INNOVATIVE PRACTICE:

DEPARTMENT OF BOTANY

Innovative Practices by the Students of the Department of Botany

2018-2019 onwards

Medicinal Garden Growth Facility and Preparation of Plant Extracts for Popularization of their Therapeutic Uses

Brief Background of the work

The students in the department of Botany have been directed to study and prepare extract of some common medicinal plants growing in the herbal garden of college premises. The following table (1) shows some of the enlisted plants which are commonly studied by the students apart from their regulate curriculum. The documentation of medicinal plants are then performed by them which include their nomenclature details, morphology, distribution, and their uses. Microscopic examination and organoleptic evaluation is followed by preparation of powdered extract or decoctions. The uses are popularized in the local area, and hostel dwellers.

Sl No.	Common name	Scientific Name	Family	Parts of Plant used	Preparation	Uses
1	Neem Bengali- Neem Hindi- Neem	*Azadirachta indica*	Meliaceae	All parts of plant (Leaves, bark, root, fruits etc.)	Leaf extracts Oil extracts	• Treatment for diabetes • Used in organic farming • Used as insect repellent
2	Holy Basil Bengali-Tulsi Hindi- Tulsi	*Ocimum sactum*	Lamiaceae	Leaves, Flowers, Seeds	Leaf extracts, Juice, Decoctions	• Treatment of epilepsy, asthma or dyspnea, hiccups, cough, skin and haematological diseases • Reduce blood cholesterol level • Treating fever
3	Malabar nut Bengali-Basak Hindi- Vasaka	*Adhatoda vasica*	Acanthaceae	Leaves	Leaf juice, leaves decoction,	• Act as a bronchodilator • An anti-asthmatic • Reduce inflammation • Remediate for cough and cold

Attested
Principal
Bongaigipur College

4	Ginger Bengali-Ada Hindi- Adrak	*Zingiber officinale*	Zingiberaceae	Rhizome	Powder	• Used as a spice, flavouring, food, and medicine • Supporting the immune system and digestion • Relief from nausea and vomiting
5	Alstonia Bengali-Chatim Hindi- Chitvan	*Alstonia scholaris*	Apocynaceae	Bark, Root, Latex	Bark paste Bark extracts Root juice	• Bark is used for fever, dyspepsia, skin diseases, liver complaints, chronic diarrhoea, and dysentery
6	Kalmegh Bengali-Kalmegh Hindi- Kalmegh	*Andrographis paniculata*	Acanthaceae	Leaves	Leave juice	• Good for diabetics, helps with common cold, • Improving the digestive problem • Antibacterial properties
7	Turmeric Bengali- Halud Hindi- Haldi	*Curcuma longa*	Zingiberaceae	Rhizome	Powder	• Used to treat digestive system, joints, skin, and respiratory conditions
8	Aloe Bengali- Ghrita Kumari Hindi- Ghikaur	*Aloe vera*	Asphodelaceae	Leaves	Juice, Gel	• Reduce swelling in the skin, relieve redness and scaling, soothe itchy skin • Oral use of aloe is promoted for weight loss, diabetes, hepatitis, and inflammatory bowel disease
9	Willow-leafed Justicia Sanskrit- Kasanah	*Justicia* sp,	Acanthaceae	Leaves	Powder	• Cures asthma • Regulates immunity • Cures tuberculosis • Bronchodilator

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Tanglpur College

Fig 1. Preparation of powdered extract from some plants (*Zingiber* sp; *Alstonia* sp.; *Justicia* sp.)

