

Identification of Food Adulterants present in Turmeric, Coriander, Chilli Powder using Low cost Laboratory Methods

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Abstract

Adulteration in food items is one of the common issues in the present scenario. In connection with this issue, the present investigation was carried out to determine the presence of adulterants in species powders used for cooking. The major species powders used for cooking in India are turmeric powder, coriander powder and chilli powder. Various samples of species powder were collected from in and around the local grocery shops of Coimbatore area. The presence adulterants were determined using laboratory methods viz, physical and chemical methods. The results revealed the food adulteration in the most of the species powder under investigation. The study was performed to create awareness to the public on the adulteration in ready-made packed species powders and simple techniques to identify the food adulteration.

Keywords: Food, adulteration, species, awareness, techniques, laboratory method

Introduction

Highest expectation of human being is to lead a disease –free life and consume high quality food, but in today's world, these are supposed to be highly difficult. Most of the food products and the grocery items used in the kitchen are found to be highly adulterated. In the recent report released by the Food Safety and Standards Authority of India (FSSAI), most of food samples tested were found to be violating the standards of FSSAI and also contaminated with adulterants. Consumption of adulterated food items will lead to severe health issues. Food adulteration is defined as the intentional or unintentional substitution with inferior foreign particles in food or the extraction of a value-added food substitute from the main food component [1]. Food adulteration involves injecting harmful chemicals into food, which lowers the quality of the food. To identify the adulterated items rapidly and for continuous surveillance, FSSAI advised to use the mobile Food laboratories so as to boost up the public confidence and also to

create awareness among the public. In India, adulteration is most common in spices, oil and other food items. These include artificial colours in red chilli powder, blackberries in black pepper, cheap oil mixed with coconut oil, lead chromate adulteration in turmeric and cassia bark in cinnamon [2]. In the present study, detection of food adulterants in spice powders was carried out by using laboratory methods. Laboratory test method is one of the fast, easy and preliminary tests to detect the food adulterants. Spice powders like chilli, coriander and turmeric powder collected from different grocery shops of Coimbatore were taken for the detection of adulteration.

1. Materials and Methods

1.1 Collection of samples

Four samples of chilli, coriander and turmeric powders were collected from different grocery shops of Coimbatore and are named accordingly.



Figure-1: Different samples of a) Turmeric b) Coriander c) Chilli Powder

1.2 Detection of Adulterants

Qualitative test for the detection of adulterants using laboratory chemicals were carried out by adapting standard procedure (4). Brief protocol for the test carried out for detecting different adulterants is given below

2.2.1 Qualitative test for detection of adulterants in turmeric powder

a. To detect the presence of yellow lead salts

2 g of turmeric powder is taken in a test tube. Conc. Hydrochloric acid is added to it. Magenta colouration indicates presence of yellow oxides of lead.

b. To detect the presence of chalk

2 g of turmeric powder is taken in a test tube. Few drops of water and then few drops of Hydrochloric acid are added to it. Effervescence will indicate the presence of chalk.

c. To detect the presence of Metanil yellow

A sample of turmeric powder is taken. To it 13N sulphuric acid is added. Disappearance of red colour on adding distilled water indicates the presence of metanil yellow

d. To detect the presence of aniline dyes

To a sample of turmeric powder few drops of water is added. To it 5 ml of spirit is added. Immediate disappearance of yellow colour indicates the presence of aniline dye

e. To detect the presence of starch of maize, wheat and rice:

Microscopic view reveals that pure turmeric is yellow in colour and bigger in size

2.2.2 Qualitative test for detection of adulterants in coriander powder

a. To detect the presence of dung powder

Soak a sample of coriander powder in water. Dung/sawdust will float and can easily be detected by its foul smell.

b. To detect the presence of common salt:

A sample of coriander powder is taken. To it 5 ml of water is added. Next few drops of silver nitrate is added to it. White precipitate confirms presence of salt.

2.2.3 Qualitative test for detection of adulterants in chilli powder

a. To detect the presence of red lead salts



Fig 1. Presence of yellow lead salts

Dilute nitric acid is added to the sample of chilli powder. The solution is filtered. Next 2 drops of Potassium Iodide is added to the filtrate. Formation of yellow coloured precipitate indicates the presence of red lead salts.

b. To detect the presence of brick powder:

Chilli powder is added in a beaker containing water. Brick powder settles down while pure chilli powder floats.

c. To detect the presence of Rodamine B

2 g of chilli powder is taken in a test tube. 5 ml of acetone is added. Immediate red colouration indicates the presence of Rodamine B.

2. Result and discussion

2.1 Adulteration in turmeric powder

Four samples of turmeric powder were subjected to qualitative test for detecting the adulterant. From the results it was found that out of four samples. All the four samples were found to be contaminated with yellow lead salts and the samples A2, A3 and A4 were giving positive results for Metanil yellow. The sample A3 has effervescence and depicted the presence of chalk. The immediate disappearance of yellow colour was observed in the samples A2 and A4 indicates the presence of aniline dye contain aniline dye.

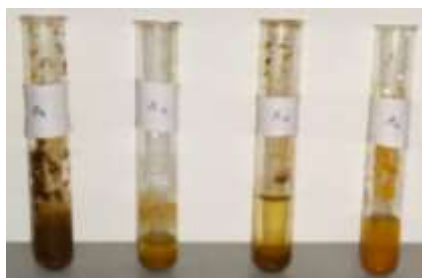


Fig 2. Presence of Metanil yellow



Fig 3. Presence of aniline dye

2.2 Adulteration in coriander powder

As the samples were tested for adulterant in coriander powder, the dung floated in the B2 sample only and indicates the presence of dung powder.



White precipitate was observed in all the samples which depicted the presence of common salt.



Fig 4. Presence of dung powder

3.3 Adulteration in chilli powder

The selected samples were tested for the adulterant present in chilli powder using qualitative tests. Out of four samples, sample C4 exhibited yellow coloured precipitate which indicated the presence of red lead salts. Samples-C2,3,4 exhibited



Fig 6. Presence of lead in Chilli powder

Fig 5. Presence of common salt

positive test for adulterant brick powder. Among four samples of Chilli powder, sample C1 shows negative test for rodamine B and all other three sample found to be having rodamine B



Fig 7. Presence of Rhodamine B

Conclusion

In the present work, the species collected from various grocery shops contains lot of chemicals as adulterant which can cause harmful diseases for human. The absence of insects, visible fungi and foreign objects can be examined visually and it is not possible to guarantee for the absence of toxic chemicals. To control adulteration, the quality of packed food material must be inspected in the regular intervals. At the time of purchase we have to know the ingredients and nutritional value of the food. The manufactures and sellers of adulterated product for the sake of the profit must be punished by the government.

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