



**SRI VENKATESWARA INTERNSHIP PROGRAM
FOR RESEARCH IN ACADEMICS
(SRI-VIPRA)**



SRI-VIPRA

Project Report of 2023: SVP-2333

“Adulteration in fruits and vegetables”


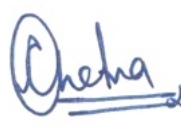

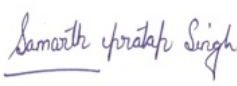


**IQAC
Sri Venkateswara College
University of Delhi
Benito Juarez Road, Dhaula Kuan, New Delhi
New Delhi -110021**

SRIVIPRA PROJECT 2023


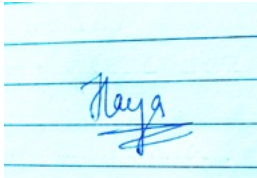




Title: Adulteration in fruits and vegetables

<p>Name of Mentor: Prof. Anita Verma Name of Department: Zoology Designation: Professor</p>	 A portrait of Prof. Anita Verma, an elderly woman with short, wavy grey hair, wearing glasses and a red top with a yellow patterned shawl. She is smiling slightly and looking towards the camera.
<p>Name of Mentor: Dr. Rajendra Phartyal Name of Department: Zoology Designation: Assistant Professor</p>	 A portrait of Dr. Rajendra Phartyal, a middle-aged man with dark hair, wearing glasses and a light blue collared shirt. He is looking directly at the camera with a neutral expression.

List of students under the SRIVIPRA Project

S.No	Photo	Name of the student	Roll number	Course	Signature
1		Chetna Sharma	2021006	BSc(H)Zoology Sem :V	
2		Samarth Pratap Singh	1121049	BSc(P)Life Sciences Sem :V	
3		Mayank Kumar	2021019	BSc(H)Zoology Sem :V	

4		Anushka Dhiman	2021004	BSc(H)Zoology Sem :V	
5		Vanshika Bhandari	1121076	BSc(P)Life Sciences Sem :V	
6		Akanshi Sharma	1121160	BSc(P)Life Sciences Sem :V	
7		Anushree Singh	1121154	BSc(P)Life Sciences Sem :V	

8		Haya Dilshad	1121163	BSc(P)Life Sciences Sem :V	
9		Itika Garg	1121113	BSc(P)Life Sciences Sem :V	
10		Deepti Rana	1121064	BSc(P)Life Sciences Sem :V	



Prof. Anita Verma



Dr. Rajendra Phartyal

Signature of Mentors

Certificate of Originality

This is to certify that the aforementioned students from Sri Venkateswara College have participated in the summer project SVP-2333 titled “**Adulteration in Fruits and Vegetables**”. The participants have carried out the research project work under our guidance and supervision from 15 June 2023 to 15th September 2023. The work carried out is original and carried out in hybrid mode.



Prof. Anita Verma

Dr. Rajendra Phartyal

Signature of Mentors

Acknowledgements

This research study has provided us with a valuable learning opportunity. It acted as a link between the theoretical and practical nature of the project.

A debt of gratitude to **Prof. K. Chandramani Singh**(Ag Principal, Sri Venkateswara College), **Prof. Swarn Singh** (IQAC Convener), **Prof. Sharda Pasricha** and **Dr. S. Krishna Kumar** (SRI- VIPRA Coordinators) for creating this platform called Sri Venkateswara Programme for Research and Innovative Academics (SRIVIPRA -2021) for us and providing an extraordinary chance to learn outside our classrooms.

Our Mentors, **Prof. Anita Verma** and **Dr. Rajendra Phartyal**, have been extremely generous with their time and the outcomes of the study benefits from their assistance and supervision.

This project could never have been brought to its completion without the extensive participation of people from across the country, who invested their precious time and energy, providing valuable input and sharing the form with others. We are fortunate for all the earlier investigations done in this field providing us a substantial ground to expand upon.

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AIM

The adulteration of fruits and vegetables poses a significant threat to public health and consumer trust in India. The aim of this project is to investigate and assess the extent of adulteration in fruits and vegetables with the objective of providing insights into the prevalence, types of adulterants, and potential health risks and economic consequences.

INTRODUCTION

Fruits and vegetables are key ingredients of human nutrition, delivering vital vitamins, minerals, and dietary fiber essential for good health (Smith et al., 2017). In India, where agriculture sustains a significant portion of the population, the consumption of these nutrient-rich foods is not just a dietary choice but a way of life (Kumar et al., 2020).

However, the safety and authenticity of these dietary staples have come under scrutiny due to the pervasive issue of adulteration. Adulteration is the intentional addition of inferior or harmful substances to food items (Choudhury et al., 2019) that poses a critical threat to public health and the agricultural sector's integrity. Consumption of adulterated food for long will have both short-term and long-term impacts on human health. Hazardous effects of adulteration are associated with gastrointestinal problems, eyesight problems, headache, anemia, insomnia, muscular paralysis, brain damage, joint pain, liver disorder, dropsy, respiratory distress, cardiac arrest, carcinogenic effects, kidney failure, etc. (Anita and Neetu, 2013, Faraz et al., 2013 and Lakshmi et al., 2012).

While food adulteration is a global concern, India's unique agricultural landscape, distribution networks, and regulatory complexities demand a context-specific examination of adulteration in fruits and vegetables. This project report sets out to comprehensively explore this multifaceted issue within the Indian context.

This report seeks to provide a comprehensive understanding of fruit and vegetable adulteration in India by drawing from academic literature, conducting field surveys in local vegetable markets, engaging with vendors, and conducting online consumer surveys. Our objectives encompass highlighting the prevalence of adulteration, identifying common adulterants, examining potential health impacts, considering economic repercussions for farmers and the agricultural sector, and gaining insights into the perceptions of common consumers. Through this multifaceted approach, we aim to deliver a holistic perspective on this critical issue.

The adulteration of fruits and vegetables encompasses a wide range of deceptive practices, including the use of artificial colors, chemical preservatives, pesticide residues and the misrepresentation of their origin or quality. Such practices not only defraud consumers but also pose serious health risks, leading to various ailments and diseases (Smith et al., 2020).

A wide range of chemicals are used as adulterants in fruits and vegetables. Calcium carbide is most often used in powdered form to artificially ripen fruits and vegetables. The major reasons behind its wide usage

are the high price of ethylene, faster-ripening capability and being cheaper than other chemicals. (Bhattarai et al., 2005). Oxytocin is a mammalian hormone that is widely used in bottle gourds, bitter gourds, cucumbers, and pumpkins for enhancing size and color. The saccharine mixture is injected into melons and watermelons to artificially enhance the sweetness. Rhodamine B, Auramine, Congo red, Orange II, malachite green, and other dyes are also used in vegetables. Red dye is being injected into watermelons to make them more appealing to the consumers. Malachite green is being extensively used for making green vegetables like green chilies, peas, bitter gourds, lady finger etc., to look greener, brighter, and fresher. (Panghal et al., 2018). With the increasing globalization of food trade and the complexity of supply chains, detecting and preventing adulteration has become an immense challenge for regulatory authorities and stakeholders across the world (Johnson et al., 2018).

