



**P-ISSN: 2349-8528**

**E-ISSN: 2321-4902**

IJCS 2019; 7(3): 1202-1204

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Received: 16-03-2019

Accepted: 18-04-2019

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## Incidence of adulteration in the paneer samples collected from Nagpur city

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### Abstract

Adulteration in paneer is very common, it is adulterated to increase the quantity and earn more profit. Synthetic paneer making involves extensive use of chemical like Urea, Coal tar dyes, detergent, sulphuric acid and starch. In the present investigation about 75 samples of paneer were examined which were collected from different regions viz., central, east, west, north and south. From each region, 15 samples were collected and analyzed during three fortnight. These paneer samples were collected by adopting stratified randomization technique and analyzed them for possible adulteration in Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur during year 2017-2018. Possible adulteration was analyzed in laboratory by legal method prescribed in ISI and FSSAI Hand book and the sale price of paneer considered by contacting with selected respondent from different sources. Adulteration of starch was more or less found in all regions paneer samples. Whereas, adulteration of coal tar dyes was found in central, west, north and south regions. However, east region paneer gives negative test for coal tar dyes and only two samples gives positive test for starch, hence east region paneer found superior over other with respect to starch and coal tar dyes adulteration. The sale price of paneer sold in west region was highest (Rs.320/kg) as compared to all regions (Central, East, West and South).

**Keywords:** Paneer, cottage cheese, adulteration, starch, coal tar dyes, sale price, cost

### 1. Introduction

Paneer is full of nutrients such as the protein which aids weight loss, calcium and vitamin D good for healthy bones and teeth, vitamin A, iron, potassium, manganese, phosphorous, selenium, sodium and zinc etc. that are necessary for a healthy body. Paneer contains conjugated linoleic acid, Vitamin D, and calcium, which protects against cancer. This kind of cheese is low in carbohydrates, high in protein and magnesium that makes it safe for people with diabetes. Paneer is rich in phosphorus, which results in improved digestion. Paneer contains omega 3 fatty acids which promote heart health by controlling lipid profile. Experts recommend eating paneer raw. It is one of the best options for healthy snacking. Paneer is also known as boneless meat for vegetarians. Because of such amazing health benefits of paneer, their demand is increasing in Indian cuisine. Now, it enjoys the status of a national delicacy. To full fill the increasing demands of consumers paneer is adulterated with some small quantity of adulterants like starch, coal tar dyes and urea intentionally to improve the appearance, texture or storage properties.

Paneer adulterated with starch which is used to give it thick, rich texture. Its harmful effect is that it is unhygienic, unprocessed water and starch can cause stomach disorders. Starch greatly reduces the nutritional value of the ingredient (Lakshmi, 2012) [7]. Globally, 57 % of people (32% children and 25% adult) have developed health problems due to ingestion of adulterated and contaminated foods. It is important to mention that about 22 % of foods are manually adulterated in order to reduce the amount of expensive product (Pal, 2017) [11].

Coal tar dyes are generally formed as a by-product of hydrocarbon solvents. They are used to dilute bituminous coal – a form of coal that is often used in the steel-making process. When the coal is diluted with these hydrocarbon solvents, it produces a variety of colors. Coal tar dyes are known to contain small amounts of other heavy metals additives (such as aluminum). Ingesting them over a continuous amount of time can potentially cause brain damage or speed up the progression of brain diseases like Alzheimer's (Backe, 2018) [2].

Adulteration is commonly practiced in both branded and unbranded foods in daily life. From local market to the hypermarket adulteration is prevalent everywhere. Majority of adulteration in India is Intentional adulteration and it affects the people of all the age group. Even today,

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many people in India are unaware about adulteration and its harmful effects (Abhirami, 2015) <sup>[1]</sup>. Keeping these in mind, present paper focused on adulteration of paneer sold in Nagpur study.

## Materials and Methods

The present investigation was carried out to detect adulteration of paneer in the laboratory of Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur during year 2017-2018.

In all 75 samples of paneer were examined during the course of investigation which were collected from different regions viz., central, east, west, north and south region. From each region, 15 samples were collected and analyzed during three fortnight. So, 5 samples of each regions were analysed each fortnight. These paneer samples were collected by adopting stratified randomization technique.

## Tests for detection of adulteration

Market samples of paneer were subjected to detection of starch and coal tar dyes.