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Jangipur College, University of Kalyani

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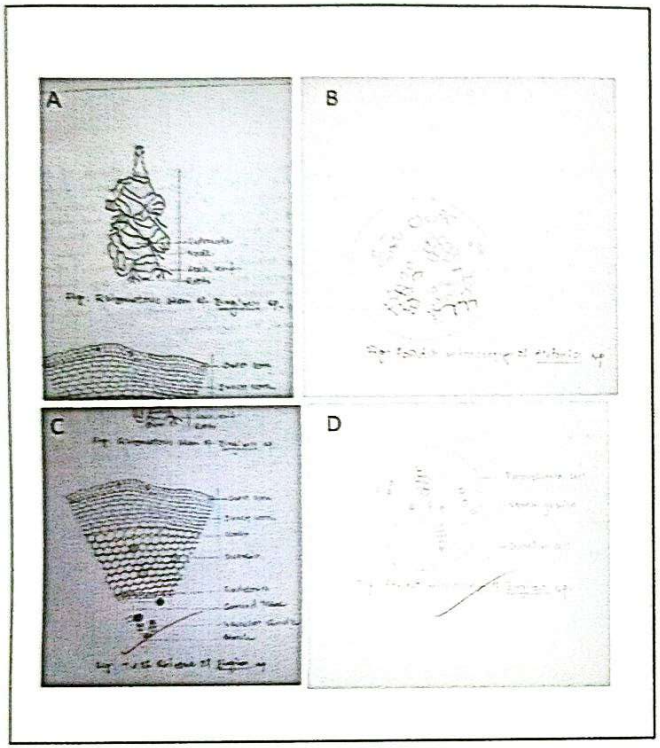

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Fig 2. Morphological and Anatomical study of plant parts performed by students

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INNOVATIVE PRACTICE:

DEPARTMENT OF CHEMISTRY

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JANGIPUR, MURSHIDABAD, WEST BENGAL - 742213

Ref. No. JC/……. Dated: 30.06.23

Innovative Practice of the Department of Chemistry

Practice Title: Hand Sanitizer Preparation using Ingredients from the Laboratories of the Department of Chemistry, Jangipur College

Objective: The objectives of this practice are the following:

1. Promoting innovative practice in the Department of Chemistry so that students are encouraged to use common and handy resources and come up with something that is useful to all.
2. Cost effective – the said practice saves a lot of money which otherwise is required to purchase Hand Sanitizers from the market. The product prepared in the Laboratories of the Department of Chemistry is a quality product and it serves the purpose it is prepared for.

Ingredients Used:

1. Plastic Bottles
2. Nozzles
3. Ethyl Alcohol (99.9%)
4. Glycerin
5. Hydrogen Peroxide (3%)
6. Double Distilled Water

Procedure of Making Hand Sanitizers:

The Department of Chemistry, during the pandemic period and thereafter devised a project to reuse bottled mineral water containers and such other plastic bottles with nozzles. Such bottles were filled with common chemistry laboratory's chemicals like ethyl alcohol (99.9%), Glycerine, Hydrogen Peroxide (3%) and Double Distilled Water in proportions as directed by Dr. Naba Kumar Ghosh, Assistant Professor in Chemistry, to produce hand sanitizers which could be sprayed on palms and solid surfaces as and when required.

Use of the Product: The Hand Sanitizers thus prepared have been extensively used by students of the college and staff as well. During the onslaught of Pandemic, Hand Sanitizers were placed at strategic places of the campus including classrooms, office, laboratories, staff-rooms, corridors, near every wash basin, wash-rooms, and the Boys' Hostel of the college. The product is still used in the college.

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Ref. No. JC/……. Dated: 30.06.23

Picture:

……..

Dr. Naba Kumar Ghosh
Teacher-in-Charge, Jangipur College &
Assistant Professor, Department of Chemistry

INNOVATIVE PRACTICE:

DEPARTMENT OF GEOGRAHY

&

DEPARTMENT OF ENVIRONMENTAL SCIENCE

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S.S.R.- 3.2.1 SESSION: 2018-19 to 2022-2023

Innovative Practice of the Department of Geography & Environmental Science

Practice Title: Rainwater Harvesting for Water Conservation in College Campus.