This report aims to provide a comprehensive analysis of the current challenges associated with the adulteration of fruits and vegetables, highlighting the various methods employed by unscrupulous individuals in the food industry. By examining the common adulterants, their detection techniques, and the potential health implications for consumers, this report seeks to shed light on the gravity of the issue. Moreover, this report will delve into the factors contributing to the prevalence of adulteration, including economic pressures, inadequate regulatory measures and insufficient quality control systems. It will explore the impact of adulteration on consumer trust, industry reputation and the overall economy, emphasizing the need for urgent action to mitigate this pervasive problem.

In addition, it will present an overview of the emerging technologies to combat adulteration effectively. From advancements in analytical techniques and DNA-based authentication methods to blockchain technology and supply chain traceability, a range of promising strategies will be discussed, offering potential avenues to enhance transparency, ensure food safety, and safeguard consumer interests.

By reviewing the existing literature on adulteration in fruits and vegetables, we aim to contribute to the knowledge base and stimulate further research in this critical area. Through a comprehensive understanding of the challenges and potential solutions, stakeholders can work together to develop robust measures and policies that promote the integrity and authenticity of our food supply, ultimately safeguarding the health and well-being of consumers globally.

We have delved into consumer perceptions and behaviors concerning the purchase and consumption of these essential foods and examine the roles played by various stakeholders, including farmers, traders and regulatory authorities.

The insights and recommendations put forth in this report aim to contribute substantively to the ongoing dialogue on food safety in India, advocating for more stringent measures to combat adulteration, protect consumers' health, and ultimately, bolster the sustainability of India's farming industry

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METHODOLOGY

This research adopted a mixed-methods approach, combining both quantitative and qualitative data collection methods to provide a bio-statistical nature and comprehensive analysis of fruit and vegetable adulteration in India. We used Google Forms to conduct an online survey in the form of a questionnaire to understand the perception of general consumers towards threats posed by adulteration to public health and consumer trust in India. Through this survey, we wanted to study the current knowledge of people regarding the types of adulterants, adulteration techniques, their prevalence, and their impact on human health. In order to formulate the survey questions, we did an extensive literature review of a variety of research articles and blogs on adulteration in fruits and vegetables.

The questionnaire was finalized with the help and guidance of our mentors Dr. Anita Verma and Dr. Rajendra Phartyal.

The survey form was pretested with 10 correspondents. We conducted the survey after obtaining prior consent from all the participants. The basic aim of our survey was to know about the awareness of common people regarding adulteration and its consequences, to identify common adulterants used in fruits and vegetables, to understand the challenges faced by consumers and regulatory bodies in combating adulteration and to explore public perceptions and awareness of fruit and vegetable adulteration. Our Google form was distributed mainly on social media, we ensured that it reached consumers from diverse backgrounds in India. With the help of this survey, we were able to collect 404 responses. The data obtained was then processed, analyzed, visualized, and stored using Microsoft Excel for research purposes. Our team also visited mandis and interacted with the vendors and collected information about different chemicals commonly used by them on different fruits and vegetables.

The link to the Survey Form: <https://forms.gle/7cXTn8NDtz3Vq7S9>

SVC 2333 Fruit and Vegetable Adulteration Survey



Warm Greetings! 🌞

We, the students of Sri Venkateswara College, University of Delhi, are conducting the following survey under SRIVIPRA internship Program with a research objective. 📄

The title of our Project is “ **Adulteration in fruits and vegetables (SVP-2333)**”

Adulteration poses a significant threat to public health and consumer trust in India. Our study aims to provide a comprehensive analysis of the prevalent practices and challenges associated with fruit and vegetable adulteration in India.

Through an extensive survey, our objective is to analyze the current knowledge regarding the types of adulterants, adulteration techniques, their prevalence and impact on human health. **We therefore request you to kindly spare some time from your busy schedule and fill this google form which is a comprehensive part of our research.**

THANK YOU!



Email *

Record as the email to be included with my response

Name

Your answer

State of residence *

Your answer

Town of residence *

Your answer _____

Is your area of residence rural or urban? *

- Urban / City
- Small Town
- Rural/ Village

By clicking "I agree" below you are indicating that you give your consent to participate in this research study. Your name, other personal details and your answers in this study will remain confidential. *

- I agree

Section 2 of 2

Adulteration in fruits and vegetables



Description (optional)

Have you ever come across any fruit or vegetable adulteration ? *

- Yes
- No
- Maybe

How often do you wash your fruits and vegetables thoroughly before eating? *

- Always
- Often
- Sometimes
- Rarely
- Never

Do you think adulterants are substances that are intentionally added to food for commercial reasons? *

- True
- False
- Can't Say

Which one of the following adulterants have you heard of? *

- Ethylene
- Artificial colors
- Artificial sweeteners
- Growth injections
- Calcium Carbide
- Any other Chemical
- None of the above

What do you use most often for washing your fruits and vegetables at home? *

- Baking soda
- White Vinegar
- Salt Solution
- Haldi
- Only tap water
- Kent/any other brand's Ozone vegetable washers
- None

Are you familiar with any government regulations or initiatives aimed at preventing fruit and vegetable adulteration? (If yes, you can add answer below) *

- Yes
- No
- Not sure
- Other...

The government and regulatory bodies are effectively addressing the issue of fruit and vegetable adulteration. *

- Yes
- No
- Not sure

What do you think can be some of the consequences of Adulteration? *

- Cancer
- Allergic reactions
- Cardiovascular disorders
- Diabetes
- None of the above

Have you ever suffered any health issues due to the consumption of artificial dyes and chemicals in vegetables/fruits? *

- Yes
- No
- Maybe

If a fruit or vegetable is unadulterated but does not appear appealing, would you still buy it? *

- Yes
- No
- Maybe

Are you familiar with any specific tests or methods that can be used at home to detect fruit and vegetable adulteration? (If yes, you can add a suggestion below) *

- Yes
- No
- Other...

Have you come across any article/video on fruit/vegetable adulteration in any of the following *
media?

