“ENSURING FOOD SAFETY: A STUDY ON ADULTERATION IN EVERYDAY PRODUCTS”

Project work by

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Under the guidance of

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Submitted to St .Teresa’ College(Autonomous) Ernakulam

Affiliated to Mahatma Gandhi University, Kottayam in partial fulfilment of

Requirement for the degree of Bachelor in Science in Zoology

2023-2024

CERTIFICATE

This is to certify that the project entitled "**ENSURING FOOD SAFETY: A STUDY ON ADULTERATION IN EVERYDAY PRODUCTS"** submitted by Ms. BEXY K F, Reg.no:AB21ZOO003 in partial fulfilment of the requirement of Bachelor of Science of science in Zoology to the Department of Zoology .St. Teresa's College affiliated to Mahatma Gandhi University, Kottayam is a bonafide work under my guidance and supervision and to my her best knowledge, this is her best effort .

Dr .Meera Jan Abraham	Dr. Soja Louis
Associate Professor	Head of the Department
Department of Zoology	Department of Zoology
St. Teresa's College (Autonomous)	St. Teresa's College
Ernakulam	Ernakulam

EXAMINERS

1.

2.

DECLARATION

I hereby declare that project work titled "**ENSURING FOOD SAFETY: A STUDY ON ADULTERATION IN EVERYDAY PRODUCTS** "submitted to St. Teresa's College (Autonomous), Ernakulam affiliated to Mahatma Gandhi University, Kottayam in the partial fulfilment of the requirements of Bachelor of Science degree in Zoology, is a record of original project work done by me under the guidance and supervision of Dr.Meera Jan Abraham, Associate Professor, Department of Zoology, St. Teresa's College (Autonomous),Ernakulam.

Name: BEXY K F
Reg.No:AB21ZOO003

Signature

ACKNOWLEDGEMENT

The success and final outcome of this project required a lot of guidance and assistance from many people and I am extremely fortunate to have got this all along the completion of my project work. Whatever I have done is only due to such guidance and assistance and I would not forget to thank them.

I respect and thank Dr.Soja Louis, HOD, Department of Zoology, St. Teresa's College (Autonomous), Ernakulam for giving me an opportunity to do the project work and providing useful support and guidance which made me complete the project on time. I am extremely grateful to her for providing such nice support and guidance through her busy schedule.

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ABSTRACT

Food, the sustenance of life, holds an important position in the realm of human existence.

In todays globalized and industrialized food market, there is a rapid increase in the usage of adulterants in foods that compromise their quality, safety, or authenticity.

The purpose of the project, entitled “ENSURING FOOD SAFETY: A STUDY ON ADULTERATION IN EVERYDAY PRODUCTS” is to determine the daily consumption of contaminated food. As a result, the food items often found in families were selected. Food adulteration in everyday consumables such as milk, honey, ghee, spice powders, oil, and flours was chosen.

The study on food adulteration was conducted from December 12th, 2023, to December 18th, 2023.

From the experiment conducted, it is clear that many food brands we are using in daily consumables are adulterated with harmful adulterants

INTRODUCTION

Food is any substance consumed to provide nutritional support for an organism. It typically consists of carbohydrates, fats, proteins, vitamins, minerals, and water, which are essential for sustaining life and promoting growth, health, and energy. Food plays a crucial role in maintaining overall health and well-being. It provides essential nutrients that the body needs to function properly, including energy for daily activities, growth, repair, and immune function. A balanced diet rich in fruits, vegetables, whole grains, lean proteins, and healthy fats can help prevent chronic diseases such as obesity, diabetes, heart disease, and certain cancers.

Food, the sustenance of life, holds a pivotal position in the realm of human existence. Beyond its mere function as a source of nourishment, it intertwines with the cultural, social, and economic dimensions of society. This research project delves into the intricate web of food adulteration, aiming to dissect its manifestations, impacts, and potential solutions.

The purpose of this study is to determine the daily consumption of contaminated food. As a result, the foodstuffs often found in families were selected.

The concept of food adulteration dates back centuries, with historical records documenting instances of fraudulent practices aimed at enhancing profits or deceiving consumers. Yet, in today's globalized and industrialized food market, the issue has attained unprecedented complexity and scale. From artificial coloring agents in spices to counterfeit dairy products, the spectrum of adulterated foods spans across categories, posing significant challenges to public health and consumer trust.

Food adulteration refers to the deliberate or unintentional contamination or alteration of food products with substances that may compromise their quality, safety, or authenticity. This unethical practice involves the addition of inferior, harmful, or unauthorized substances to food items for various reasons, such as economic gain, preservation, or fraud. Adulterants may include substances like water, chemicals, artificial colors, flavors, or fillers, which are added to food products to increase volume, enhance appearance, or prolong shelf life. Food adulteration can pose serious health risks to consumers, leading to foodborne illnesses, allergic reactions, or long-term health consequences. Regulatory measures, quality control protocols, and consumer awareness efforts are essential for detecting and preventing food adulteration, safeguarding public health, and ensuring the integrity of the food supply chain.

Food adulteration in everyday consumables such as milk, honey, ghee, and spice powders represents a critical challenge in food safety, public health, and consumer trust. Despite existing regulations, the

widespread practice of adulterating food with cheaper and sometimes hazardous substances continues, driven by the incentives of lower costs and higher profits. This not only poses significant health risks, including chronic diseases and acute food poisoning, but also undermines consumer confidence in food systems.The purpose of adulteration in food varies depending on the intentions of those involved, but it typically revolves around financial gain or altering the appearance or quality of the food product. Some common purposes of adulteration include:

1.Economic Gain: Adulteration is often driven by the desire to increase profits by diluting expensive ingredients with cheaper substitutes or fillers. For example, adding water to milk or substituting lower-grade spices for higher-quality ones can reduce production costs while maintaining the appearance of the product.

2. Extended Shelf Life: Some adulterants are added to food products to extend their shelf life or prevent spoilage. Preservatives or additives may be used to inhibit microbial growth or delay oxidation, thereby prolonging the product's freshness and increasing its marketability.

3. Improving Appearance: Adulterants may be used to enhance the appearance of food products, making them more visually appealing to consumers. For example, artificial colors or dyes may be added to spices, sauces, or beverages to give them a vibrant hue that suggests freshness or quality.

4. Masking Inferior Quality: Adulteration can be employed to disguise the inferior quality of food products. By adding fillers, artificial flavors, or enhancers, manufacturers can mask flaws or deficiencies in taste, texture, or aroma, making the product more palatable to consumers.

5. Meeting Demand: In some cases, adulteration may be driven by supply chain constraints or shortages of certain ingredients. Adulterants may be added to meet consumer demand and maintain product availability during periods of scarcity or high demand.

Regardless of the purpose, adulteration in food is unethical and can have serious consequences for consumer health, safety, and trust in the food supply chain. Regulatory measures and enforcement efforts are essential to combatting this practice and ensuring the integrity and safety of the food supply.

One of the defining features of food adulteration is its clandestine nature. Adulterants, ranging from harmless substances to toxic chemicals, are surreptitiously introduced into food products, often escaping

detection by routine quality control measures. As a result, unsuspecting consumers unknowingly ingest compromised food items, exposing themselves to countless health risks.

The consequences of food adulteration extend beyond individual health implications, permeating through the fabric of society. Vulnerable populations, including children, pregnant women, and the elderly, are particularly susceptible to the adverse effects of consuming adulterated foods. Furthermore, endemic food adulteration exacerbates food insecurity, worsening the plight of already marginalized communities. In essence, food adulteration not only erodes public health but also erodes the social fabric by worsening inequalities and stimulating mistrust.

Amidst the multifaceted challenges posed by food adulteration, addressing the issue requires a holistic approach encompassing regulatory, technological, and dimensions.

Regulatory bodies play a crucial role in enforcing stringent quality standards and implementing robust monitoring mechanisms to deter adulteration practices. Simultaneously, technological advancements, such as block chain and DNA barcoding, offer promising avenues for enhancing traceability and authenticity in the food supply chain.

In short, food adulteration represents a multifaceted challenge with far-reaching implications for public health, socioeconomic well-being, and ethical integrity. Through this research project, we attempt to solve the complexities surrounding food adulteration, shedding light on its prevalence, impacts, and potential solutions. By stimulating interdisciplinary dialogue and collaboration, we desire to pave the way toward a future where food is not only a source of sustenance but also a symbol of trust, integrity, and well-being.

OBJECTIVE

This research aims to identify, analyse, and prevent the addition of harmful substances in daily food products.

REVIEW OF LITERATURE

Koul et al. (2020) stated the presence of adulterants in immunity booster foods, plant beverages, spices and condiments are a growing cause of concern as these are taken almost daily and can pose high health risks. Detection of adulterants require huge investments and often regulatory agencies, or small food testing labs do not get adequate support to setup of sophisticated equipment for detection of adulterants. Therefore, microscopic techniques and micro-chemical tests that do not need extensive paraphernalia and that can be carried out in any basic science laboratory can be reliable and alternative methods to detect adulteration in common food samples. These techniques are scientific, qualitative standard techniques that are authenticated and accepted worldwide. Lately, techniques like DNA analysis and ELISA based techniques are also being used for detection of food adulterants.

Soopa & Panwar (2020) stated that the food adulteration rate in INDIA has almost double over the last five years according to data sourced from FSSAI annual reports .Food adulteration rate in INDIA stood at 13% in 2011-12 which increased to 23% in 2016-17.Aganist this backdrop this paper, attempts to explain the emerging trends of food adulteration in India and its remedies .

Bansal et al.(2017) stated that the authentic testing of food and adulterant detection of various food products is required for value assessment and to assure consumer protection against fraudulent activities. Concerns about food safety and regulation have ensured the development of various techniques like physical, biochemical/immunological and molecular techniques, for adulterant detection in food. Molecular methods are more preferable when it comes to detection of biological adulterants in food, although physical and biochemical techniques are preferable for detection of other adulterants in food.

Mishra (2017) stated that the adulteration of food items became a metonym for all the various problems that plagued the middle-class existence. In the second decade of the twentieth century, a completely unforeseen new development suddenly transformed the nature and intensity of all existing debate surrounding ghee adulteration. As a result of these growing fears, a number of laws were passed on the subject of adulteration from the 1880s onwards. A huge factor that contributed towards building up the public furore around adulteration, especially of milk and milk products, was the new concern for the rising child mortality rates.

Choudhary et al. (2020)stated that food adulteration involves the infusion of useless, harmful, unnecessary substances to food which decreases the quality of food. The problems of adulteration makes the food items used in our daily life unsafe and unhygienic for use due to poor handling.