Objective: The objectives of this practice are the following:

1. To recycle water and preserve rainwater in different niches within the college campus.
2. To collect and store rainwater in order to recharge groundwater level.
3. To satiate the requirements of water for the entire college campus.
4. To arrest the wastage of water through drainage pipes

The Practice

There are drainage pipes attached to the roofs within the premises of college campus through which a lot of water runs in pits and wasted. The students and faculty members of the Departments of Geography and Environmental Science noticed the imminent crisis of water wastage and decided to report the matter to the management of the college. The Governing Body of the college steadfastly looked into the matter and suggested a solution for water conservation. It was decided that rainwater harvesting would be taken up as an innovative practice for a sustainable eco-friendly campus and retain the water to foster a greener campus. The college adapted the method of surface run-off rainwater harvesting. The harvesting pit does not let the water run-off and redirected to deep pits so that it seeps down and restores the ground water.

Outcome of the Practice:

Before the environmental audit was undertaken in college in 2022-2023 session, rainwater harvesting was implemented in college campus. The practice was initiated in August 2021 and the results were cost-effective.

Picture:

……..
Dr. Naba Kumar Ghosh
Teacher-in-Charge, Jangipur College

INNOVATIVE PRACTICE:

DEPARTMENT OF PHYSICS

Innovative practice of the department of Physics

Title: Satellite Based Weather Monitoring system with Make-it-Yourself Antenna and Software Defined Radio

Objective:

1. To promote innovative practice in the Department of Physics where Students use their theoretical knowledge learned in the class and apply it to practical use by making a useful device.

2. Students use their textbook knowledge of Electromagnetic Wave and their Propagation (EM theory) to construct a Quadrifilar Helix (QH or QFH) antenna to receive weather satellite data. This data, with software post processing, is used to generate a cloud distribution map over the land covered by the passage of the satellite.

Ingredients:

1. PVC pipes (1.5 inch and 0.5 inch diameter), end cap, mounting clamps, glue.
2. RG174 cable and 12 gauge copper wire (earthing wire) for antenna element.
3. Software Defined Radio (SDR) receiver USB dongle.
4. RG58 cable for transmission of signal from antenna on roof to SDR in lab.
5. A Laptop / Desktop with SDR software and image processor software (open source).
6. Tools: Drill machine, Hole cutter, Soldering iron, Saw, Pliers, Screw driver, knife etc.

Procedure:

The Target satellites that we want to monitor for this project were launched by NOAA (**N**ational **O**ceanic and **A**tmospheric **A**dministration), a US agency, in the 1970s. The downlink frequencies of the target satellites are 137.10 MHz to 137.92 MHz, so we use **137.5 MHz** as the center frequency. The design parameters (*e.g.* length of the antenna elements, inter element spacing, etc.) are available (open source) in NOAA and other blog websites. Students cut the PVC pipes, and 12 gauge wires, and drill holes, as per the dimensions. After fixing the PVC frame with glue and letting it dry overnight, students fix the antenna elements and solder them with coaxial cable. Then they fix it on the highest roof of the college building. All construction steps and installation were supervised by teachers of the department.

Use of the project:

This project gives students hands-on experience on how to build an antenna for a particular frequency and the effect of EM wave polarization. Another outcome of the project is the remote images of the land area over which the satellite passes. During the monsoon we can observe the cloud distribution over the satellite coverage area.

Future Prospects:

i) To use the satellite images of clouds and correlate them with actual rainfall amounts and then use this correlation data to predict rainfall amounts (approximately).

Pictures:

Dr. Naba Kumar Ghosh
Teacher-in-Charge, Jangipur College &
Assistant Professor, Department of Chemistry.

INNOVATIVE PRACTICE:

DEPARTMENT OF ZOOLOGY

Inspecting Adulteration: A Localized Approach to Ensure Food Safety

By Department of Zoology

Yearly Report: 2018-2019

Introduction:

In the pursuit of safeguarding food safety within our campus community, the Department of Zoology at Jangipur College initiated a study titled "Inspecting Adulteration: A Localized Approach to Ensure Food Safety." This study aimed to assess the quality and purity of commonly used food items in the college canteen, specifically focusing on oil and turmeric. The study spanned from 2018 to 2019 and included two sudden visits to the canteen for sample collection and analysis.

Methodology:

Sample Collection: Samples of oil and turmeric were randomly collected from the college canteen during two unannounced visits over the course of the year.