- Newspaper
- Television
- Social media
- None

What matters to you the most with respect to fruits and vegetables? *

- Quality
- Price
- Both

Would you prefer paying a higher price for non-adulterated food items instead of eating adulterated ones? *

- Yes
- No
- Maybe

Which fruits or vegetables do you like to buy? *

- Shiny but adulterated
- Dull but not adulterated

Do you think that retailers and vendors are also equally responsible as the producers/wholesalers for Adulteration ? *

- Yes they are responsible
- Somewhat Responsible
- Not Responsible

Do you trust your vegetables/fruit supplier that he/she is supplying you with unadulterated items? *

- Yes
- No
- Maybe

Do you prefer AGMARK-certified products over normal ones? *

- Do not prefer
- Somewhat prefer
- Strongly prefer

In which fruit you have commonly found adulteration *

- Banana
- Mango
- Apple
- Watermelon
- Java plum (Jamun)
- Grapes
- Pear
- None of the above

In which vegetable you have commonly found adulteration *

- Brinjal
- Tomato
- Green chilly
- Cucumber
- Lady finger
- Bottle gourd (Lauki)
- Peas
- None of the above

Do you consider that the addition of artificial adulterants is acceptable to a considerable amount? *

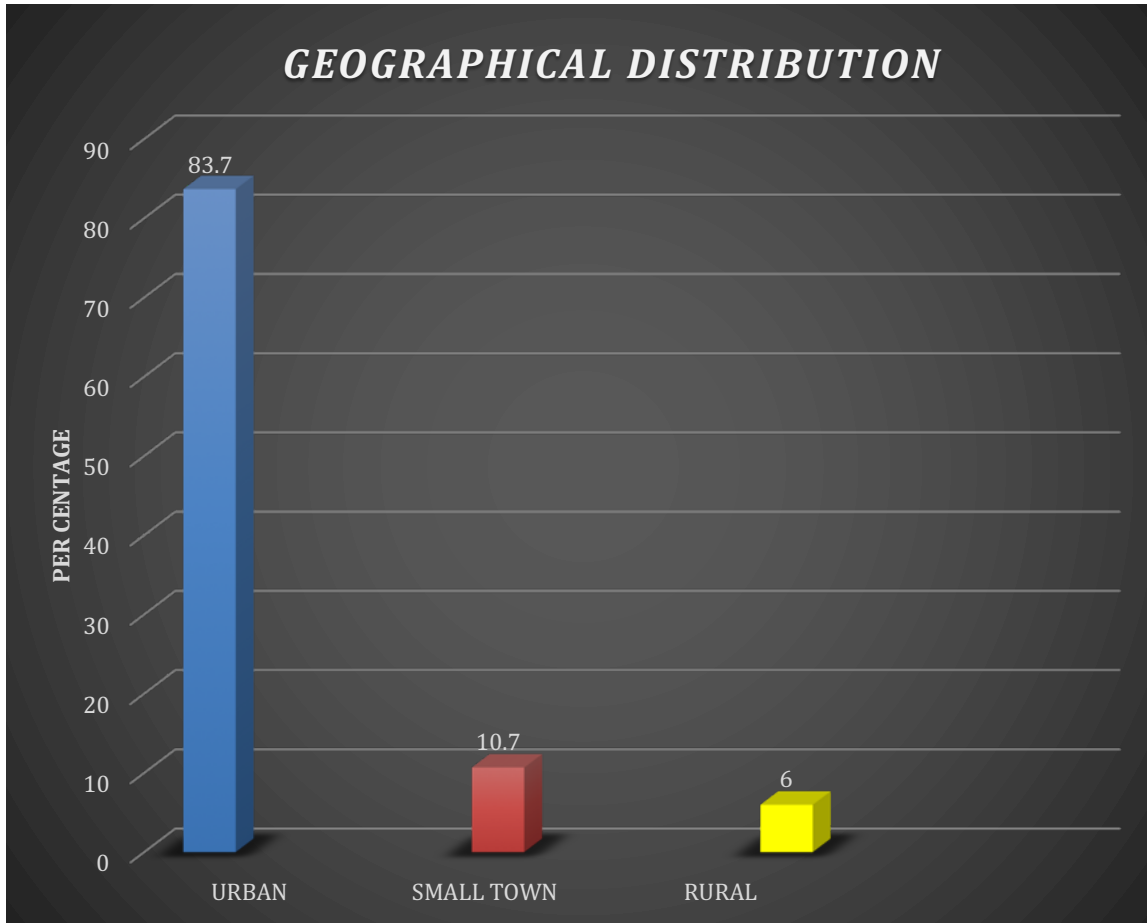
- Yes
- No
- Not sure

According to you, how the problem of fruit/vegetable adulteration can be tackled? (You can also add your suggestion below) *

- By raising public awareness
- By educating the street vendors about the consequences of adulteration
- Adulterants should not be made easily accessible
- Frequent raids by Authorities/sting operations by media
- By implementing stringent punishments
- Other...

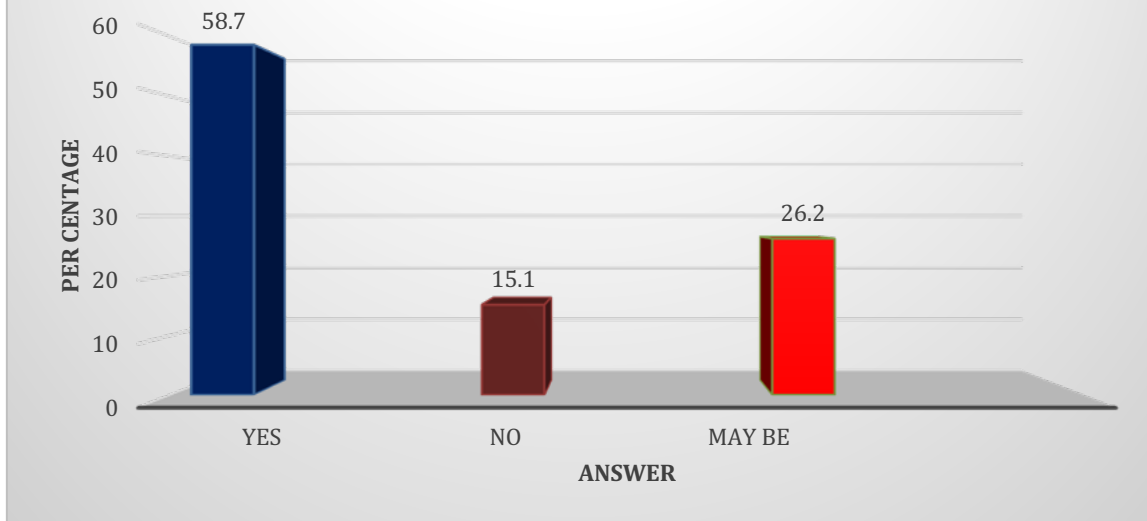
RESULTS AND ANALYSIS

● GEOGRAPHICAL DISTRIBUTION Of Respondents :



Out of a total of 404 responses gathered 83.7% responses came from urban cities, 10.7% responses were from small towns and the rest 6% were people residing in rural or village areas.

HAVE YOU EVER COME ACROSS ANY FRUIT OR VEGETABLE ADULTERATION?