Adulteration in food items can cause tremendous affect on health without our knowledge. If we tend to actively participate in these changes then we can bring about a healthy and non venturous future for the upcoming generations

Thangaraju et al. (2021) stated that approximately 57% of people have developed health issues because of indigested adulterants and contaminants, and about 22% of foods are adulterated every year globally. There should be quick, precise, easy, and cheap source techniques and sources to detect/identify adulterants in various foods. Regulations that castigate illegal traders and dishonest producers that adulterate different food products in various places should be applied. This study reveals covers the detection of food adulteration, why it is done, its types, its effect on human health, and balanced nutrition.

Gahukar (2014) stated that it is possible to prevent food adulteration and contamination if people are made aware of health hazards. If food inspectors are vigilant and active, the risk of food toxicity can be minimized at all levels of food supply and consumption. Further, simple measures can prevent further complications, particularly those caused by microbiological contaminants. Fatal diseases and health hazards prevalent in India can be minimized and consumers can live happily with good health.

METHODOLOGY

In this project some samples are collected to check adulteration

- MILK
- TURMERIC POWDER
- CHILLI POWDER
- GHEE
- HONEY
- OIL
- FLOUR (WHEAT,MAIDA)

MILK

EXPERIMENT -1

WATER TEST: Detection of water in milk

MATERIALS REQUIRED: Slanting surface , milk samples ,dropper

PROCEDURE:

The milk samples taken are the following;

- MILMA
- PDDP
- RAW MILK

Now the presence of milk can be found by putting a drop of sample on a polished slanting surface.

The drop of pure milk flows slowly and leaves a white trail behind it.

The drop of adulterated milk flows immediately without leaving any trail behind it, due to the presence of water in it.

EXPERIMENT -2

STARCH TEST: Detection of starch in milk

MATERIALS REQUIRED: Test tubes, milk samples, iodine solution and dropper.

PROCEDURE:

The milk samples taken are the following

- MILMA
- PDDP
- RAW MILK

Take 1ml of each milk sample in a test tube.

Add a few drops of iodine solution using a dropper into the test tubes .(2.5 gm of iodine is dissolved in water and then volume is made up to 200ml).

If starch is present in the milk ,the milk mixture will turn into a blue black coloured solution.

EXPERIMENT -3

FORMALIN TEST: Detection of formalin in milk

MATERIALS REQUIRED: Milk samples, dropper, test tube, conc. Sulphuric acid.

PROCEDURE:

The milk samples taken are the following;

- MILMA
- PDDP
- LOOSE SAMPLE

Take 10ml of milk in a test tube.

Add 5ml of conc. Sulphuric acid along the sides of the wall without shaking.

If a violet or blue ring appears at the intersection of two layers then it shows presence of formalin.

EXPERIMENT-4

TEST FOR UREA: Detection of urea in milk

MATERIALS REQUIRED: Milk samples, test tubes, dropper, resorcinol solution, burner.

PROCEDURE:

The milk samples taken are the following;

- MILMA
- PDDP
- RAW MILK

Take 0.1 ml of milk samples in each test tube.

Add 0.2 ml of resorcinol solution (0.5gm of resorcinol in 100 ml of dilute HCL 1 part: 2 part of distilled water).

Boiled for 30 seconds and observed for colour change.

Appearance of off-white colour indicates the presence of urea.

EXPERIMENT -5

TEST FOR DETERGENT: Detection of detergent in milk.

MATERIALS REQUIRED: Milk samples, test tubes, distilled water.

PROCEDURE

The milk samples taken are the following;

- MILMA
- PDDP
- RAW MILK

Shake 5 to 10 ml of sample with an equal amount of water lather indicates the presence of detergent.

EXPERIMENT -6

TEST FOR VANASPATI: Detection of Vanaspati in milk.

MATERIALS REQUIRED: Milk samples, test tubes, hydrochloric acid, teaspoon, dropper, glass rod.

PROCEDURE:

The milk samples taken are the following;

- MILMA
- PDDP
- RAW MILK

Take 3 ml of milk in a test tube.

Add 10 drops of hydrochloric acid into the test tube.

Mix up one teaspoon full of sugar into it.

After 5 minutes, examine the mixture.

The colouration indicates the presence of Vanaspati in the milk.

TURMERIC POWDER

EXPERIMENT-1

TEST FOR METANIL YELLOW

MATERIALS REQUIRED: Turmeric samples, distilled water, test tubes, dropper, glass rod, concentrated Hydrochloric acid.

PROCEDURE:

The samples taken are the following:

- EASTERN

- UNITASTE
- LOOSE SAMPLE 1
- LOOSE SAMPLE 2

Add a teaspoon of turmeric into distilled water and shake vigorously.

Filter the sample and dilute it till it is almost colourless.

Few drops of conc.hcl to a small portion of diluted sample.

Observe the colour change in the test tube.

Magenta red colour indicates the presence of metanil yellow.

EXPERIMENT -2

TEST FOR SAMPLE IS PURE

MATERIALS REQUIRED: Turmeric samples, dropper, distilled water, beaker.

PROCEDURE:

The samples taken are the following:

- EASTERN
- UNITASTE
- LOOSE SAMPLE 1
- LOOSE SAMPLE 2

Take a spoon of turmeric powder.

Add to a glass of distilled water.

Wait for 5 to 7 minutes.

If all the turmeric sits at the bottom and water gets clear, the turmeric is pure.

EXPERIMENT -3

TEST FOR LEAD CHROMATE

MATERIALS REQUIRED: Turmeric samples, spatula, distilled water, beaker.

PROCEDURE:

The samples taken are the following:

- EASTERN
- UNITASTE
- LOOSE SAMPLE 1
- LOOSE SAMPLE 2

Take a glass of distilled water into the beaker.

Add a teaspoon of turmeric powder in a spatula into the beaker.

Wait for 4-5 minutes.

Appears to be bright in colour which leaves colour immediately in water.

CHILLI POWDER

EXPERIMENT -1

TEST FOR ARTIFICIAL COLOUR

MATERIALS REQUIRED: Chilli samples, distilled water, beaker, spatula, glass rod.

PROCEDURE

The samples taken are the following

- EASTERN
- LAKSHMI
- GOPIS

- LOOSE SAMPLE 1
- LOOSE SAMPLE 2

Take a teaspoon of chilli powder in a glass of water.

Coloured water extract will show the presence of artificial colour.

EXPERIMENT -2

TEST FOR RHODAMINE B

MATERIALS REQUIRED: Chilli samples, distilled water, test tube, spatula, paraffin oil or mineral oil.

PROCEDURE:

The samples taken are the following

- EASTERN
- LAKSHMI
- GOPIS
- LOOSE SAMPLE 1
- LOOSE SAMPLE 2

Take 5ml of paraffin oil in the test tube.

Add a 5 scoop full of chilli powder on the spatula into the test tube.

Keep it for 15 minutes with intermittent shakings.

Check the colour is red, presence of Rhodamine B.

GHEE

EXPERIMENT -1

TEST FOR STARCH

MATERIALS REQUIRED: samples of ghee, beaker, dropper, iodine solution.

PROCEDURE:

The samples taken are the following:

- NAMBISAN
- MILMA
- LOOSE SAMPLE

Take 22 ml of ghee into a beaker.

Add 3-5 drops of iodine solution into the beaker containing ghee

The presence of mashed potatoes and sweet potatoes (starch) can be found by brownish colouration.

EXPERIMENT -2

TEST FOR PURITY

MATERIALS REQUIRED: samples of ghee, beaker, dropper, Bunsen burner and tripod.

PROCEDURE:

The samples taken are the following:

- NAMBISAN
- MILMA
- LOOSE SAMPLE

Take a 22 ml of ghee into a beaker

HONEY

EXPERIMENT -1

TEST FOR PURITY

MATERIALS REQUIRED: Samples of honey, warm water, beaker and dropper.

PROCEDURE:

The samples taken are the following

- NAMBISAN
- DABUR
- SITARAM
- LOOSE SAMPLE

Take some warm water in a beaker.

Add 2-5 drops of honey into the water using a dropper.

Keep it for 5 minutes until it settles or not.

If it settles down honey is pure.

if it dissolves honey impure .

EXPERIMENT -2

TEST FOR PRESENCE OF SUGAR

MATERIALS REQUIRED: Samples of honey, match stick.

PROCEDURE:

The samples taken are the following

- NAMBISAN
- DABUR
- SITARAM

- LOOSE SAMPLE

A match stick is dipped in the honey samples.

When it is lit against the matchbox, if it burns and shows the purity of honey.

OIL

EXPERIMENT -1

TEST FOR PRESENCE ANY OTHER OIL

MATERIALS REQUIRED: Samples of oil, small beaker and refrigerator.

PROCEDURE

The samples taken are the following

- KERA
- RUCHI GOLD
- SUNFLOWER OIL
- LOOSE SAMPLE 1
- LOOS SAMPLE 2

Pour some oil samples into a clean small beaker.

Place the beaker in the refrigerator until it solidifies.

Coconut oil solidifies leaving the adulterant as a separate layer

EXPERIMENT -2

TEST FOR PRESENCE OF PROHIBITED COLOUR

MATERIALS REQUIRED: Samples of oil (kera, ruchigold, and sunflower oil, test tubes, concentrated hydrochloric acid .

PROCEDURE:

The samples taken are the following

- KERA
- RUCHI GOLD
- SUNFLOWER OIL
- LOOSE SAMPLE 1
- LOOS SAMPLE 2

Take 5 ml of samples in the test tube

Add 5 ml of concentrated hydrochloric acid into the test tube.

Shake gently; let it stand for 5 minutes.

Colour will separate in the upper layer of the solution.

FLOUR

EXPERIMENT – 1

TEST FOR PRESENCE OF CHALK POWDER

MATERIALS REQUIRED: Samples of flours (wheat), (Maida) , beaker, spatula , dilute hydrochloric acid ,Bunsen burner , Distilled water.

PROCEDURE

The samples taken are the following

- AASHIRVAAD (WHEAT)
- LOOSE SAMPLE 1(WHEAT)
- LOOSW SAMPLE 2(MAIDA)
- AASHIRVAAD (MAIDA)
- LOOSE SAMPLE (MAIDA)

Take a teaspoon of flour in a test tube and shake it with 10 ml of the distilled water.

Warm 20 ml of dilute hcl using a Bunsen burner.

Warm 20 ml dilute hcl in a beaker to 50-60 *C and add to the test tube containing flour.

Observe for the effervescence

If gas bubbles are released, it indicates the presence of chalk in flour.