1. **Methodology for Detection of Argemone Oil in Mustard Oil**

Objective:
To detect the presence of Argemone oil, a common adulterant in mustard oil, using a chemical test involving nitric acid.

Materials:

a. Mustard oil sample suspected of adulteration with Argemone oil (approximately 5 ml)
b. Test tube
c. Nitric acid (approximately 5 ml)

Procedure:

Preparation of Mustard Oil Sample:

Approximately 5 ml of the mustard oil sample is taken in a clean, dry test tube. The test tube containing the mustard oil is then carefully subjected to the addition of approximately 5 ml of nitric acid. Subsequently, the test tube is gently shaken to ensure thorough mixing of the mustard oil and nitric acid.

Observation:

Upon immediate observation after shaking, no colour change is observed in the acidic layer.

Interpretation of Results:

No Colour Change: If the acidic layer remains clear or retains a pale-yellow colour similar to mustard oil, it suggests that the sample is free from Argemone oil adulteration.
Colour Change to Orange-Yellow or Red: If the acidic layer develops an orange-yellow to red colouration, it indicates the presence of Argemone oil adulteration. This colour change is due to the formation of sanguinarine nitrate, a toxic polycyclic compound present in Argemone oil.

Conclusion:

The presence of Argemone oil in mustard oil can be detected effectively using this sensitive chemical test with nitric acid. Regular application of such tests is essential to ensure the purity and safety of mustard oil, safeguarding consumers from potential health risks associated with adulterated food products.
By following this methodology, food safety authorities and consumers can maintain vigilance against adulteration practices in mustard oil, thereby promoting public health and well-being.

2. Methodology for Detection of Lead Chromate in Turmeric Powder

Objective:

To detect the presence of lead chromate, a common adulterant in turmeric powder, using a chemical test involving pure water.

Materials:

a. Turmeric powder sample suspected of adulteration with lead chromate
b. Glass beaker
c. Pure water

Procedure:

Preparation of Turmeric Sample:

A small amount of turmeric powder sample is taken in a clean, dry glass beaker. The beaker containing the turmeric powder is then carefully subjected to the addition of pure water.

Observation:

The sample turns light yellow and the turmeric settles down at the bottom.

Interpretation of Results:

The unadulterated turmeric sample produces a light yellow solution with the turmeric settling at the bottom, while the adulterated sample exhibits a deep yellow hue. This indicates that the sample free of lead chromate.

Conclusion:

The detection of lead chromate in turmeric powder can be effectively performed using this simple chemical test. When pure water is added to the turmeric powder, an unadulterated sample will turn light yellow with the turmeric settling at the bottom. In contrast, an adulterated sample containing lead chromate will display a more intense yellow color. This differential response allows for the identification of turmeric powder that is free of lead chromate.

A B

Fig: A Mustard oil treated with acid showing no such colour change (sample is free from Argemone oil adulteration), **B** The unadulterated turmeric sample produces a light yellow solution with the turmeric settling at the bottom.

Overall Conclusion:

The findings from the study indicate that the food items sampled from the Jangipur College canteen, including oil and turmeric powder, were devoid of hazardous or impure substances. This suggests that the management and suppliers involved in providing these food items have adhered to quality standards that ensure the safety and well-being of the college community.

Recommendations:

Based on the results of this study, it is recommended that:

Regular monitoring and random sampling of food items continue to ensure sustained food safety standards.

Awareness programs be conducted to educate canteen staff and suppliers on the importance of maintaining food quality and safety.

Acknowledgments:

The Department of Zoology acknowledges the support and cooperation of the college administration, canteen staff, and suppliers throughout the course of this study.

This report serves as a testament to our commitment to ensuring food safety within our campus premises and underscores the importance of localized efforts in upholding quality standards in food provision. All protocols employed in this test are sourced from the Food Safety and Standards Authority of India (FSSAI) and MyGov India.

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Inspecting Adulteration: A Localized Approach to Ensure Food Safety

By Department of Zoology

Yearly Report: 2019-2020

Introduction:

In the pursuit of safeguarding food safety within our campus community, the Department of Zoology at Jangipur College initiated a study titled "Inspecting Adulteration: A Localized Approach to Ensure Food Safety." This study aimed to assess the quality and purity of commonly used food items in the college canteen, specifically focusing on oil and chilli powder. The study spanned from 2019 to 2020 and included two sudden visits to the canteen for sample collection and analysis.