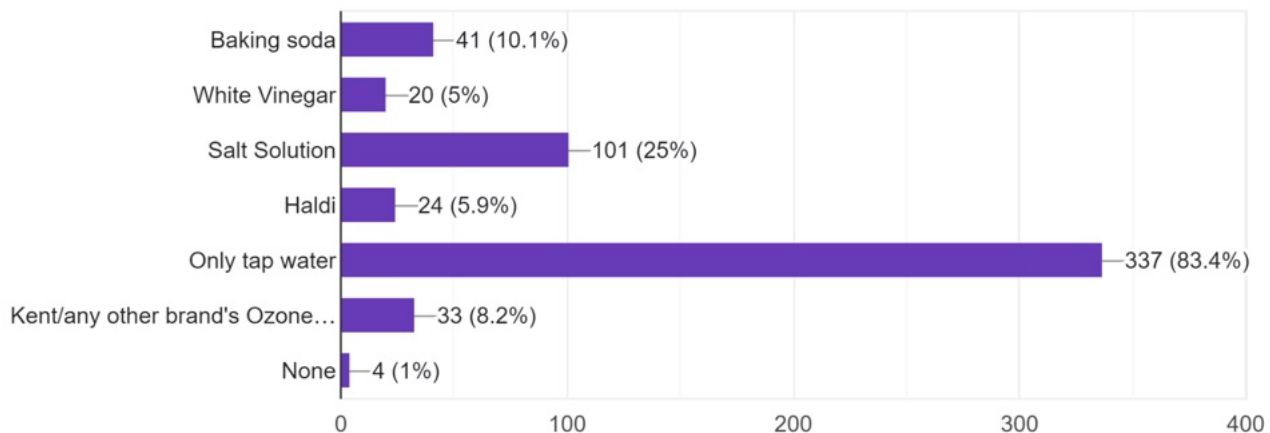


In response to this question 58.7% of the people responded with yes as they have encountered adulteration and 15.1% people responded with no and the rest 26.2% responded with maybe.

● WASHING FRUITS AND VEGETABLES:

What do you use most often for washing your fruits and vegetables at home?

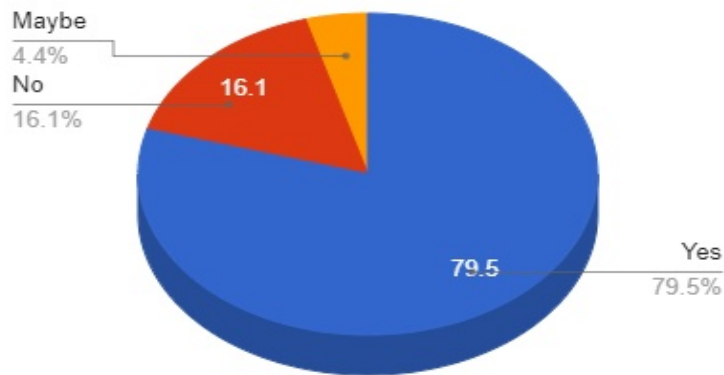
404 responses



Out of a total of 404 responses received 83.4% of people use only water to wash their vegetables and fruits, 25% people use salt solution, 10.1% people use baking soda, 8.2% people use some popular brands ozone cleaners, 5% people use haldi and the rest 1% people do not use anything to wash their fruits and vegetables.

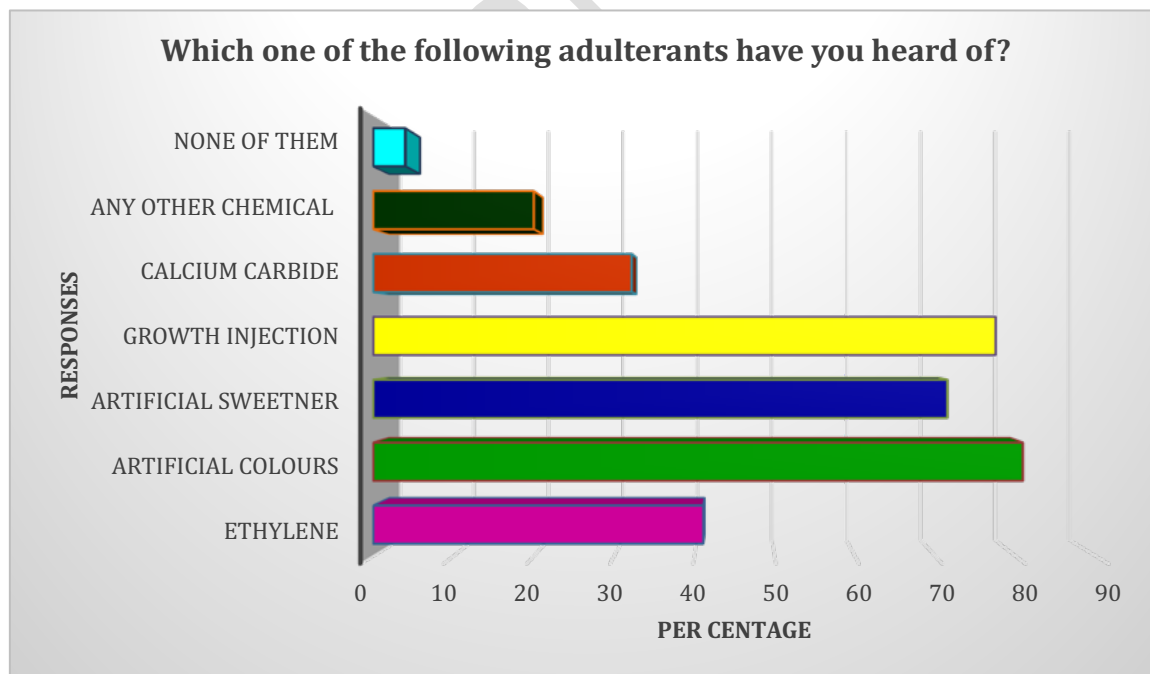
● USE OF ADULTERANTS:

Do you think adulterants are substances that are intentionally added to food for commercial reasons?



As per the data collected, more than three-fourth of the people i.e. 79.5% responded with true and agreed that adulterants are substances that are intentionally added for commercial reasons while 16.1% people responded with false thus disagreeing with the statement given in the question and the rest people didn't have any say in the above question hence responded with can't say.

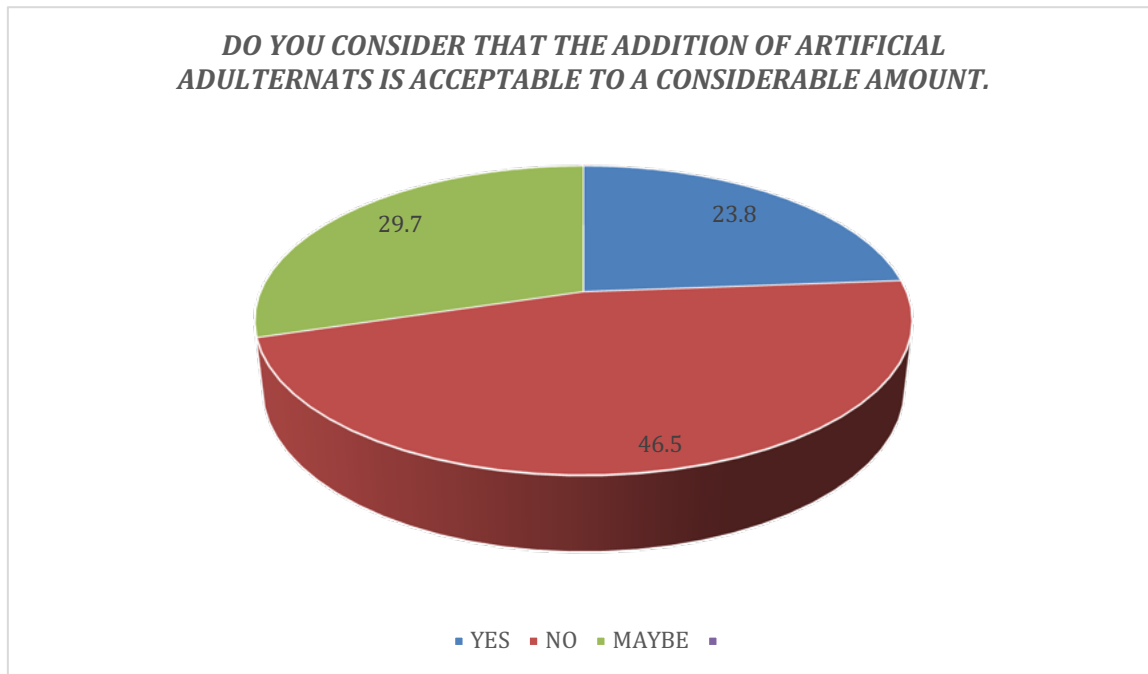
● COMMONLY USED ADULTERANTS:



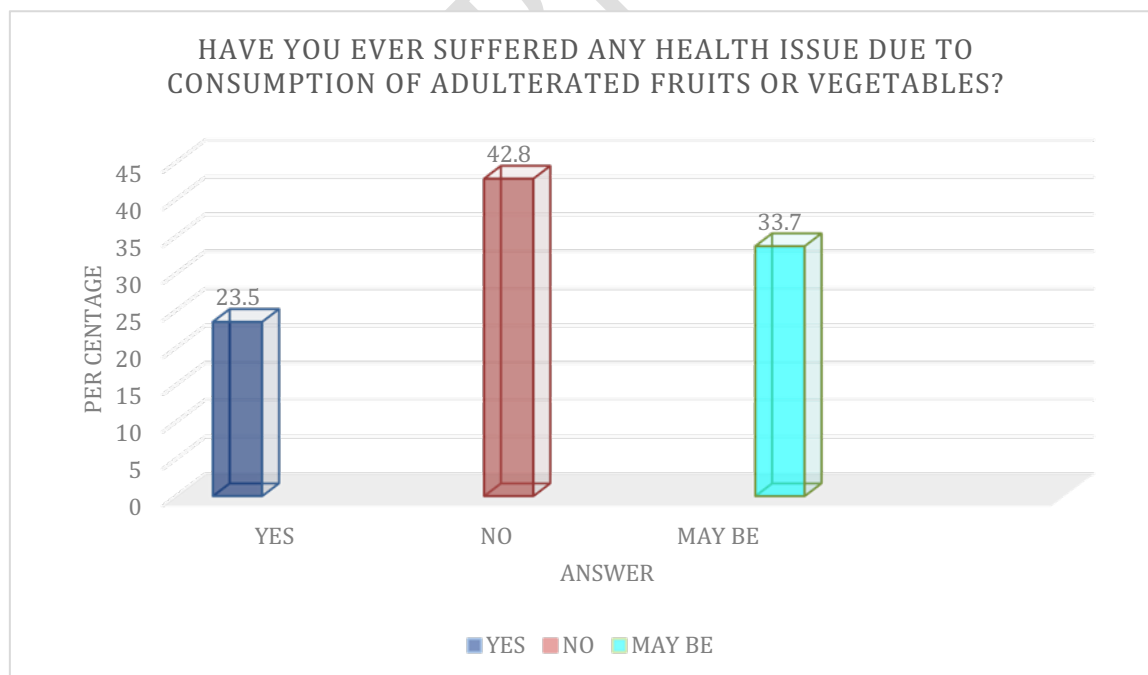
Of all the responses collected 80.9%(326) people were mostly aware of the use of artificial colors, 77.5%(313) people were aware of growth injections, 71.5%(289) people were aware of the use of artificial

sweeteners, 41.1%(166) people were aware about ethylene hormone, 32.2%(130) people were aware of the use of calcium carbide, 20%(81) people were aware of some other chemicals also and the remaining 4% people were not aware about any of the following adulterants used.

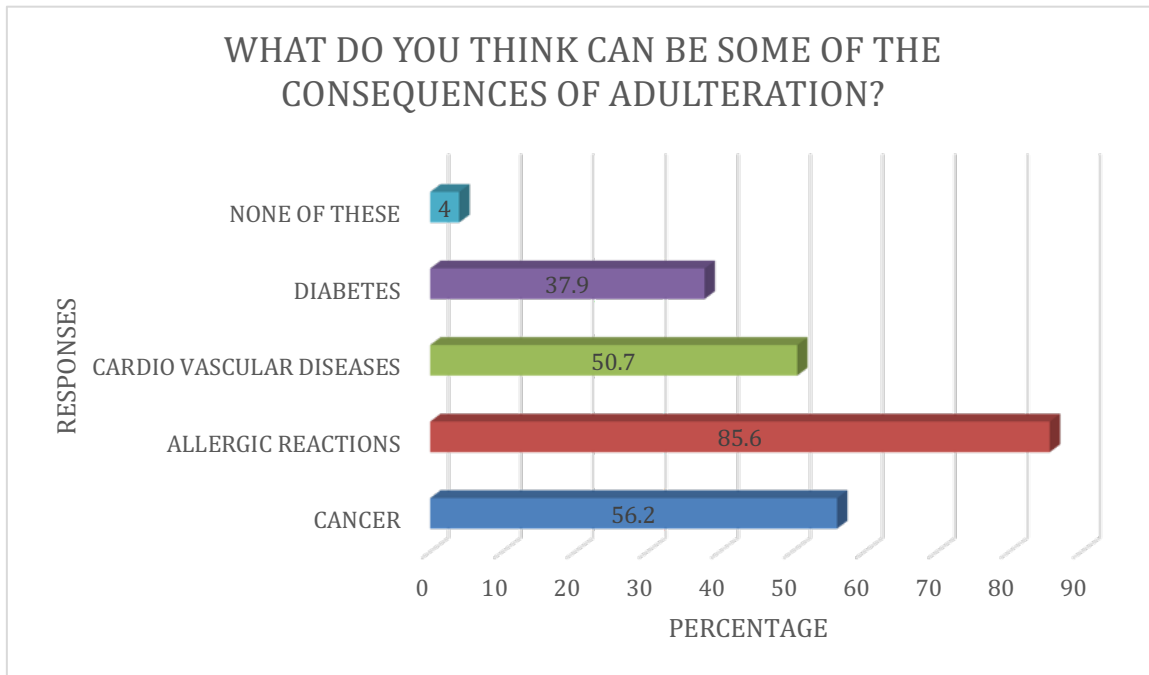
● IS ADULTERATION ACCEPTABLE?



In the answer to this question, 23.8% people responded with yes thus agreeing that adulteration is acceptable up to a safe extent and 46.5% people responded with no thus disagreeing with acceptance of adulteration at all and the rest 29.7% didn't have any say in this, this responding with not sure.