OBSERVATION AND RESULT

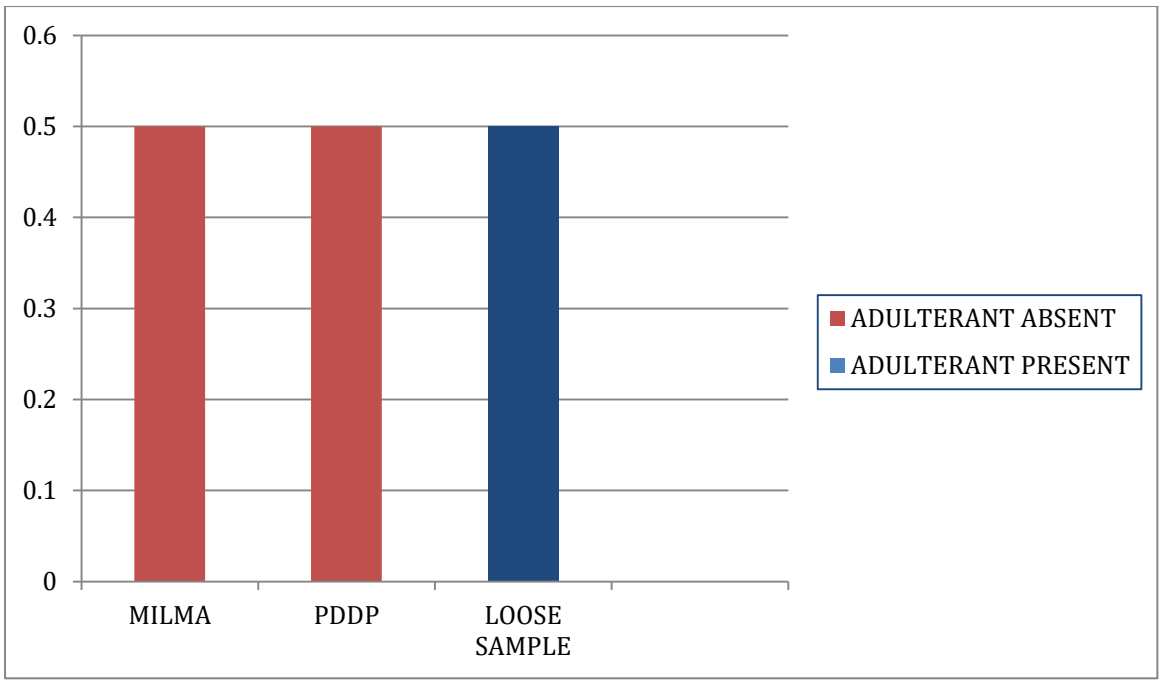
TEST TO IDENTIFY ADULTERANT IN MILK

SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	MILMA	WATER TEST	The milk drop took 11.31 sec to reach the bottom of the tile	Absence of water
		DETERGENT	Absence of effervescence	Absence of detergent
		UREA	Appearance of off-white colour	Presence of urea
		STRACH	Presence of yellow colour instead of blue colour	Absence of starch
		FORMALIN	Presence of precipitate or ring	Presence of formalin
		VANASPATI	Absence of characteristic colouration	Absence of vanaspati
2	PDDP	WATER TEST	The milk drop took 19.18 sec to reach the bottom of the tile	Complete absence of water
		DETERGENT	Presence of effervescence	Presence of detergent
		UREA	Appearance of off-white colour	Presence of urea
		STRACH	Presence of yellow colour instead of blue colour	Absence of starch
		FORMALIN	Presence of precipitate or ring	Presence of

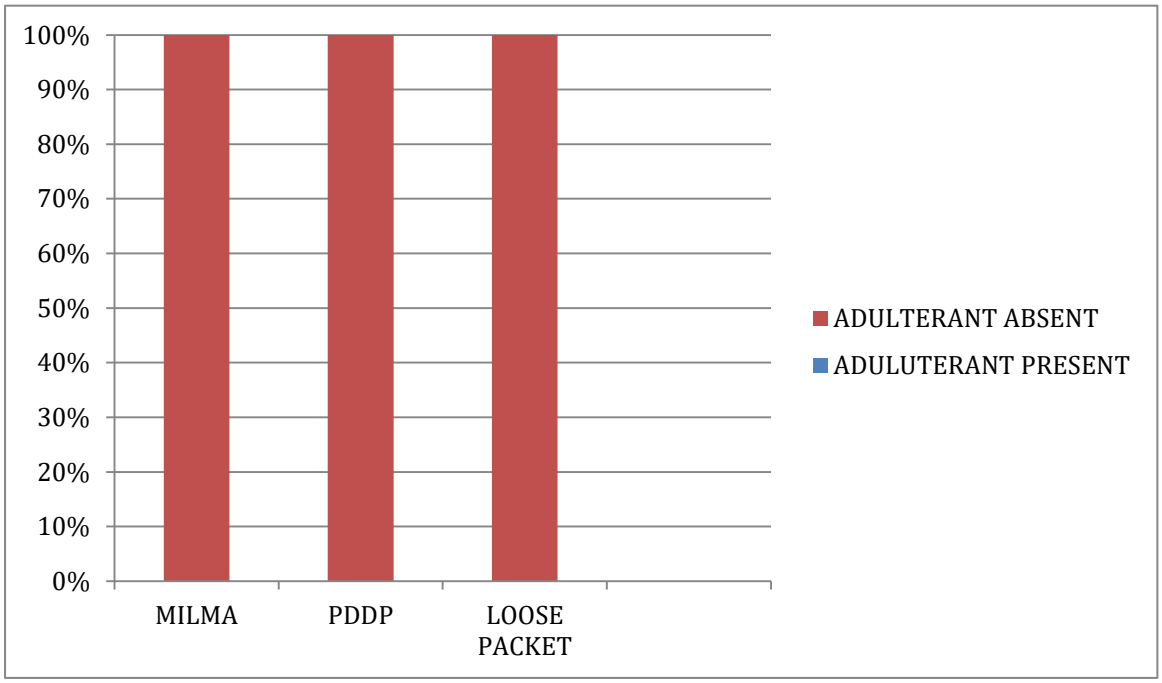
				formalin
		VANASPATI	Absence of characteristic colouration	Absence of vanaspati
3	LOOSE PACKET	WATER TEST	The milk drop took 8.7 sec to reach the bottom of the tile	Presence of adulterant
		DETERGENT	Absence of effervescence	Absence of detergent
		UREA	Absence of off-white colour	Asence of urea
		STRACH	Presence of yellow colour instead of blue colour	Absence of starch
		FORMALIN	Presence of precipitate or ring	Presence of formalin
		VANASPATI	Absence of characteristic colouration	Absence of vanaspati

(TABLE: 1)

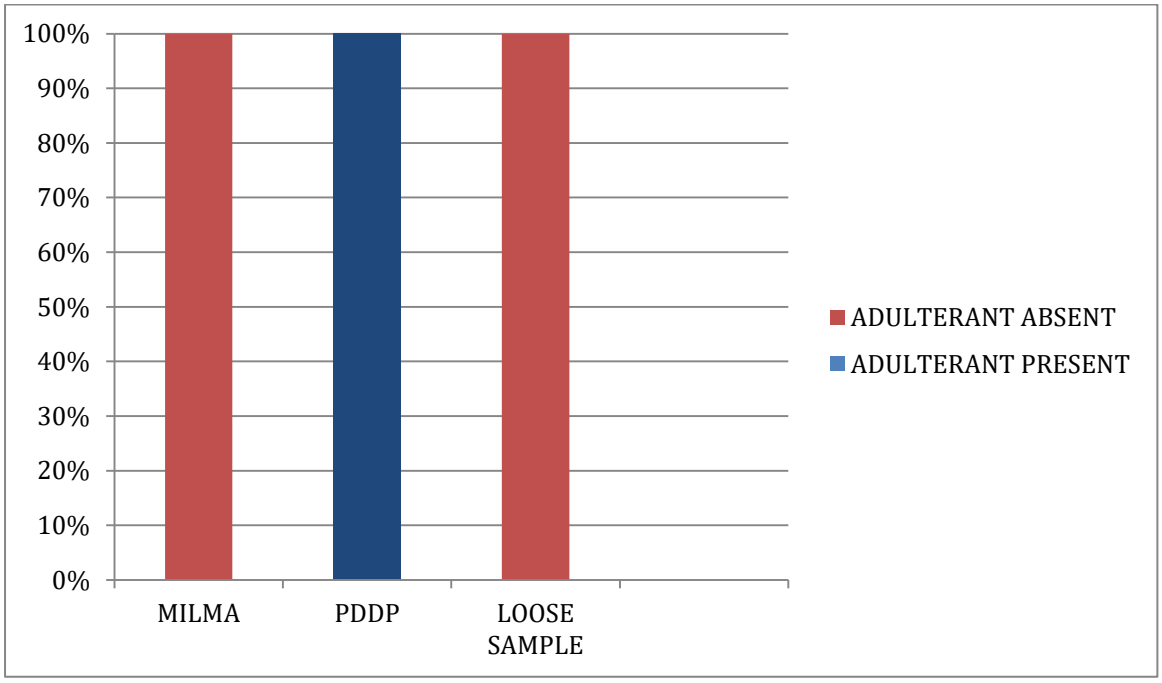
TO IDETIFY PRENSENCE OF WATER WATER TEST