Methodology:

Sample Collection: Samples of oil and chilli flakes were randomly collected from the college canteen during two unannounced visits over the course of the year.

1. **Methodology for Detection of Argemone Oil in Mustard Oil**

Objective:
To detect the presence of Argemone oil, a common adulterant in mustard oil, using a chemical test involving nitric acid.

Materials:

a. Mustard oil sample suspected of adulteration with Argemone oil (approximately 5 ml)
b. Test tube
c. Nitric acid (approximately 5 ml)

Procedure:

Preparation of Mustard Oil Sample:

Approximately 5 ml of the mustard oil sample is taken in a clean, dry test tube. The test tube containing the mustard oil is then carefully subjected to the addition of approximately 5 ml of nitric acid. Subsequently, the test tube is gently shaken to ensure thorough mixing of the mustard oil and nitric acid.

Observation:

Upon immediate observation after shaking, no colour change is observed in the acidic layer.

Interpretation of Results:

No Colour Change: If the acidic layer remains clear or retains a pale-yellow colour similar to mustard oil, it suggests that the sample is free from Argemone oil adulteration.
Colour Change to Orange-Yellow or Red: If the acidic layer develops an orange-yellow to red colouration, it indicates the presence of Argemone oil adulteration. This colour change is due to the formation of sanguinarine nitrate, a toxic polycyclic compound present in Argemone oil.

Conclusion:

The presence of Argemone oil in mustard oil can be detected effectively using this sensitive chemical test with nitric acid. Regular application of such tests is essential to ensure the purity and safety of mustard oil, safeguarding consumers from potential health risks associated with adulterated food products.
By following this methodology, food safety authorities and consumers can maintain vigilance against adulteration practices in mustard oil, thereby promoting public health and well-being.

2. Methodology for Detecting Artificial or Water-Soluble Colour Adulteration in Red Chilli Powder

Objective:

To detect the presence of artificial or water-soluble colour adulteration in red chilli powder using a simple water test.

Materials:

a. Clean and transparent glass of water

Procedure:

Preparation:

Ensure the glass of water is clean and transparent.

Testing Procedure:

Sprinkle a small amount of red chilli powder onto the surface of the water.

Observation:

The behavior of the chilli powder is observed. Unadulterated chilli powder remains on the surface of the water for some time and gradually settles to the bottom of the glass without dispersing or leaving any visible colour streaks in the water (adulterated chilli powder, containing artificial or water-soluble colours, will immediately start to release coloured streaks into the water upon sprinkling. These streaks will be visible as bands of colour spreading through the water).

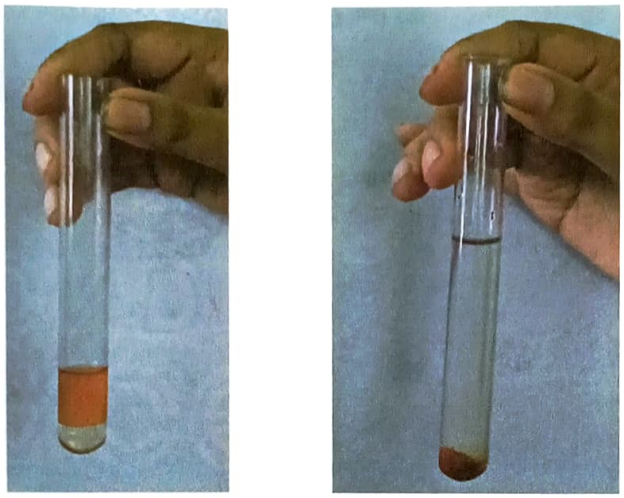
Interpretation of Results:

Based on the observations, determine whether the red chilli powder sample shows characteristics of unadulterated or adulterated powder.

It was observed that the sample of chilli flakes from the college canteen was unadulterated, displaying behavior consistent with pure chilli powder without any immediate colour streaks descending into the water.