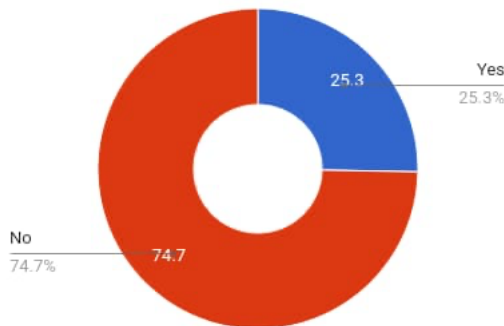
As per the survey conducted 42.8% people haven't suffered from any problem, 23.5% people have suffered with health problems by consuming adulterated fruits or vegetables and the remaining 33.7% people were not sure whether they have suffered from problems or not as they have responded with maybe.



When asked about the consequences of adulteration majority of people (85.6) think that allergic reactions are the most probable consequences of adulteration. Secondly 56.2% people think of cancer as the most probable consequence, 50.7% people thought cardiovascular diseases are the most common consequences whereas 37.9% people thought that diabetes is the most common consequence of adulteration and the remaining 4% people thought that none of these consequences are related to adulteration.

● GENERAL AWARENESS:

Are you familiar with any tests or methods to detect adulteration at home?



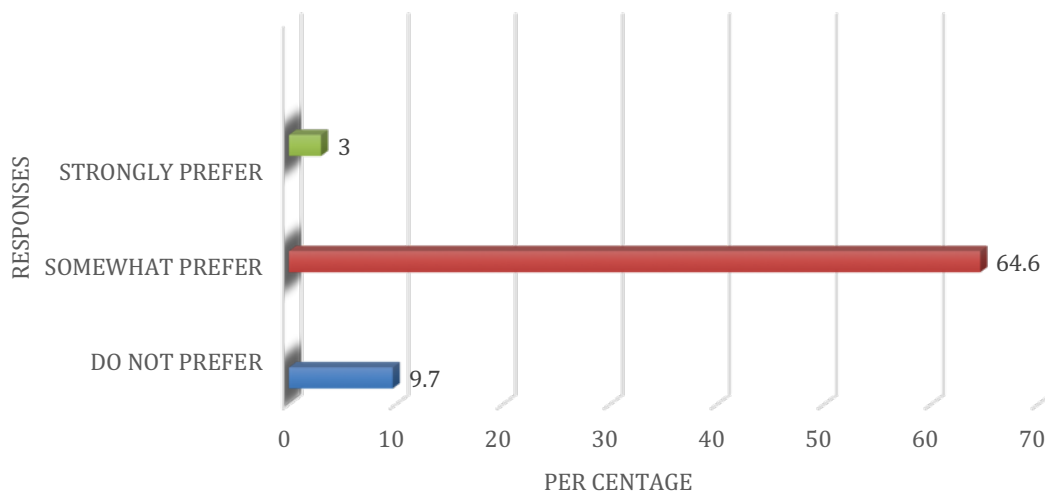
In this question 75.2% of people responded with a no, implying they are not aware of the methods to detect adulteration at home in contrast to this 25.5% people responded with a yes meaning that they are aware of certain methods to detect adulteration, and even suggested methods like DART test, removing wax by scratching with the help of a knife, by using soaked cotton in vegetable oil to detect artificial colors and many more.

WHAT MATTERS TO YOU THE MOST WITH RESPECT TO THE FRUITS AND VEGETABLES?



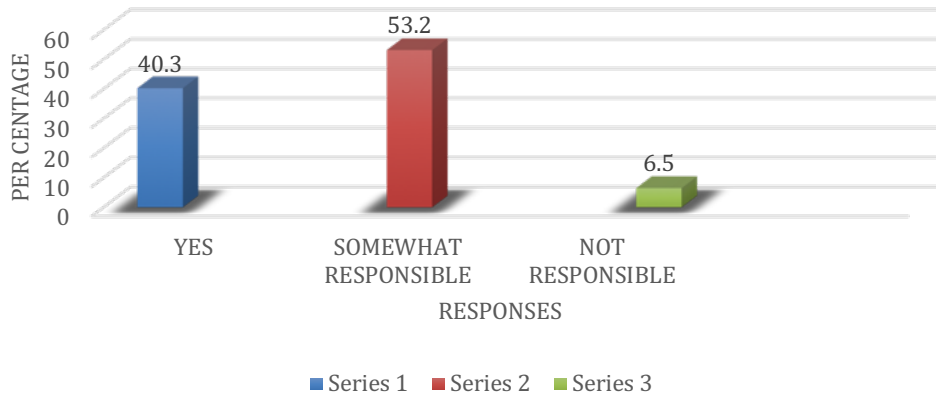
As per the data collected from this question, 66.7% of people preferred both quality and price at the same time. 31.8% of people preferred only quality and the remaining ones preferred only price.

DO YOU PREFER AGMARK CERTIFIED PRODUCTS OVER NORMAL ONES?



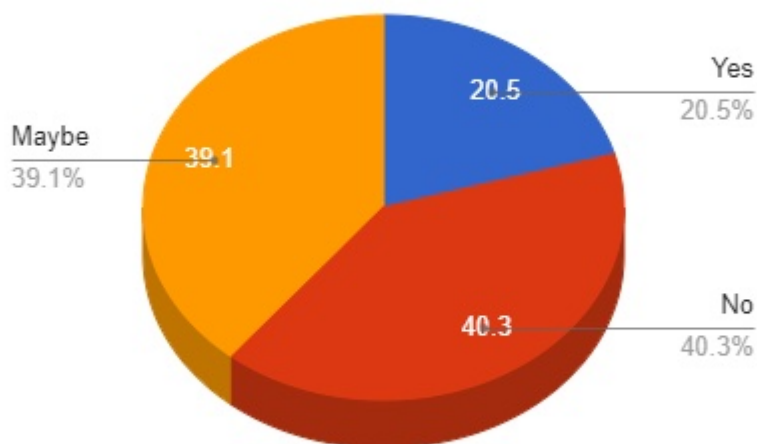
As per the results, 64.6% of people said that they prefer AGMARK-certified fruits and vegetables to some extent but not fully. 9.7% of people did not prefer AGMARK certification at all whereas 25.7% of people strongly prefer AGMARK certification.

DO YOU THINK THAT RETAILERS AND VENDORS ARE EQUALLY RESPONSIBLE AS THE PRODUCERS/WHOLESALERS FOR ADULTERATION?



As per the data collected from the survey, 53.2% of people were of the opinion that yes they are somewhat responsible. 40.3% of people strongly believed that they were equally responsible and the remaining 6.5% did not hold them equally responsible.

Do you trust your vegetables/fruit supplier that he/she is supplying you with unadulterated items?