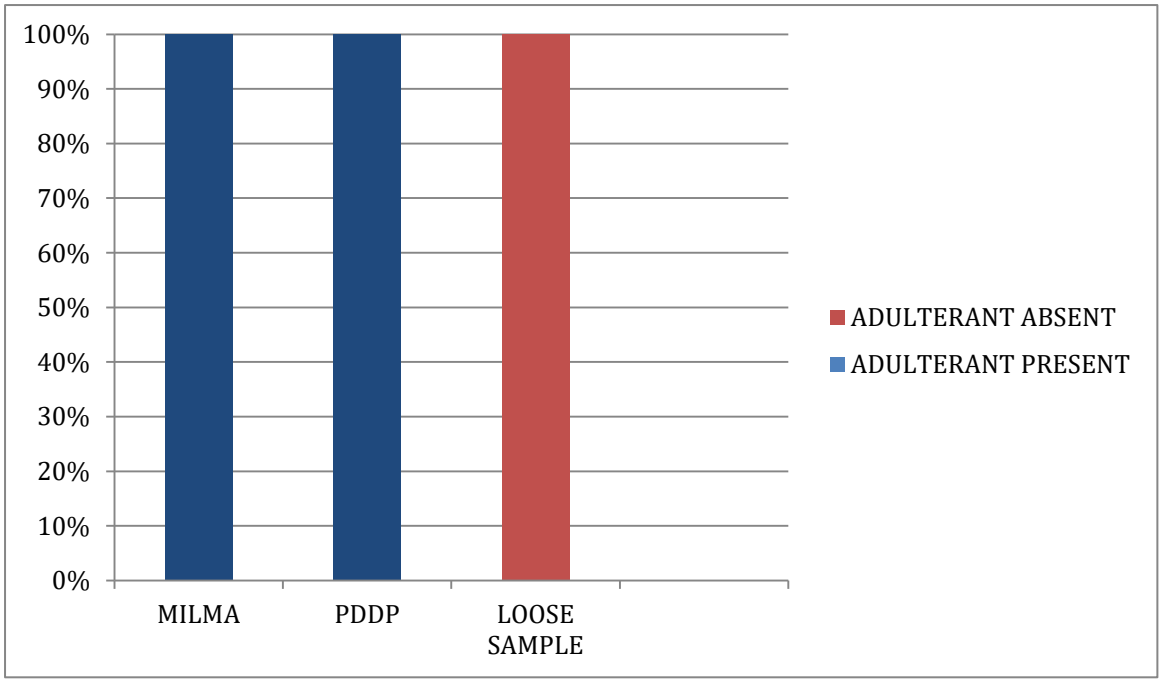
INDICATE THE PRESENCE OF STARCH IN MILK



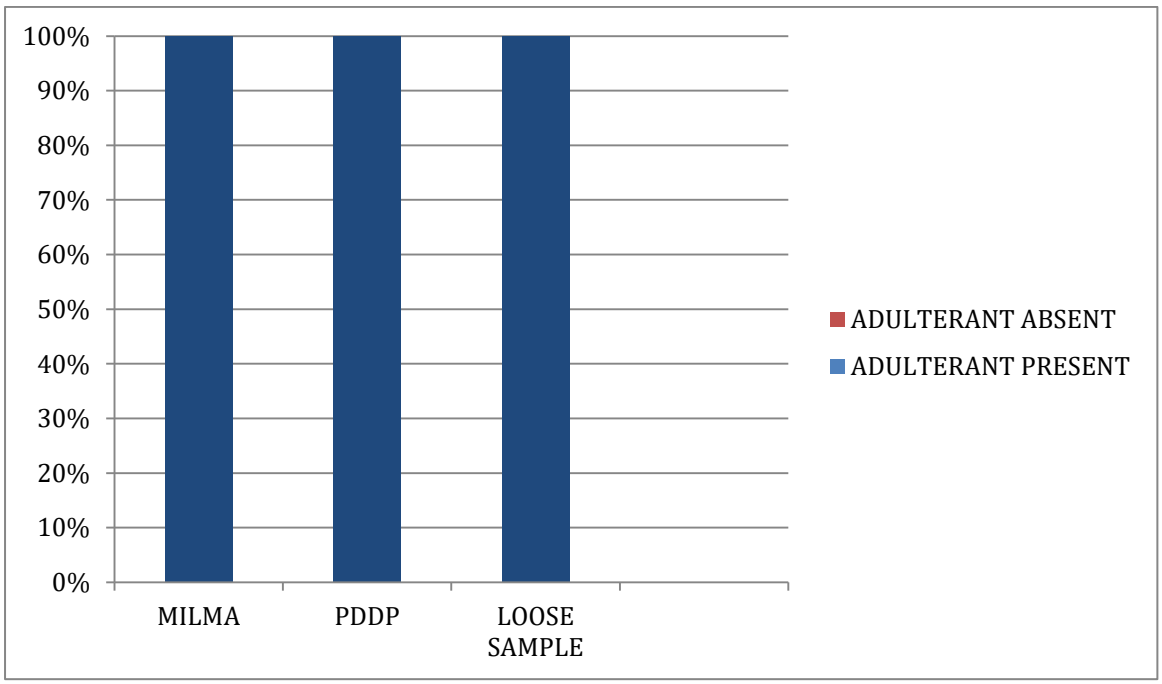
INDICATE THE PRESENCE OF DETERGENT IN MILK



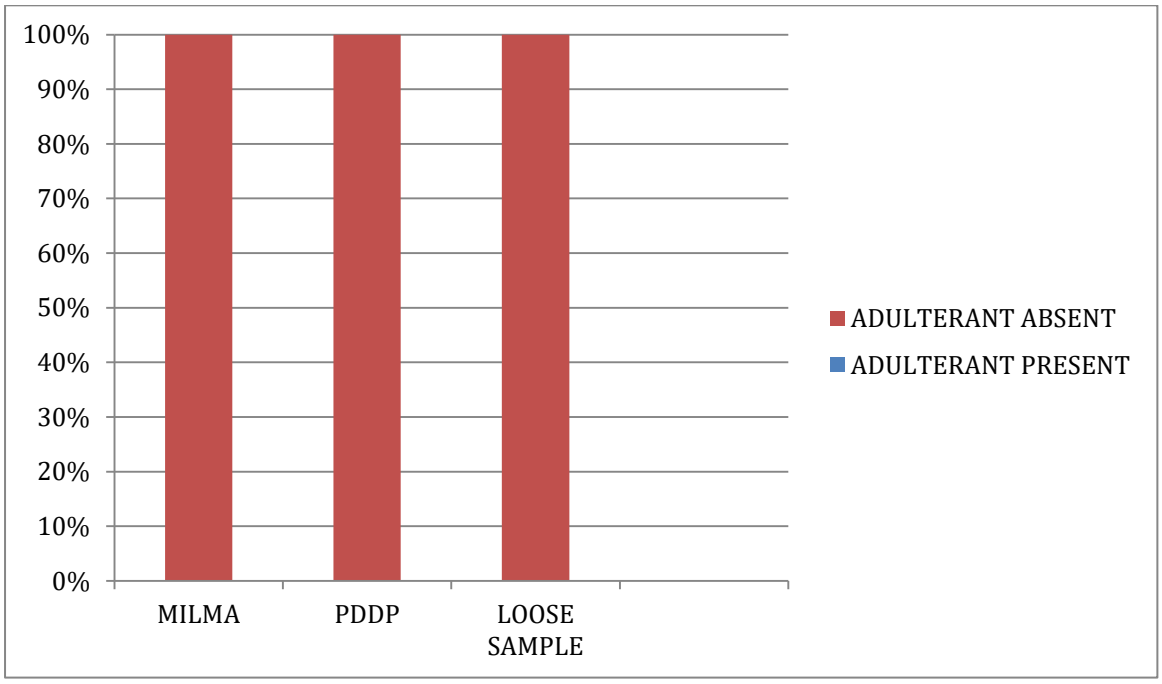
INDICATE THE PRESENCE OF UREA IN MILK



INDICATE THE PRESENCE OF FORMALIN IN MILK



INDICATE THE PRESENCE OF VANASPATI IN MILK



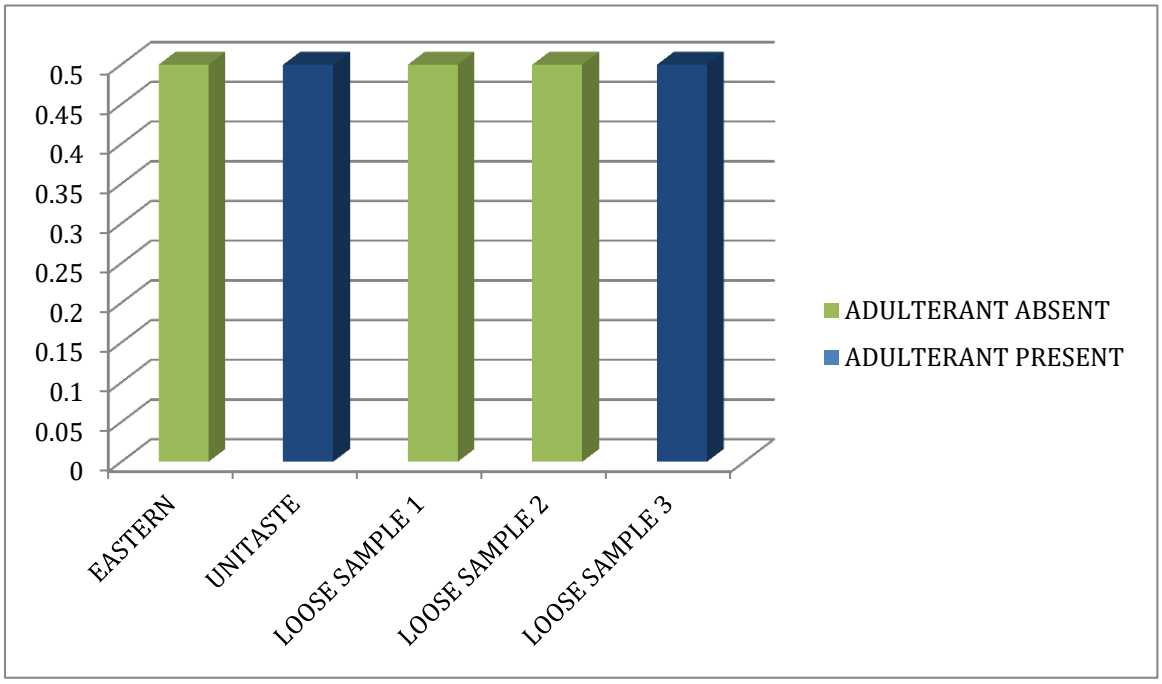
TEST TO IDENTIFY ADULTERANT IN TURMERIC POWDER

SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	EASTERN	PURITY TEST	Turmeric sit at the bottom of the beaker and water gets clear	Sample is pure
		LEAD CHROMATE TEST	Orange colour appeared	Presence of lead chromate
		METANIL YELLOW	Absence of magenta red colour	Absence of metanil yellow
2	UNITASTE	PURITY TEST	Water is not clear	The sample is impure
		LEAD CHROMATE TEST	Slight orange colour appeared	Partial presence lead chromate
		METANIL YELLOW	Absence of magenta red colour	Absence of metanil yellow
3	LOOSE SAMPLE (1)	PURITY TEST	Turmeric sit at the bottom of the beaker and water gets clear	Sample is pure
		LEAD CHROMATE TEST	Orange colour appeared	Presence of lead chromate
		METANIL	Absence of	Absence of

