appearance- Shall clear and free from dirt, surface discoloration and insect's contamination. It shall not have any free moisture.

Flavor - It shall have pleasant odor and characteristic mild acid flavor.

Texture - It shall have a closely-knit smooth texture and spongy body.

II. Chemical Tests

1. Moisture Detection

Calculated by using the formula:

$$\text{Moisture \% by mass} = \frac{100 (W1 - W2)}{(W1 - W)}$$

W1 = mass of gm of dish + sample before drying

W2 = mass in gm of dish + sample after drying

W = Mass in gm of empty dish

2. Determination of fat (Gerber's Method)

$$\% \text{ Fat} = \text{Butyrometer reading} \times 20/3$$

3. Determination of acidity (Titration method)

Calculated by using the formula:

$$\text{Titrateable acidity (\% lactic acid)} = \frac{10 - V \times 0.9}{W}$$

Where,

V= volume in ml of standard acid used in titration.

W= wt in gm of sample.

III BACTERIOLOGICAL ANALYSIS:

Introduction: Different agar or medium and specific medium for the identification of the different type of microbes, pathogenic microorganism present in the quality control laboratory are: Detection of Total Count, Yeast and mold, Coliforms, E.coli

Media used

- Plate Count Agar (Tryptone Glucose Yeast Agar- TGYA) for Standard Plate Count.
- Violet Red Bile Agar (VRBA) for Coliform.
- Brilliant Green Bile Broth – 2% for Presumptive Coliform Test.
- Chloramphenicol yeast glucose medium – yeast and mould count (used for fermented products)

Assessing sterility

i. Swab sampling

ii.Swab testing

Studies carried out on the microbial quality of Paneer have indicated that paneer is often contaminated with *staphylococcus aureus* and *coliform*.

IV. RESULTS AND DISCUSSIONS

In tropical countries like India, dairy products are responsible for many outbreaks of gastrointestinal infections. Dairy products prepared under unhygienic conditions pose a great threat to the health of consumers. The Indian cheese (Paneer) is a regular dietary favorite among the North Indians. A study was carried out to identify bacterial pathogens/contaminants in Paneer samples.

❖ Physical appearance of the samples(table:1):

Whey separation

- Four branded samples and two local samples are analyzed for their appearance.

- Studies found that in **Samples A and D** there is no whey separation. These are acceptable samples.
- Rest of the four **samples B & C; LOCAL-1 & LOCAL-2** have whey separation. Which affects its total solid %. These type of samples are not acceptable.

Color

- Color of all the six samples is white which is acceptable to the consumers.

Texture

Paneer shall have a closely-knit smooth texture and spongy body.

- **Samples A, D and LOCAL-2** has rough texture and has large pores on their surface; this defect is due to improper pressing during the manufacturing of Paneer.
- **Sample B and LOCAL-1** has smooth texture.
- **Sample C** has very smooth texture as comparable to other samples and gives good appearance to the Paneer.

Flavor

Paneer shall have pleasant odor and characteristic mild acid flavor.

- **Samples B and LOCAL -2** are found more acidic in taste. Confirmation is done by chemical test which shows that these two samples have maximum acidity, which is not acceptable.
- **Samples A, C, D and LOCAL-1** have normal acidity, which is acceptable.

❖ **Chemical analysis of the samples (Table 1):**

Weight of the samples

- There is little variation in weight of the samples but it does not affect the quality of the samples.

Fat %

- **Samples A and D** has highest % of fat among all other samples.
- **Sample B** also has an acceptable amount of fat %.
- **Sample C, LOCAL-1 and LOCAL -2** has lowest fat % which is not acceptable.

Acidity %

- **Sample B and local -2** have acidity above the acceptable level.
- Rest of the four samples has normal acidity as shown by the chemical test.

Total solids %

- **Sample B, C, local-1 and local -2** has lowest % of total solids because of whey separation in these samples.
- **Sample A & D** contains good amount of total solids.

❖ **Bacteriological analysis of the samples (Table 3):**

- All samples are positive for PCT (presumptive coliform test) except **Sample C** (negative for PCT), which has nil Coliform, Yeast & Mold count, the reason is due to very protective packaging of this sample.
- **Sample A:** +ve for PCT and confirmation is done by coliform count which is high in dilution 2nd. Growth of Yeast and Mold is also there.
Sample B: +ve for PCT, high count of SPC in dilution 5th, presence of coliform and Yeast & Mold count is also there
- **Sample C:** -ve for PCT, nil coliform and Yeast & Mold count in dilution 2nd. Very low count for SPC (standard plate count).
- **Sample D:** +ve for PCT, high count for SPC in dilution 5th, presence of coliform and Yeast & Mold count is also there.
- **local-1:** As local sample is considered to be the more unhygienically prepared but results shows that this sample has low SPC and Yeast and Mold count than sample D.
- **local-2:** This is a typical local sample, highly contaminated. Yeast and Mold count is very high in this sample. Presence of coliform is also there.

V. CONCLUSION

Good quality paneer is characterized by a white colour, mild acidity, spongy body and a closely knit texture. For the manufacture of good quality paneer sweet milk (fresh milk) is the best suitable raw material whereas high acidity or sour milk tends to produce sour flavour and bitter taste, which makes it unsuitable for the preparation of culinary dishes. An acceptable quality of paneer can be produced from slightly acidic or neutralized milk. Although the present scenario suggests that India is second largest producer of milk in the world but still surplus amount of improvisations like better packaging, more hygienic environment during its production, good manufacturing techniques etc have to be made to bring out utmost quality product in Indian market.

Table1: Physical appearance of the paneer samples

S.No.	Sample	Price-Rs	Whey separation	Color	Texture	Flavor
1.	A	25	NO	White	Rough surface	Normal
2.	B	25	YES	White	Smooth	Acidic
3.	C	28	YES	White	V. smooth	Normal
4.	D	25	NO	White	Rough	Normal
5.	LOCAL-1	25	YES	White	Smooth	Normal
6.	LOCAL-2	20	YES	White	Rough	Acidic

Table2: Chemical analysis of the paneer samples

S.No.	Sample	Wt. of sample	Fat %	Acidity %	T.S %	Moisture %
1.	A	203.0 gm	31.5	0.63	52.75	47.25
2.	B	206.0 gm	26	1.70	47.52	52.48
3.	C	211.0 gm	16	0.63	32.01	67.99
4.	D	209.1 gm	32	0.67	60.79	39.21
5.	LOCAL-1	202.0 gm	14	0.70	40.53	59.47
6.	LOCAL-2	204.0 gm	13	0.83	37.26	62.74

Table3: Bacteriological analysis of paneer samples

S.No.	Sample	PCT*	SPC*	COLIFORM	Y&M*
1.	A	+VE	33 X D5	7X D2	117 X D2
2.	B	+VE	180 X D5	56 X D3	69 X D3
3.	C	-VE	2 X D5	Absent in 1 st and 2 nd dilution	Absent
4.	D	+VE	224 X D5	10 X D2	316 X D2
5.	LOCAL-1	+VE	62 X D5	15 X D4	293 X D2
6.	LOCAL-2	+VE	260 X D5	30 X D4	715 x D2

*PCT- PRESUMPTIVE COLIFORM TEST * SPC - STANDARD PLATE COUNT * Y & M - YEAST AND MOULD

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