BHARATHIDASAN UNIVERSITY

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UNIT IV

TESTING ADULTERATION OF SPICES

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Extraction of Flavour: Coriander Powder

This presentation explores the common adulteration techniques used in coriander powder and outlines reliable methods for identifying these impurities. The goal is to empower consumers and food businesses to ensure the purity of their coriander powder.

Introduction to Coriander Powder

Coriander Powder: A Global Spice:

Coriander powder is derived from the seeds of the Coriandrum sativum plant. It's a vital spice in countless cuisines globally, used in curries, sauces, and seasonings. Its distinct, citrus-like aroma and earthy flavor enhance a variety of dishes.

Adulteration: A Growing Concern

Unfortunately, adulteration of coriander powder has become a significant issue. It's essential to understand the common adulterants and the methods used to detect them, ensuring safe and high-quality ingredients.

Test for Starch in Coriander Powder

Iodine Test

Add a few drops of iodine solution to a small sample of coriander powder. If the sample turns blue-black, it indicates the presence of starch.

Microscopic Examination

A more precise method is to examine the powder under a microscope. Starch granules will be visible, their shape and size varying depending on the source.

Identifying Horse Dung Powder in Coriander Powder

1 2 3

Smell

horse dung powder has a distinct, unpleasant odor that sets it apart from the aroma of pure coriander powder.

Color

It often has a dark brown color, making it visibly different from the normal tan color of coriander powder.

Microscopic Examination

Under a microscope, horse dung powder will reveal its unique, fibrous structure, distinct from coriander powder.

Physical Inspection of Coriander Powder

Color

Pure coriander powder has a consistent tan color. Any variation in color can indicate adulteration.

Texture

Coriander powder should have a fine, powdery texture. Any gritty or coarse particles suggest impurities.

Presence of Foreign Material

Closely inspect the powder for any visible signs of foreign materials such as twigs, stones, or insects.

Importance of Purity in Coriander Powder

1

Flavor Integrity

Pure coriander powder delivers the true, nuanced flavor profile that enhances recipes.

2

Health and Safety

Contamination with adulterants can pose health risks, particularly with horse dung powder.

3

Food Quality

Purity ensures consistent, reliable quality and enhances the overall reputation of the product.

Impacts of Adulteration on Consumers

1

Health Concerns

Exposure to pathogens from adulterants can lead to foodborne illnesses.

2

Loss of Trust

Adulteration erodes consumer trust in food products and brands.

3

Economic Loss

Consumers pay for a product that's not what they think they're buying.

TESTING ADULTERATION FOR SPECIES

INTRODUCTION

- Common adulterants mixed in red chilli powder are brick powder, sawdust, sand, soapstone, water-soluble coal-tar based colours, and red oxide.
- Another dangerous adulterant that may be added to red chilli powder is a chemical called Rhodamine B. Rhodamine B is a by-product of the process of extraction of chilli oil.
- It is poisonous and harmful to humans. When mixed with oil and dried, it forms a mixture that looks precisely like red chilli powder. This powder is meant to be used as an additive in furnaces. However, there have been reports of same being mixed with and sold as chilli powder

TEST FOR OIL SOLUBLE DYES

- Oil soluble dyes are also known as oil dyes, oil-based dyes, or solvent based dyes. They are commonly used in the automotive industry to color petrol and other hydrocarbon based fuel oils.
- To test for oil soluble dyes in chili powder, you can use the following procedure:

1. Add a few milliliters of ether to a test tube containing 2 grams of chili powder
2. Shake the test tube well
3. Decant the ether layer into another test tube containing 2 milliliters of dilute hydrochloric acid
4. Shake the test tube again
5. Observe the color of the lower acid layer
6. If the lower acid layer is red or pink, the chili powder contains oil soluble dyes

TEST FOR POWDERED BRAN

- **Bran** is the outer skin of grain that is left when the grain has been used to make flour.
- If chili powder contains powdered bran, you can sprinkle some of the powder on water and observe if any bran floats on the surface:

❑ **Pure chilli powder**

- Pure chilli powder will settle to the bottom of the glass without leaving any color streaks or traces of bran on the water's surface.