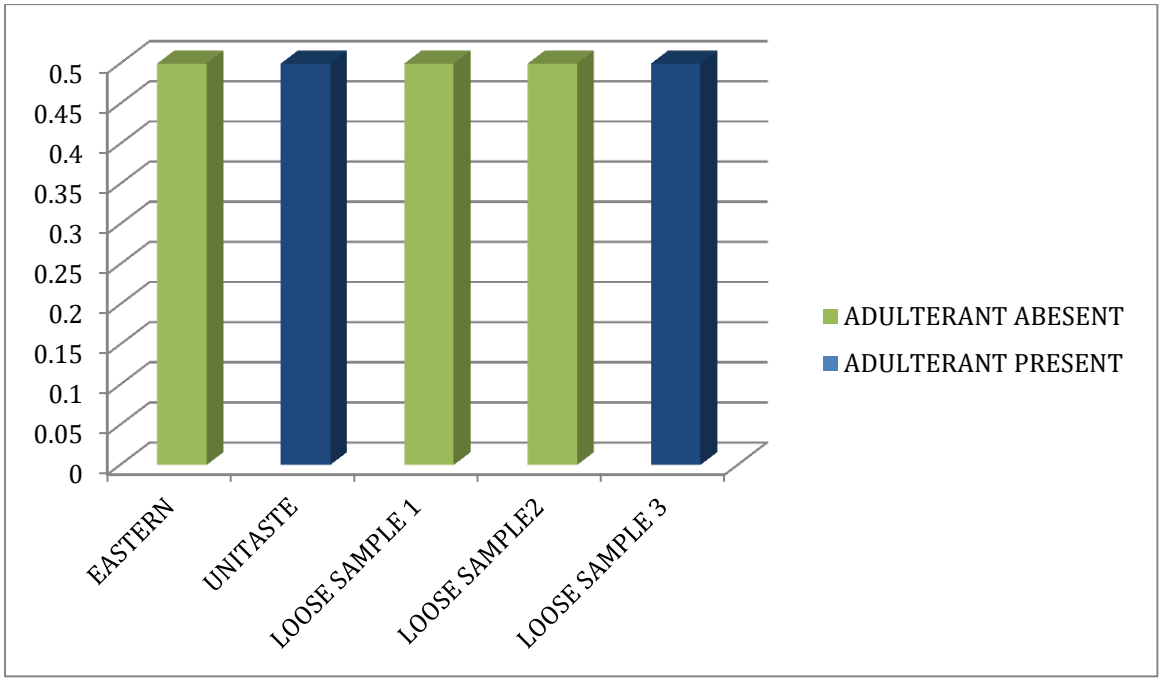
		YELLOW	magenta red colour	metanil yellow
2	LOOSE SAMPLE(2)	PURITY TEST	Turmeric sit at the bottom of the beaker and water gets clear	Sample is pure
		LEAD CHROMATE TEST	Orange colour appeared	Presence of lead chromate
		METANIL YELLOW	Presence of magenta red colour	Presence of metanil yellow
5	LOOSE SAMPLE (3)	PURITY TEST	Water is not clear	Sample is impure
		LEAD CHROMATE TEST	Absence of orange colour	Absece of lead chromate
		METANIL YELLOW	Absence of magenta red colour	Absence of metanil yellow

(TABLE: 2)

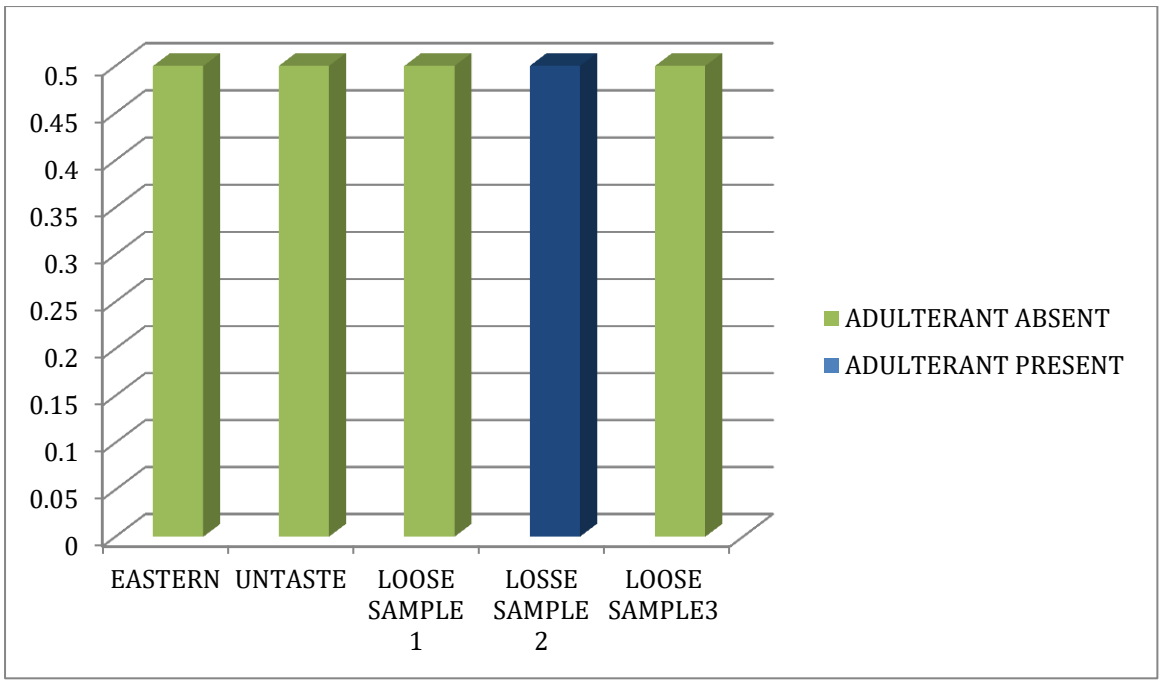
INDICATE THE PRESENCE OF PURITY IN TURMERIC POWDER



INDICATE THE PRSENCE OF LEAD CHROMATE IN TURMERIC



INDICATE THE PRESENCE OF MENTANIL YELLOW IN TURMERIC POWDER



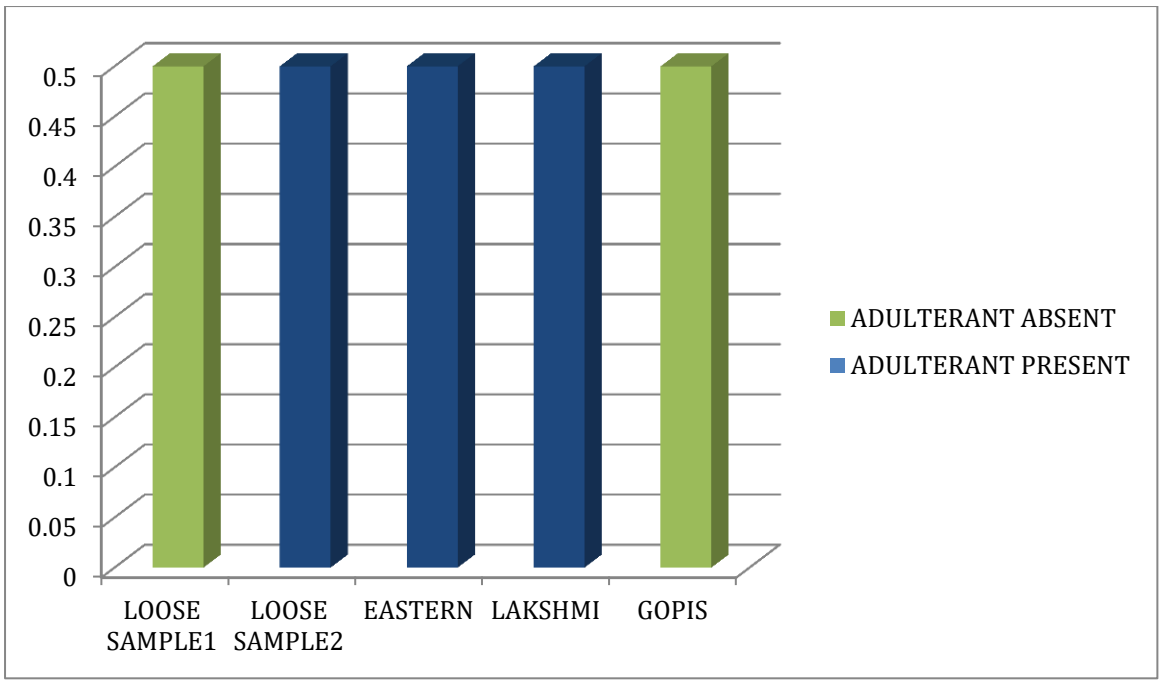
TEST TO IDENTIFY ADULTERANT IN CHILLI POWDER

Sl.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	LOOSE SAMPLE (1)	TEST FOR ARTIFICIAL COLOUR	Water exract is not red in colour	Absence of artificial colour
		TEST FOR RHODAMINE B	The sample is not red in colour	Absence of Rhodamine B
2	LOOSE SAMPLE (2)	TEST FOR ARTIFICIAL COLOUR	Water exract is red in colour	Presence of artificial colour
		TEST FOR RHODAMINE B	The sample is red in colour	Presence of Rhodamine B
3	EASTERN	TEST FOR ARTIFICIAL COLOUR	Water extract is partially red in colour	Partial detect of artificial colour
		TEST FOR	The sample is red in colour	Presence of

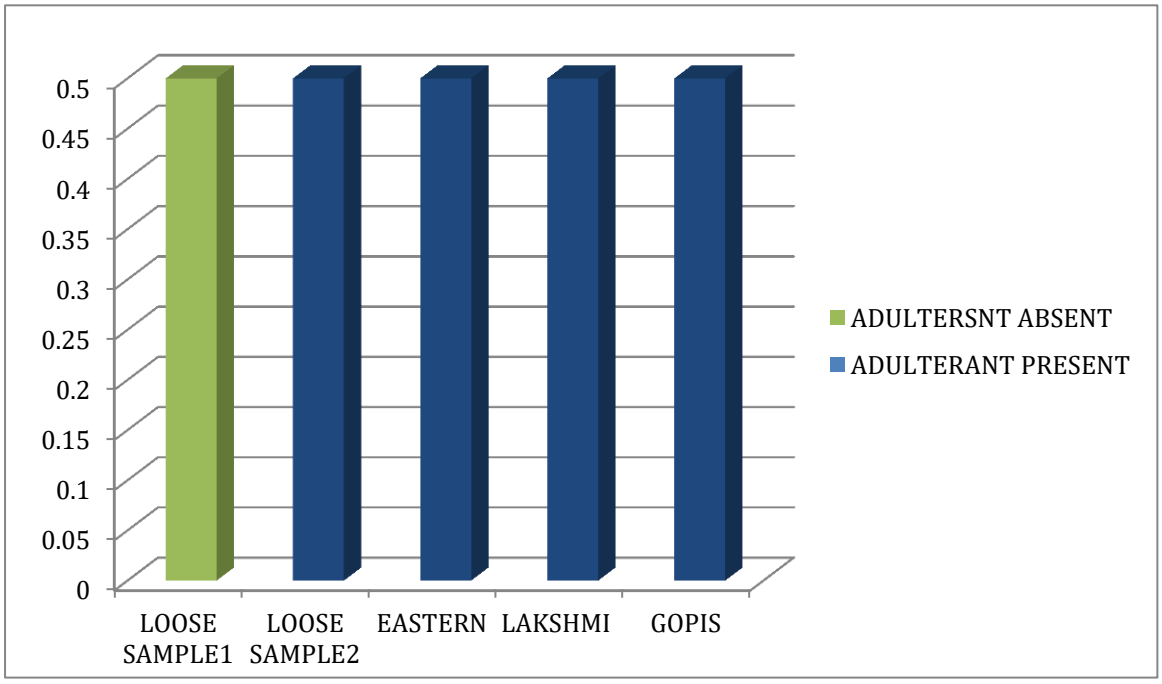
		RHODAMINE B		Rhodamine B
4	LAKSHMI	TEST FOR ARTIFICIAL COLOUR	Water extract is bright red in colour	Presence of artificial colour
		TEST FOR RHODAMINE B	The sample is red in colour	Presence of Rhodamine B
5	GOPIS	TEST FOR ARTIFICIAL COLOUR	Water exract is not red in colour	Absence of artificial colour
		TEST FOR RHODAMINE B	The sample is red in colour	Presence of Rhodamine B