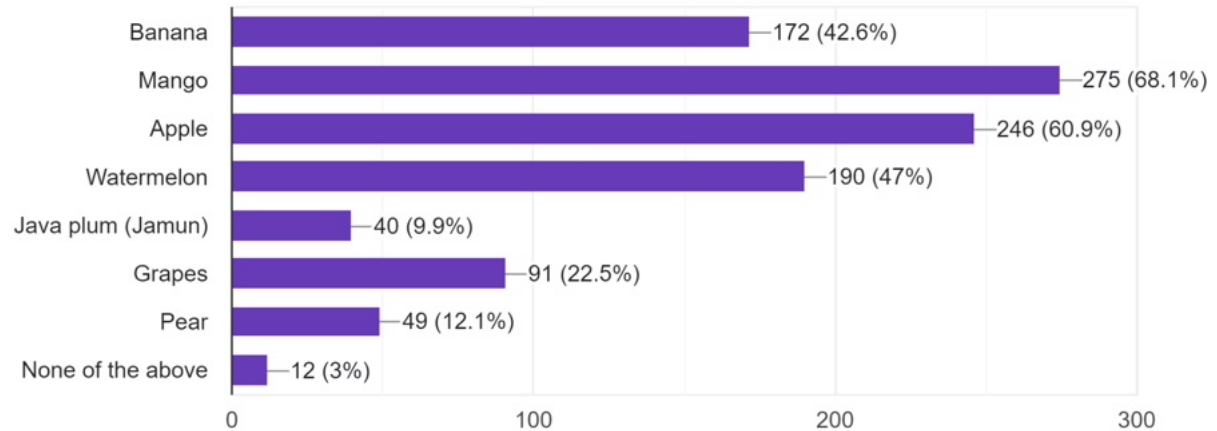


40.3% of people responded that they do not trust their suppliers, 39.1% of people responded with maybe as they did not trust their suppliers completely and 20.5% people responded with a yes as they completely trusted their suppliers.

● COMMONLY ADULTERATED FRUITS

In which fruit you have commonly found adulteration

404 responses

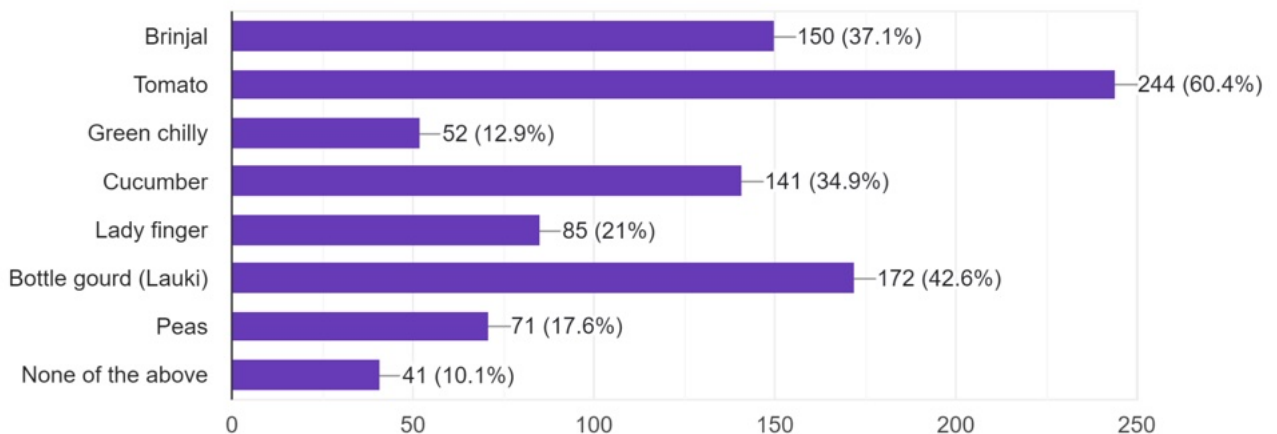


According to the data, most of the people (68.1%) have experienced adulteration in mango, next is apple with 60.9% people, third being watermelon with 47% agreeing it being most adulterated. 42.6% people felt adulteration in Banana is common, while only 22.5%, 12.1% and 9.9% experienced adulteration in grapes, pear and java plum. Only 3% respondents feel that none of the mentioned fruits are adulterated.

● COMMONLY ADULTERATED VEGETABLES

In which vegetable you have commonly found adulteration

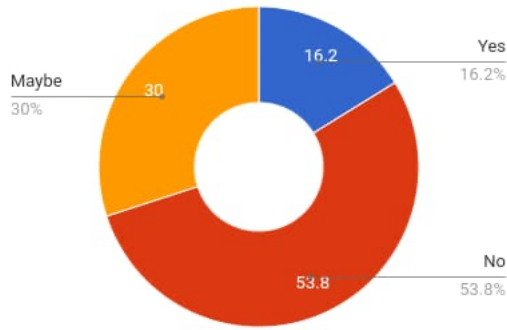
404 responses



60.4% of people have experienced adulteration in tomatoes, followed by bottle gourd (42.6%), brinjal (37.1) cucumber (34.9), lady finger (21%), peas (17.6%) and only 12.9% felt green chillies are adulterated.

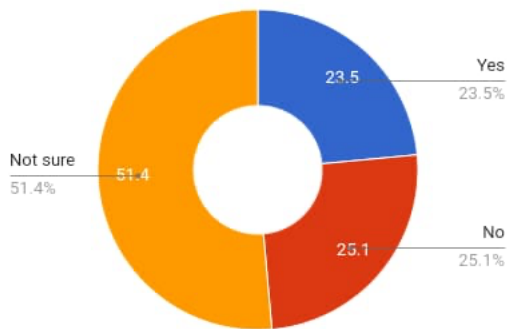
● RULES AND REGULATIONS:

Are you familiar with any government initiatives aimed at preventing fruit and vegetables adulteration?



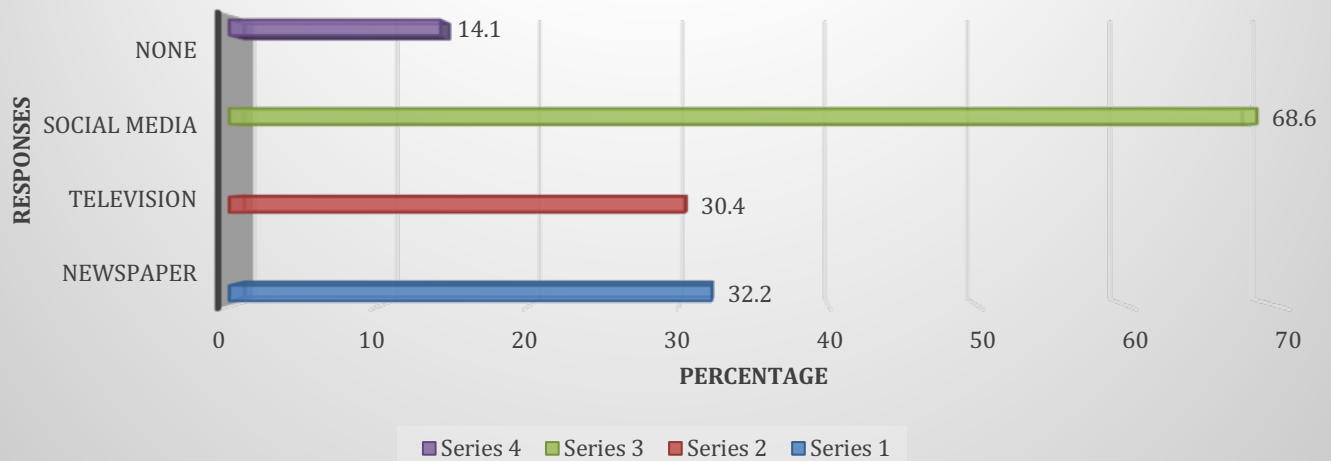
It was found that 55% of people are not aware of any initiatives or programs and 16.6% of people are aware while the rest 30.7% are not quite sure about any government-regulated rules and regulations.

