

Adulteration in Spices – A Threat to Human Health and Well Being

Sohini Roy¹, Susmita Mukherjee¹, Asmeeta Sircar¹, Debsikha Dutta Roy¹, Ishika Banerji¹, Snejuti Barua¹, Sonali Paul^{1*}

¹Department of Biotechnology, University of Engineering and Management (UEM), University Area, Plot No. III - B/5, New Town, Action Area - III, Kolkata, West Bengal 700160

*Corresponding email: sonali.paul@uem.edu.in

Abstract

Spices are used to flavor food and are a common ingredient of cooking. But adulteration by some people have led these spices to not increase the aroma of food but to convert it into a food item unfit for human consumption. This study is based on detection of food adulterants in various samples of turmeric powder using various analytical methods. It was found from the results that branded turmeric powder contains different adulterants like yellow lead, metanil yellow which are toxic for human health.

Keywords

Spices, Adulteration, analytical methods.

Introduction

Food is one of the basic necessities of life. But nowadays even it is exploited by mixing several harmful adulterants. These adulterants varies from too harmful which might cause

cancer and various diseases to less harmful which harms us too. Our study helps identify these adulterants in turmeric powder (Encyclopedia of food safety).

Food adulteration occurs globally and in many facets and affects almost all food commodities. Adulteration may lead to serious health issues for consumers. As the methods of adulterating foods have become more advanced, very efficient and improved techniques for the detection of these harmful manipulations are required (Scheiber, 2018).

Food adulteration risk – intended to harm or commit food fraud motivated by economic gain – is growing in scope, scale, and threat. The adulteration risks are direct, indirect, and technical. Public health vulnerability in each case is because the production operation is probably not following the good manufacturing practices. Examples of fraud include melamine in milk,

carcinogen colorants in foods, dilution of fruit juices (Spink, 2014)

Spice is a seed, fruit, root, bark, bud or vegetable substance primarily used for flavouring, coloring or preserving food. Common and rare spices have their respective adulterants that either are mixed while preparation of the spices or completely replace the original spices (Jaiswal et al., 2016).

In our current work we have tried to analyze the type of adulterants found in one of the most common spices – turmeric

Materials and methodology:

Study samples:

Turmeric powders from four different brands were collected along with a sample of unbranded one from local grocery shop which prepares spices by grinding the spices with a grinder at the shop.

To detect the presence of yellow lead salts:

2g of turmeric powder was taken in a test tube. Concentrated hydrochloric acid was

added to it. Magenta colouration indicates presence of yellow oxides of lead

To detect the presence of chalk:

2g of turmeric powder was taken in a test tube. Few drops of water and then few drops of concentrated hydrochloric acid was added to it. Effervescence indicates the presence of chalk

To detect the presence of metanil yellow:

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

To detect the presence of aniline dyes:

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

Results:

	presence of yellow lead salts	presence of chalk	presence of metanil yellow	presence of aniline dyes
Brand 1	✓	✓	✓	✓
Brand 2	✓	-----	✓	-----

Brand 3	✓	✓	✓	✓
Brand 4	✓	-----	✓	✓
Unbranded locally made	-----	✓	-----	-----

Discussion:

We consume the spice - turmeric in our everyday Indian cooking. As the number of cancer cases is rising every day, study is being conducted globally to understand the probable causal factors. Lead salts lead to contamination of food with lead which may lead to harmful effect on the vital organs of our body. Young children are more likely to be affected. Chalk, though is not as toxic as the other types of contaminants are added to reduce the cost and adds to the impurity content. Metanil yellow is azo dye synthesized from the coupling of metanilic acid and diphenylamine and is carcinogen. Aniline dyes is also a toxic food additive. (Purba et al., 2015). This study was conducted to understand how safe the spice turmeric is for everyday consumption.

One interesting finding from the results is that the samples from branded companies are having more adulteration than the unbranded one, where as people pay more to buy branded products. Among the adulterants especially Metanil yellow and Lead salts are more damaging. Hence the unbranded one obtained at the neighborhood shop which had

adulterants but less toxic in nature and is therefore better recommended.

Conclusion:

From the study we may conclude that the spices should be checked for the presence of harmful adulterants to protect the health of the people of our country. Most interestingly we pay more for the branded product considering these to be good but unbranded one is better for consumption.

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