### 1. Starch

Market paneer samples were tested for adulteration of starch. Starch was detected according to the method given in IS-1479 Part I (1960)

### Procedure

Approximately one gram of paneer was placed in test tube. 5 to 10 ml of distilled water was added. The content were boiled by holding the test tube over a flame. The test tube was allowed to cool at room temperature. One to two drops of one per cent iodine solution were added. Presence of starch was indicated by the appearance of a blue colour which disappeared when the sample was boiled and reappeared when the sample was cooled indicating presence of starch in the sample.

### 2. Coal tar dyes

Market samples were tested for adulteration of coal tar dyes. Coal tar dyes was detected according to the method given by FSSAI (2012) <sup>[5]</sup>

### Procedure

One teaspoon full of product was placed in the test tube and 5 ml of dilute sulphuric acid was added and shaken it well. Presence of coal tar dyes was indicated by the appearance of a pink colour.

## Result and Discussion

In India, in the last few decades, the popularity of Paneer has spread from the northern parts to all over the country. Its growing popularity has leads to increase in the rate of adulteration for earn more profit. Due to all those reasons, the need of investigation is arise to ensure its quality. Result with regard to adulteration of paneer sold in Nagpur city and their

respective sale price according to different zones are given in table 1.

## Detection of Adulteration

### Starch

When market paneer samples obtained from Nagpur city were tested for starch. The iodine test was positive for central, east, west, north and south paneer which was sold in Nagpur city for 5, 2, 3, 6 and 3 samples (out of 15 samples each), respectively. Sharma *et al.* (2005) <sup>[16]</sup> noticed very few samples of paneer adulterated with starch in Haryana and Uttar Pradesh. Adulteration was less pronounced in paneer samples, this might be due to the reason that, most of the adulterants are removed along with whey during preparation of paneer. These findings are agreeable with the findings of present study. On the contrary, Abhirami and Radha (2015) <sup>[1]</sup> when conducted adulteration test to detect starch in paneer they not found the adulterant in tested samples of paneer.

### Coal tar dyes

When market paneer obtained from Nagpur city were tested for coal tar dyes. The test was negative for east paneer collected samples while, this test was positive for central, west, north and south paneer which was sold in Nagpur city for 2, 1, 2 and 1 samples, respectively out of 15 samples from each.

Little work so far has been made to investigate nature of adulteration in paneer, its ill effects on health of consumers. Hence, further research should be done to detect the adulteration with substances other than starch and coal tar dyes.

### Sale price of paneer

Prevailing sale price per kg of paneer sold in Nagpur city of various regions (Rs.) is given in Table 1. The sale price of paneer obtained from west region was found to be Rs.320/kg which was highest amongst all regions while the lowest cost of paneer was found in central and north regions i.e. Rs.280/kg. The cost of paneer obtained from east and south region was found to be Rs.300/kg. The difference in sale price per kg of paneer sold in Nagpur city might be due to the quality parameters.

The sale price of paneer in Nagpur city found higher than the observation recorded by Shakuntala (2013) <sup>[14]</sup>, reported price of paneer as 135.71 Rs/Kg. Whereas Sweta and Bhongal (2013) <sup>[18]</sup> and Sharma and Chandel (2016) <sup>[15]</sup> found that, consumer price of paneer in the range between Rs.110 to Rs.140 per Kg.

The market price of paneer and almost all the dairy products always fluctuated, place-to-place and season-to-season too. During traditional functions, dairy products are always costly as compared to other days. As the Nagpur city going to become a metro politian city in upcoming years, where dairy product manufacturers gets good price for paneer and other dairy milk products generally throughout the year.

**Table 1:** Average percent adulteration and cost of paneer sold in Nagpur city

Sr. No.	Region	No. of sample taken	Test for Starch			Test for Coal tar Dyes			Average Cost/kg (Rs)
			+ (ve)	- (ve)	Per cent adulteration	+ (ve)	- (ve)	Per cent adulteration	
1	Central	15	5	10	33.33	2	13	13.33	280
2	East	15	2	13	13.33	0	15	00.00	300
3	West	15	3	12	20.00	1	14	6.67	320
4	North	15	6	09	40.00	2	13	13.33	280
5	South	15	3	12	20.00	1	14	6.67	300

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