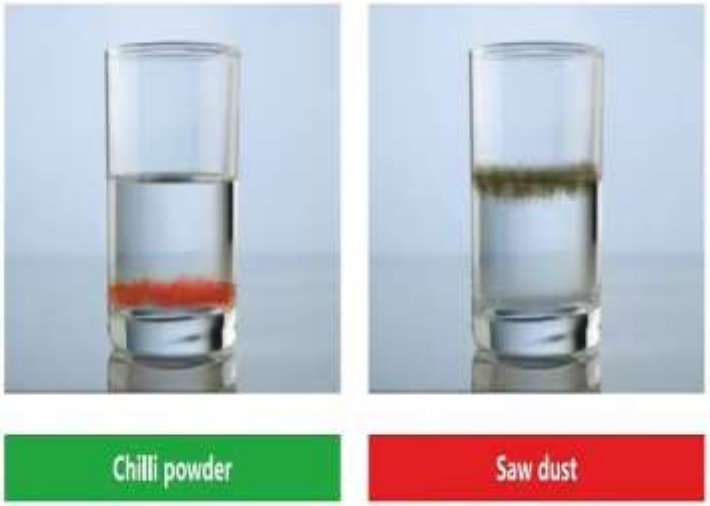
❑ **Adulterated chilli powder**

- Adulterated chilli powder will have traces of bran floating on the water's surface, and may also leave color streaks in the water.

TEST FOR SAW DUST

- To test for saw dust in chili powder, you can perform the following simple test:

1. Add a teaspoon of chili powder to a glass of water
2. Observe the residue
3. Rub a small amount of the residue between your palms
4. If you feel grittiness, the chili powder is adulterated with saw dust or brick powder



Turmeric Powder: Test for metanil yellow and lead chromate polish

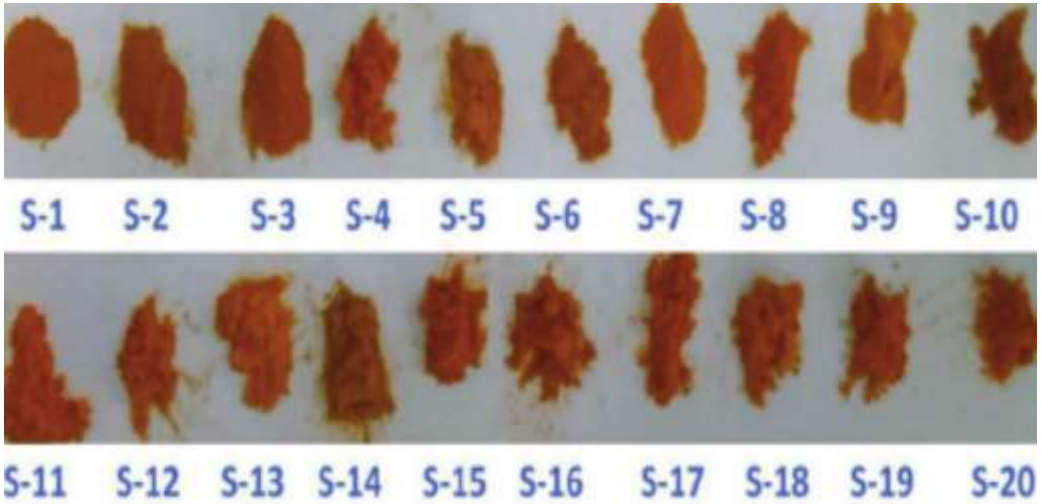
The food products available in the market today are made attractive by adding food colors. Fruits, vegetables, spices, sweets, and even the commonest drugs used as medicine in day-to-day life are adulterated with nonpermitted colors. Haridra or turmeric is the most popularly used Vishaharadravya/antitoxic drug which is taken internally almost every day both in diet and as medicine.