Conclusion:

This method provides a straightforward and effective means to identify artificial or water-soluble colour adulteration in red chilli powder, ensuring the quality and authenticity of culinary ingredients used in food preparation. Regular application of such tests helps uphold food safety standards in college canteens and similar food service settings.



A B

Fig: A Mustard oil treated with acid showing no such colour change (sample is free from Argemone oil adulteration), **B** The gradual settling of chili powder to the bottom of the glass without dispersing or leaving any visible color streaks in the water (unadulterated chili powder).

Overall Conclusion:

The findings from the study indicate that the food items sampled from the Jangipur College canteen, including oil and chilli flakes, were devoid of hazardous or impure substances. This suggests that the management and suppliers involved in providing these food items have adhered to quality standards that ensure the safety and well-being of the college community.

Recommendations:

Based on the results of this study, it is recommended that:

Regular monitoring and random sampling of food items continue to ensure sustained food safety standards.

Awareness programs be conducted to educate canteen staff and suppliers on the importance of maintaining food quality and safety.

Acknowledgments:

The Department of Zoology acknowledges the support and cooperation of the college administration, canteen staff, and suppliers throughout the course of this study.

This report serves as a testament to our commitment to ensuring food safety within our campus premises and underscores the importance of localized efforts in upholding quality standards in food provision. All protocols employed in this test are sourced from the Food Safety and Standards Authority of India (FSSAI) and MyGov India.

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MURSHIDABAD

Inspecting Adulteration: A Localized Approach to Ensure Food Safety

By Department of Zoology

Yearly Report: 2022-2023

Introduction:

In the pursuit of safeguarding food safety within our campus community, the Department of Zoology at Jangipur College initiated a study titled "Inspecting Adulteration: A Localized Approach to Ensure Food Safety." This study aimed to assess the quality and purity of commonly used food items in the college canteen, specifically focusing on oil and turmeric. The study spanned from 2022 to 2023 and included two sudden visits to the canteen for sample collection and analysis.

Methodology:

Sample Collection: Samples of oil, turmeric and chilli flakes were randomly collected from the college canteen during two unannounced visits over the course of the year.

1. **Methodology for Detection of Argemone Oil in Mustard Oil**

Objective:
To detect the presence of Argemone oil, a common adulterant in mustard oil, using a chemical test involving nitric acid.

Materials:
a. Mustard oil sample suspected of adulteration with Argemone oil (approximately 5 ml)
b. Test tube
c. Nitric acid (approximately 5 ml)

Procedure:

Preparation of Mustard Oil Sample:

Approximately 5 ml of the mustard oil sample is taken in a clean, dry test tube. The test tube containing the mustard oil is then carefully subjected to the addition of approximately 5 ml of nitric acid. Subsequently, the test tube is gently shaken to ensure thorough mixing of the mustard oil and nitric acid.

Observation:

Upon immediate observation after shaking, no colour change is observed in the acidic layer.

Interpretation of Results:

No Colour Change: If the acidic layer remains clear or retains a pale yellow colour similar to mustard oil, it suggests that the sample is free from Argemone oil adulteration.
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Conclusion:

The presence of Argemone oil in mustard oil can be detected effectively using this sensitive chemical test with nitric acid. Regular application of such tests is essential to ensure the purity and safety of mustard oil, safeguarding consumers from potential health risks associated with adulterated food products.
By following this methodology, food safety authorities and consumers can maintain vigilance against adulteration practices in mustard oil, thereby promoting public health and well-being.

2. Methodology for Detection of Lead Chromate in Turmeric Powder

Objective:

To detect the presence of lead chromate, a common adulterant in turmeric powder, using a chemical test involving pure water.

Materials:

a. Turmeric powder sample suspected of adulteration with lead chromate
b. Glass beaker
c. Pure water

Procedure:

Preparation of Turmeric Sample:

A small amount of turmeric powder sample is taken in a clean, dry glass beaker. The beaker containing the turmeric powder is then carefully subjected to the addition of pure water.