(TABLE: 3)

INDICATE THE PRESENCE ARTIFICIAL COLOUR IN CHILLI POWDER



INDICATE THE PRESENCE OF RHODAMINE B IN CHILLI POWDER

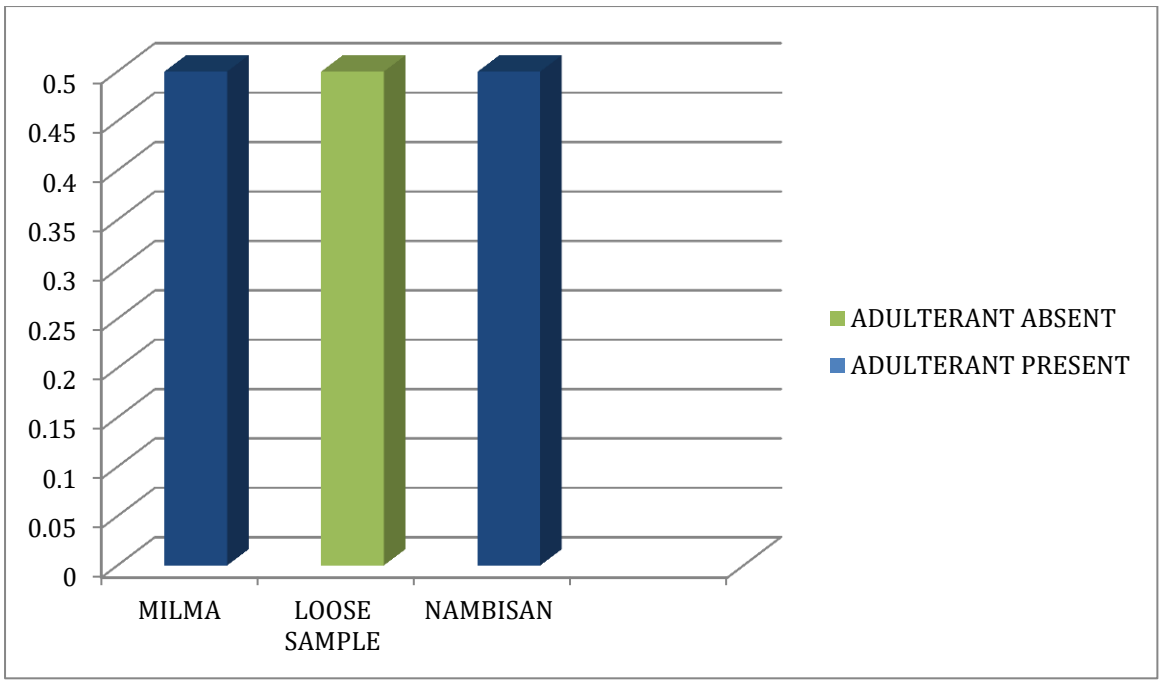


TEST TO IDENTIFY ADULTERANT IN GHEE

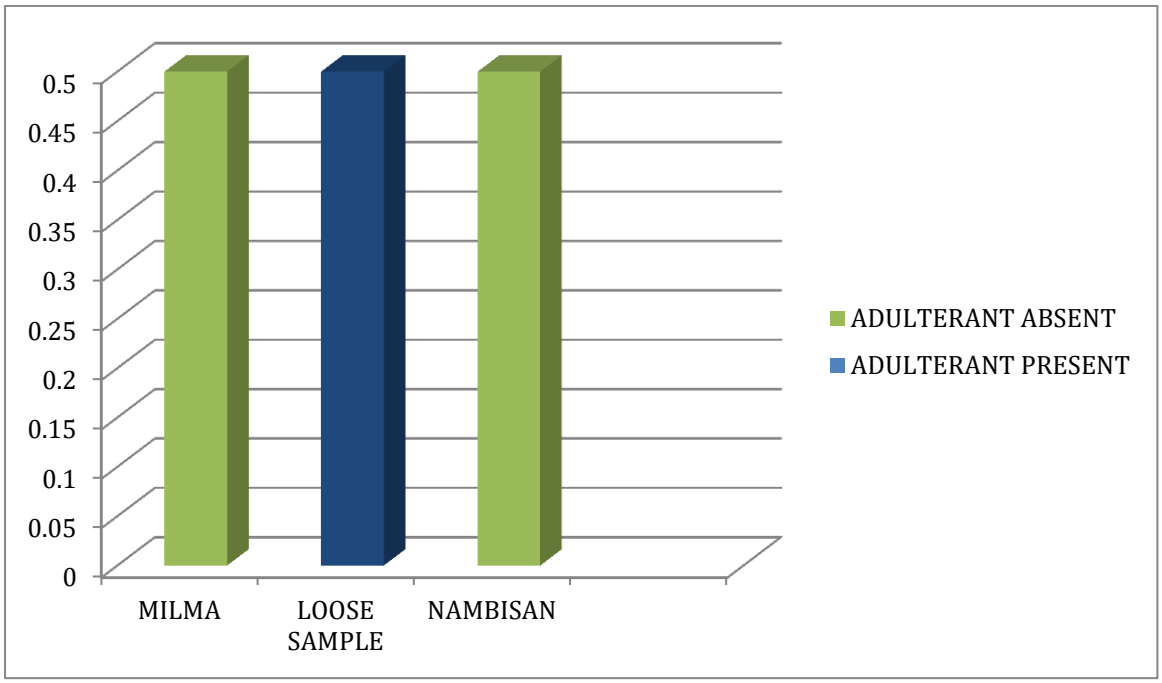
SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	MILMA	HEAT TEST	Colour turns to light yellow	Presence of Adulterant in ghee
		IODINE TEST	Absence of red colour	Absence of starch
2	LOOSE SAMPLE	HEAT TEST	Colour turns to brown colour on heating	Absence of Adulterant in ghee
		IODINE TEST	Presence of pink colour	Presence of starch
3	NAMBISAN	HEAT TEST	Colour turns to light yellow	Presence of Adulterant in ghee
		IODINE TEST	Absence of red colour	Absence of starch

(TABLE: 4)