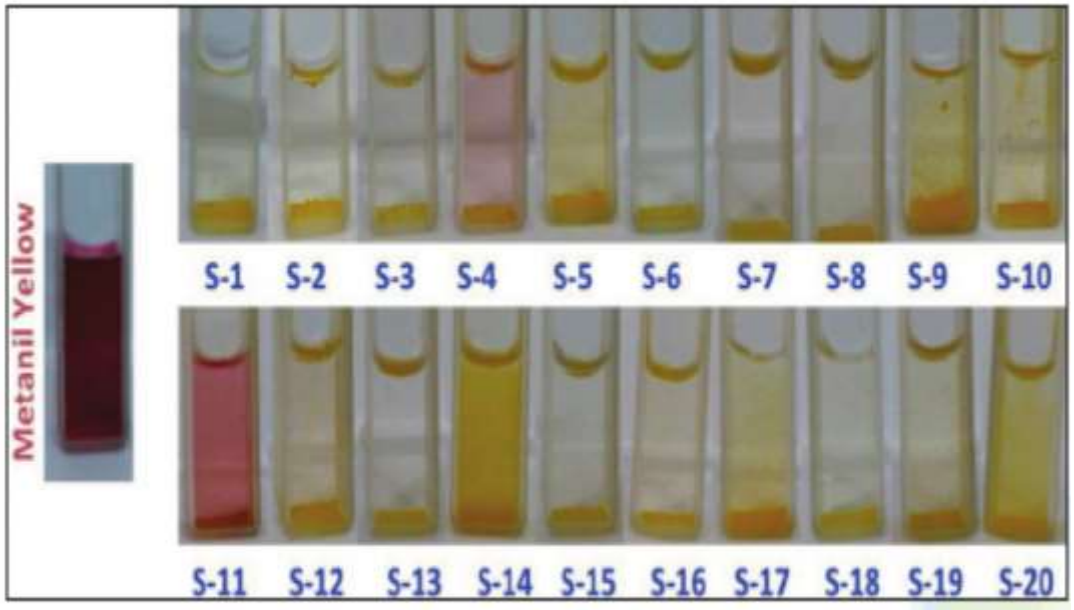
Hydrochloric acid test for metanil yellow

For the preliminary test, a pinch of turmeric powder was taken in a test tube.

A few drops of concentrated hydrochloric acid (HCl) were added to it followed by distilled water.

Appearance of pink color instantly and its persistence confirmed the presence of MY in the sample





Detection of Lead Chromate in Turmeric Powder Safety precautions:

Concentrated H_2SO_4 is corrosive and can cause burns.

Handle it with care.

Use Pasteur pipette to add acid.

Apparatus

Pasteur pipettes/ Dropper Reagents

1:7 H_2SO_4: Add 10 ml of concentrated H_2SO_4 carefully to 70 ml of distilled water.

Diphenycarbazide (0.2%): Weigh 200 mg of Diphenylcarbazide and dissolve in 100ml of 95% alcohol.

Procedure

i. Ash about 2 grams the sample.

ii. Dissolve it in 4-5 ml of 1:7 sulphuric acid (H_2SO_4) and filter.

iii. Add 1ml of 0.2% diphenylcarbazide.

iv. Observe any change

CHEMICAL TEST

*Dissolve a drop of clove oil in 5ml of alcohol and add a drop of ferric chloride solution. Blue colour is seen because of phenolic OH group of Eugenol

*Take a powder of clove and add it sudan Red colour is formed.

*Treat a thick section of hypanthium's clove with 50% potassium hydroxide solution. Needle shape crystals of potassium Eugenate are seen.

*Prepare a decoction of clove and add it ferric chloride solution. Blue-black colour is formed because of the tannin.

ADULTERANT

- Exhausted clove: Volatile oil is partly or completely removed.as a result buds appear darker in color, shrunken in form and yields no oil.Mother cloves (anthophylli) are the ripe fruits of cloves that are ovoid, brown berries, unilocular and one-seeded.
- This can be detected by the presence of much starch in the seeds. They also contain volatile oil but only about 3-5%.
- Brown cloves are expanded flowers from which both corolla and stamens have been detached.Clove stalks are slender stems of the inflorescence axis that show opposite decussate branching.
- Externally, they are brownish, rough, and irregularly wrinkled longitudinally with short fracture and dry, woody texture.