Observation:

The sample turns light yellow and the turmeric settles down at the bottom.

Interpretation of Results:

The unadulterated turmeric sample produces a light yellow solution with the turmeric settling at the bottom, while the adulterated sample exhibits a deep yellow hue. This indicates that the sample free of lead chromate.

Conclusion:

The detection of lead chromate in turmeric powder can be effectively performed using this simple chemical test. When pure water is added to the turmeric powder, an unadulterated sample will turn light yellow with the turmeric settling at the bottom. In contrast, an adulterated sample containing lead chromate will display a more intense yellow color. This differential response allows for the identification of turmeric powder that is free of lead chromate.

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Objective:

To detect the presence of artificial or water-soluble colour adulteration in red chilli powder using a simple water test.

Materials:

a. Clean and transparent glass of water

Procedure:

Preparation:

Ensure the glass of water is clean and transparent.

Testing Procedure:

Sprinkle a small amount of red chilli powder onto the surface of the water.

Observation:

The behavior of the chilli powder is observed. Unadulterated chilli powder remains on the surface of the water for some time and gradually settles to the bottom of the glass without dispersing or leaving any visible colour streaks in the water (adulterated chilli powder, containing artificial or water-soluble colours, will immediately start to release coloured streaks into the water upon sprinkling. These streaks will be visible as bands of colour spreading through the water).

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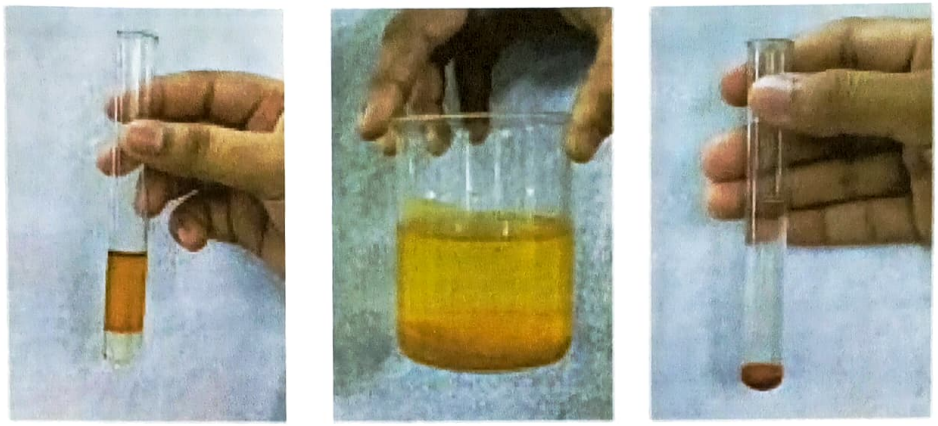

Fig: A Mustard oil treated with acid showing no such colour change (sample is free from Argemone oil adulteration), **B** The unadulterated turmeric sample produces a light yellow solution with the turmeric settling at the bottom. **C** The gradual settling of chili powder to the bottom of the glass without dispersing or leaving any visible color streaks in the water (unadulterated chili powder).

Overall Conclusion:

The findings from the study indicate that the food items sampled from the Jangipur College canteen, including oil, turmeric, and chilli flakes, were devoid of hazardous or impure substances. This suggests that the management and suppliers involved in providing these food items have adhered to quality standards that ensure the safety and well-being of the college community.

Recommendations:

Based on the results of this study, it is recommended that:

Regular monitoring and random sampling of food items continue to ensure sustained food safety standards.

Awareness programs be conducted to educate canteen staff and suppliers on the importance of maintaining food quality and safety.

Acknowledgments:

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INNOVATIVE PRACTICE:

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SSR 3.2.1 Session: 2018-19 to 2022-23

NSS's Innovative Practice

Practice Title: Wall of the Campus as Canvas

Objective: To make the walls visually impactful with life-enhancing quotations

Some Selected Examples:

Picture 1:

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SSR 3.2.1 Session: 2018-19 to 2022-23

Picture 2:

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SSR 3.2.1 Session: 2018-19 to 2022-23

Picture 4:

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Teacher-in-Charge