INDICATE THE PRESENCE OF HEAT IN GHEE



INDICATE THE PRESENCE OF IODINE IN GHEE

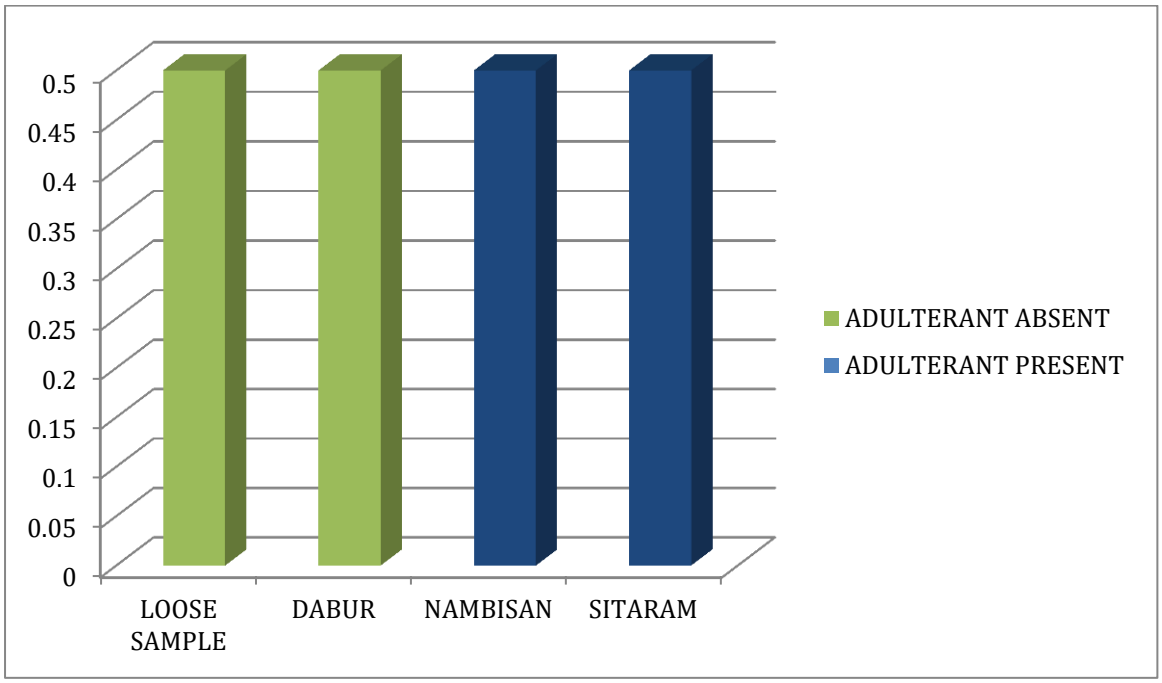


TEST TO IDENTIFY ADULTERANT IN HONEY

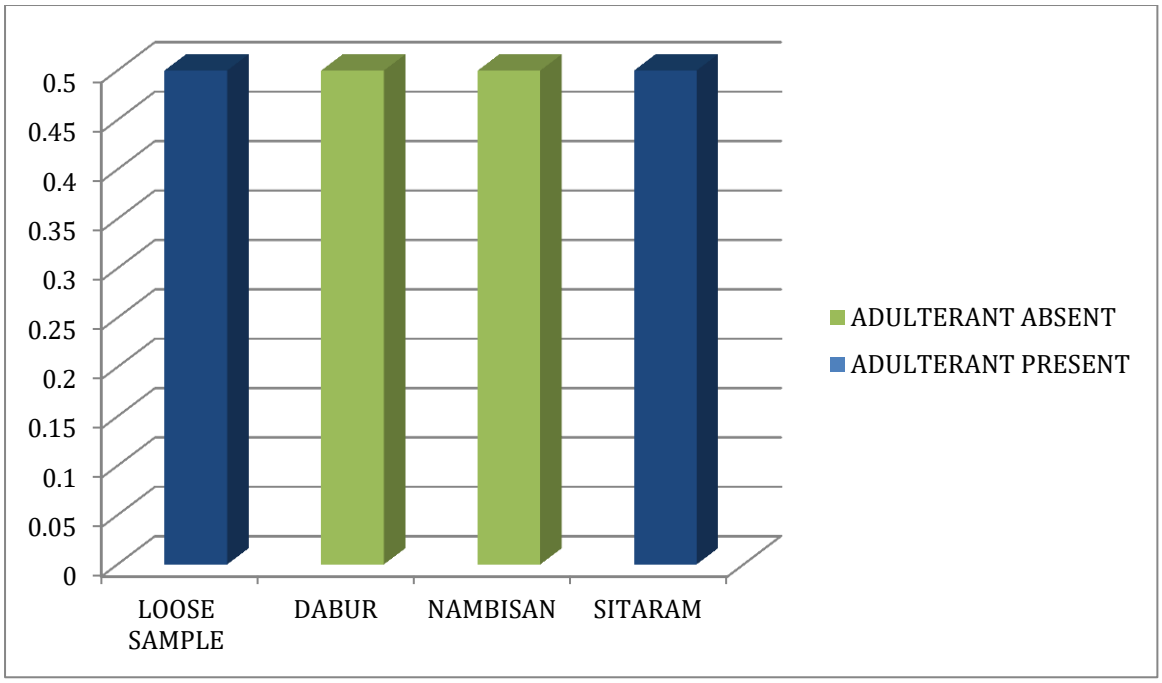
SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	LOOSE SAMPLE	PURITY TEST	A drop of honey settles down at the bottom of the test tube	Sample is pure
		TEST FOR PRESENCE OF SUGAR	Matchstick dipped in the honey doesn't burns	Presence of sugar solution
2	DABUR	PURITY TEST	A drop of honey settles down at the bottom of the test tube	Sample is pure
		TEST FOR PRESENCE OF SUGAR	Matchstick dipped in the honey burns	Presence of sugar solution
3	NAMBISAN	PURITY TEST	The drop of honey dissolved in the water	Sample is impure
		TEST FOR PRESENCE OF SUGAR	Matchstick dipped in the honey burns	absence of sugar solution
4	SITARAM	PURITY TEST	The drop of honey dissolved in the water	Sample is impure
		TEST FOR PRESENCE OF SUGAR	Matchstick dipped in the honey doesn't burns	presence of sugar solution

(TABLE: 5)

INDICATE THE PRESENCE OF PURITY IN HONEY



INDICATE THE PRESENCE OF SUGAR IN HONEY



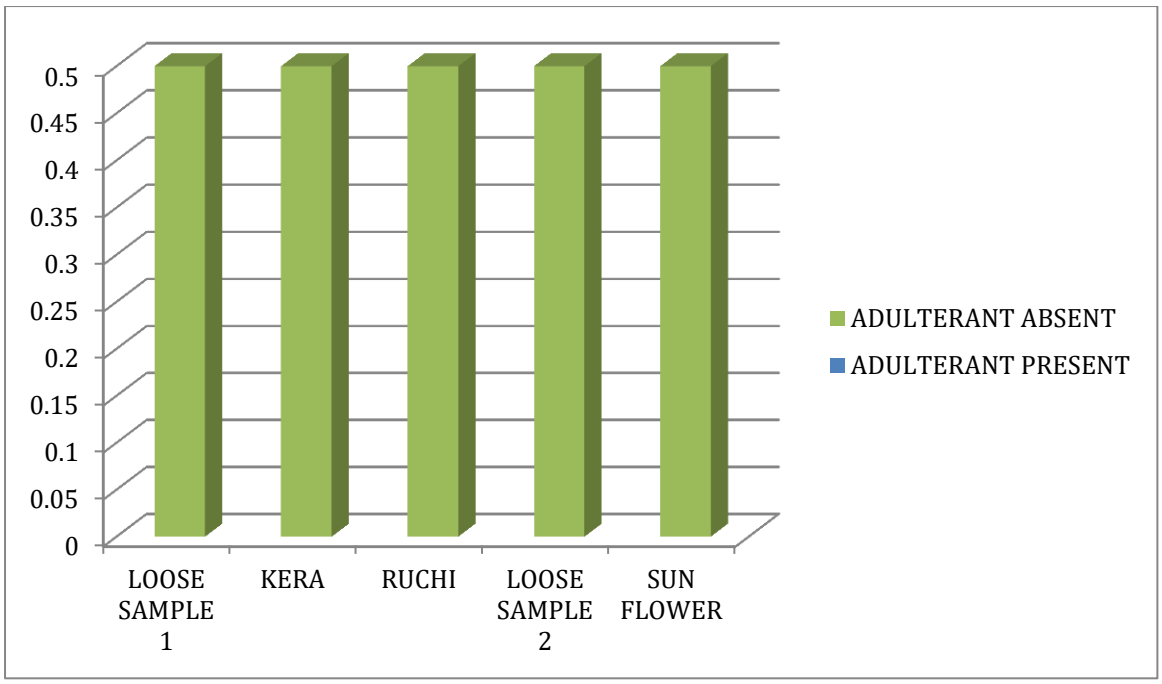
TEST TO IDENTIFY ADULTERANT IN OIL

SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	LOOSE SAMPLE (1)	TO DETECT THE PRESENCE OF ANY OTHER OIL	Solidified coconut oil doesn't leave a separate layer	Absence of adulterant as oil
		TEST FOR PROHIBITED COLOUR	Absence of separate coloured layer in the solution	Absence of prohibited colour
2	KERA	TO DETECT THE	Solidified coconut oil	Absence of

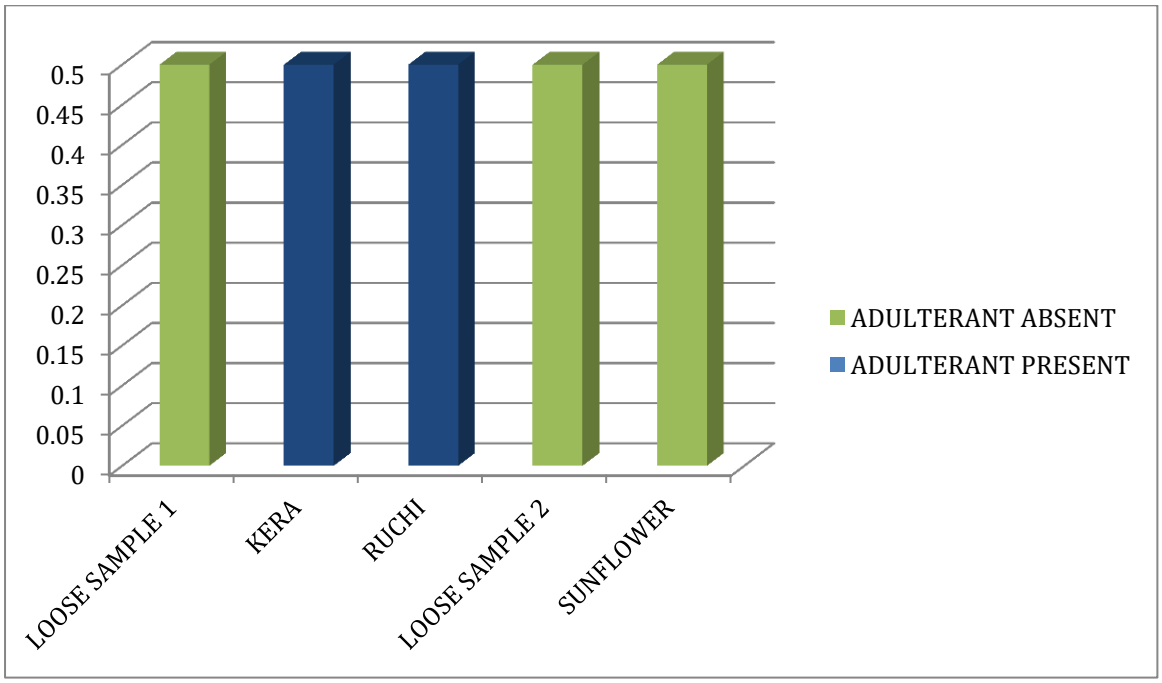
		PRESENCE OF ANY OTHER OIL	doesn't leave a separate layer	adulterant as oil
		TEST FOR PROHIBITED COLOUR	separate coloured layer is formed in the solution	presence of prohibited colour
3	RUCHI	TO DETECT THE PRESENCE OF ANY OTHER OIL	Solidified coconut oil doesn't leave a separate layer	Absence of adulterant as oil
		TEST FOR PROHIBITED COLOUR	separate coloured layer is formed in the solution	presence of prohibited colour
4	LOOSE SAMPLE (2)	TO DETECT THE PRESENCE OF ANY OTHER OIL	Solidified coconut oil doesn't leave a separate layer	Absence of adulterant as oil
		TEST FOR PROHIBITED COLOUR	Absence of separate coloured layer in the solution	Absence of prohibited colour
5	SUNFLOWER OIL	TO DETECT THE PRESENCE OF ANY OTHER OIL	Solidified coconut oil doesn't leave a separate layer	Absence of adulterant as oil
		TEST FOR PROHIBITED COLOUR	Absence of separate coloured layer in the solution	Absence of prohibited colour

(TABLE: 6)

INDICATE THE PRESENCE OTHER OIL IN TAKEN SAMPLE



INDICATE THE PRESENCE PROHIBITED COLOUR IN TAKEN OIL

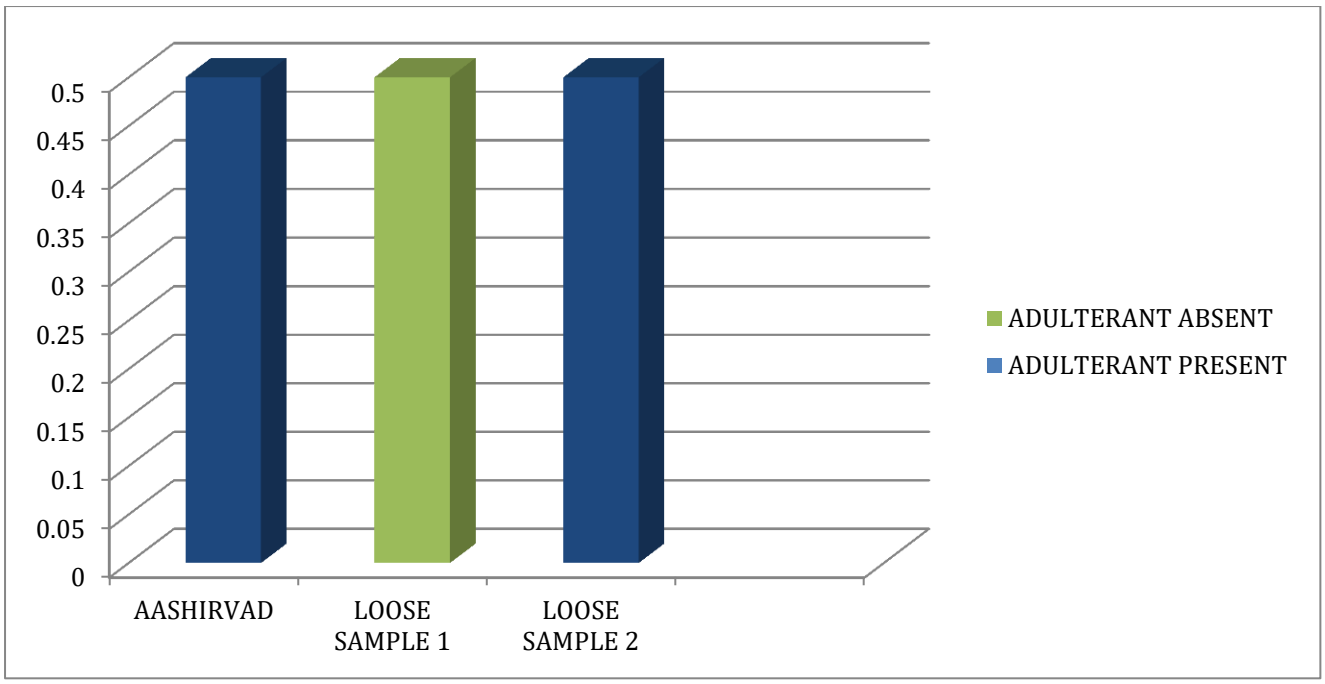


TEST TO IDENTIFY ADULTERANT IN FLOUR (WHEAT)

SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	AASHIRVAD	TEST FOR CHALK IN FLOUR	Presence of effervescence	Presence of chalk powder
2	LOOSE SAMPLE (1)	TEST FOR CHALK IN FLOUR	Absence of effervescence	Absence of chalk powder
3	LOOSE SAMPLE (2)	TEST FOR CHALK IN FLOUR	Presence of little effervescence	Presence of chalk powder

(TABLE: 7)

INDICATE THE PRESENC E OF CHALK POWDER IN FLOUR (WHEAT)

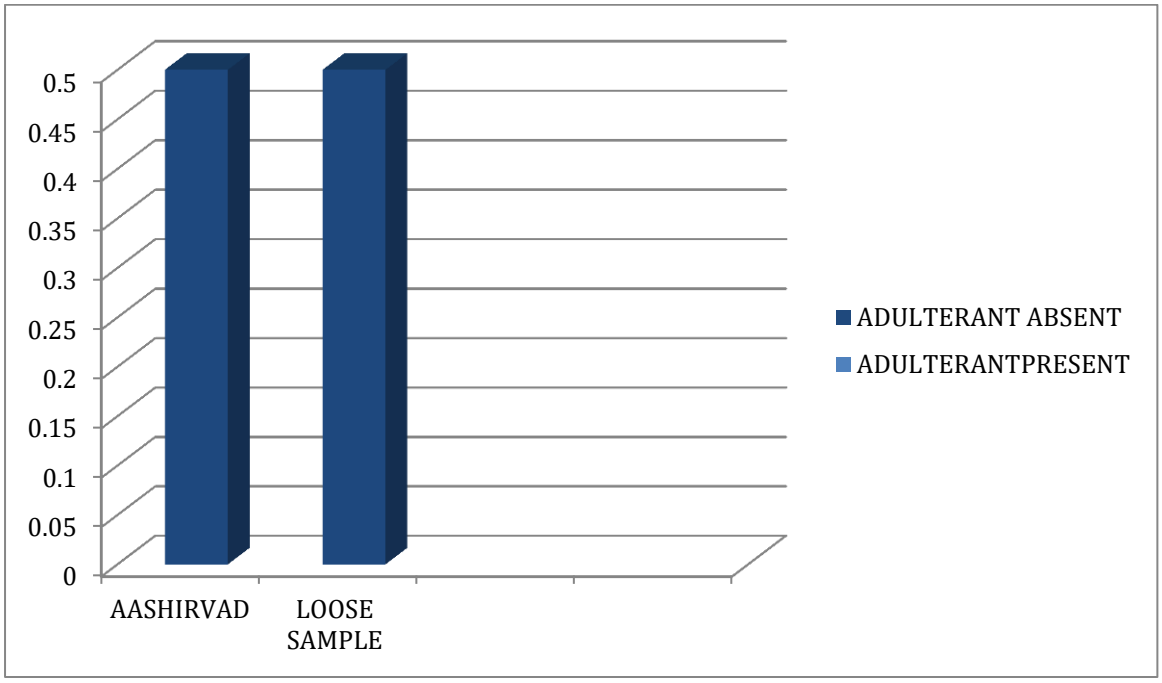


TEST TO IDENTIFY ADULTERANT IN FLOUR (MAIDA)

SL.NO	SAMPLE	TEST	OBSERVATION	RESULT
1	AASHIRVAD	TEST FOR CHALK IN FLOUR	Presence of effervescence	Presence of chalk powder
2	LOOSE SAMPLE	TEST FOR CHALK IN FLOUR	Presence of effervescence	Presence of chalk powder

(TABLE: 8)

INDICATE THE PRESENCE OF CHALK POWDER IN FLOUR (MAIDA)



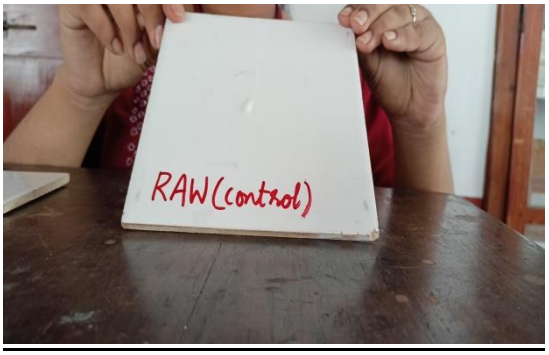


Fig 1- Water test

Detect the presence of water in milk

Fig 2- Detergent test

Detect the presence of detergent in milk

Fig 3- Urea test

Detect the presence of urea in mil

Fig 4- Starch test

Detect the presence of starch in milk

Fig 5-Formalin test

Detect the presence of formalin in milk

Fig 6-Vanaspati test

Detect the presence of Vanaspati in milk

Fig 7-Purity test

Detect the purity in Turmeric powder

Fig 8-Lead chromate test

Detect the presence of lead chromate in Turmeric powder

Fig 9-Metanil yellow test

Detect the presence of metanil yellow in Turmeric powder

Fig 10-Test for Artificial colour

Detect the presence of articial colour in Chilli powder

Fig 11-Test for Rhodamine B

Detect the presence of Rhodamine B in chilli powder

Fig 12-Heat test

Detect the ghee is pure

Fig 13-Iodine test

Detect the presence of iodine in ghee

Fig 14-Purity test

Detect the purity of honey




Fig 15-Sugar test

Detect the presence of sugar solution in hone

Fig 16-Any other oil

Detect the presence of any other oil

Fig 17-Prohibited colour

Detect the presence of prohibited colour

Fig 18-Chalk powder test

Detect the presence of chalk powder in wheat

Fig 19-Chalk powder test

Detect the presence of chalk powder in maida

DISCUSSION

The research emphasizes on the role of consumer awareness about the food adulteration that is prevailing in everyday products. This ensures the authenticity of the product's description given in its labelling. Comparative studies across different countries have revealed that more studies must be conducted in this area of food safety and regulation. It is also to check whether the food safety standard and enforcement mechanism are effective to tackle the issue of food adulteration.

Such studies help to change the consumer’s perception and behaviour towards the adulterated foods. The consumers are blindly driven towards these products on the basis of commercial advertisement rather than their purity. This study reveals the reality of the commodities that are a part of our daily consumption.

This study helps to make people aware of the threat that we are facing in the field of public health. It documents the detection and prevention of fraudulent activities prevailing in this area of food supply. It also highlights the importance of risk assessment and mitigation strategies to safeguard public health and maintain consumer’s confidence in the integrity of the food supply. Overall, the research paper provides valuable insights into the evolving nature of food fraud and its implications for public health and food safety.

CONCLUSION

The study entitled “ensuring food safety: A study on adulteration in everyday products” Reveals the reality of commodities that are a part of our daily consumption such as milk, turmeric powder, chilli powder, Ghee, honey, oil, flour etc.

Presence of some Adulterants were detected from this study

•The milk brand ‘MILMA’ contains urea and formalin, and the adulterants like detergent, starch, Vanaspati were not present in this brand.

‘PDDP’ shows the presence of detergent, urea and formalin, but the water, starch were absent.

Even the open packet shows the presence of water as Adulterant. But Harmful Adulterants like detergent, urea, starch, formalin and Vanaspati were absent. So compared to other brands this shows more purity

•The widely used brands of turmeric powder ‘EASTERN’ and ‘UNITASTE’ shows the presence of lead chromate, and absence of metanil yellow.

Among the turmeric powder brought from three retail stores (unbranded loose sample), loose sample 1 shows the presence of lead chromate and absence of metanil yellow, loose sample 2 show the presence of both lead chromate and metanil yellow, loose sample 3 shows the absence of lead chromate and metanil yellow.

•The brands of chilli powder ‘EASTERN’ and ‘LAKSHMI’ Shows positive to the test for harmful Adulterants like Rhodamine B and also detect the presence of artificial colour. The Indian brand ‘GOPIS’ shows the presence of Rhodamine B and absence of artificial colour,

Among the two Loose samples brought from the retail stores, one of them contain the presence of both artificial colour and Rhodamine B and the other one shows the absence of both the adulterants

•’MILMA’ , the widely used brands of ghee in daily food products shows the presence of Adulterants on heat test, but the complete absence of starch is found.

The brand ‘NAMBISHAN’ shows the presence of adulterant as same as the above but starch is not present.

Loose sample from unbranded source of ghee shows the presence of starch.

•The brands of honey ‘NAMBISHAN’ and ‘SITARAM’ shows the presence of impurities on purity test, SITARAM also shows the presence of sugar solution but NAMBISHAN doesn’t contain sugar

solution. ‘DABUR’ doesn’t contain any impurities or sugar solution as adulterant. As compared to others the brand ‘DABUR’ is pure and safe to use

•Coconut oil is an ingredient in daily Indian consumables. The brand ‘KERA’ and ‘RUCHI GOLD’ shows the presence of prohibited colour. But the presences of any other oil as adulterant were not found.
Loose sample of coconut oil collected from local area doesn’t show the presence of any other oil and shows the absence of prohibited colour. SUNFLOWER OIL shows the absence of prohibited color.
From this study, we can concludes that loose sample brought from location area is safe to use

• The famous brand of flour ‘AASHIRVAAD’ contains chalk powder as Adulterant. The loose sample picked from unbranded source doesn’t shows the presence of chalk powder as adulterant.

This study helps to make people aware of the threat that we are facing in the field of public health.

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