Are the government and regulatory bodies effectively addressing the fruit and vegetables adulteration problem?



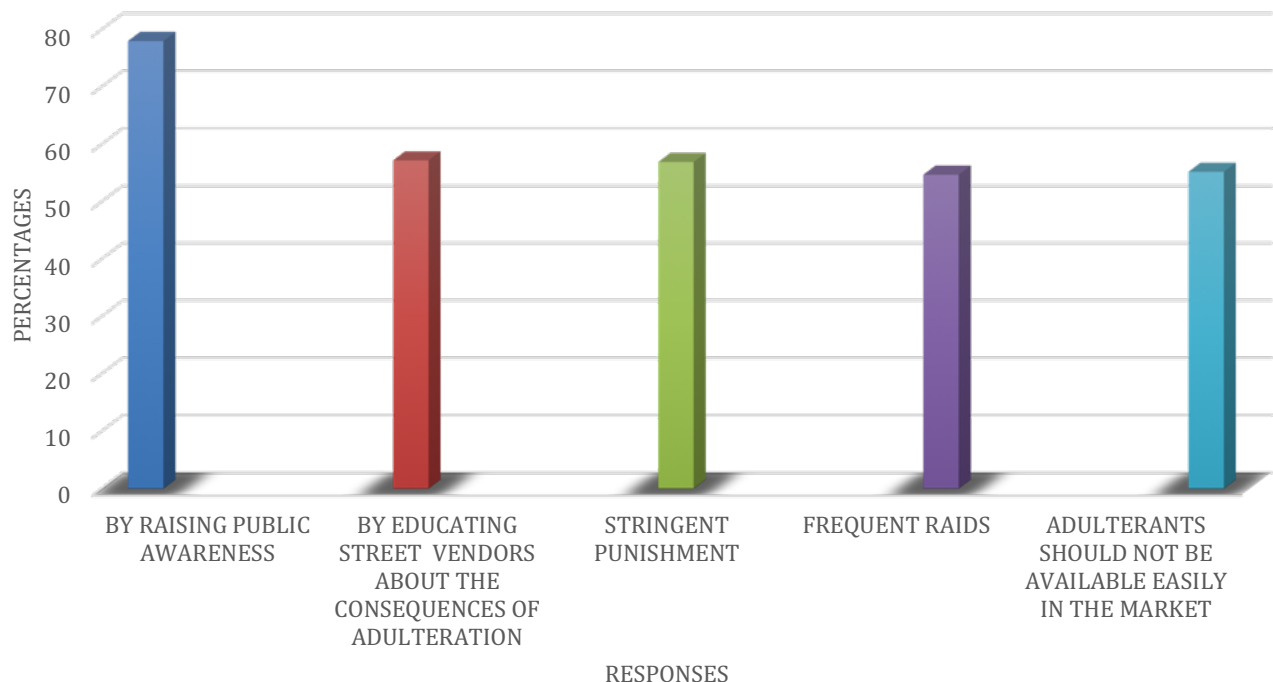
51.4% of respondents were not sure about the answer. 23.5% of people believed that the government is addressing this issue properly and 25.1% believed that the government is not addressing this issue properly.

HAVE YOU COME ACROSS ANY ARTICLE/ VIDEO ON FRUIT/VEGETABLES ADULTERATION IN ANY OF THE FOLLOWING MEDIA?



Through Social media 68.6% people have heard about adulteration, 32.2% people got to know about it via means of the newspaper, 30.4% people came to know about it by television and 14.1% people have never heard about any such articles anywhere on any platforms.

ACCORDING TO YOU, HOW THE PROBLEM OF FRUIT/VEGETABLE ADULTERATION CAN BE TACKLED?



78% people believed that the problem of fruit/vegetable adulteration can be tackled by raising public awareness, 57.2% people believed that it could be reduced by educating the street vendors about the consequences of adulteration and 56.9% people believed that it could be controlled by implementing stringent punishments whereas 55.2% people believed that adulterants should not be made easily available in the market and 54.7% believed that frequent raids could also help curb this problem of fruit and vegetable adulteration.

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DISCUSSION

In this SRIVIPRA project, we delved into the critical issue of adulteration in fruits and vegetables, a pressing concern affecting both public health and consumer trust. Our research involved analyzing existing literature, field surveys in local mandi markets, and conducting online surveys through Google Forms, to identify common adulterants, assess their potential health risks, and propose preventive measures.

Over the duration of this project we discovered alarming instances of adulteration, including the use of harmful chemicals for ripening, artificial coloring agents and unapproved growth hormones. These adulterants pose severe health risks from acute poisoning to long-term health complications.

Our findings highlight the need for stringent monitoring and regulatory measures within the food industry. Consumer education and awareness campaigns are also essential to help individuals make informed choices.

We conducted local mandi visits, as it is significant to understand the on-site application of adulterants and first-hand witnessing of these practices. So some students from our team visited Okhla Mandi, where we gained extensive insights into fruit and vegetable adulteration. During interactions with fruit vendors, we learned that they employ Calcium carbide as a ripening agent in bananas due to the prevalence of unripe bananas in the mandi. Additionally, our observations revealed the use of mustard oil being applied to Java plums to maintain their freshness and shine. The calcium carbide method is also employed for the ripening of mangoes as well. We also got to know about the extensive usage of Malachite green in green vegetables like a pointed gourd, bottle gourd, bitter gourd, cucumbers, green chillis, and peas. Malachite green is used to make the vegetables look greener, fresh, and bright but it also causes serious health disorders. One of the vendors also told us that they use green lights on green vegetables to make them look more appealing to consumers at night.

We also tried to assess the awareness of the general public by means of the survey conducted online, wherein we asked a total of 404 people. Various questions related to adulteration were asked in this survey and a conclusion was drawn on each question according to the number of responses on each one, which has already been discussed in the above-mentioned results and analysis part. This internship experience underscores the importance of collaborative efforts between government bodies, food producers, and consumers in combating adulteration. Addressing this issue is crucial not only for safeguarding public health but also for preserving the integrity of our food supply chain.



CONCLUSION

The study brings out a clear picture of the present scenario of fruit and vegetable adulteration in India.

Adulterated food is often lower in quality than expected and can pose a health risk to consumers. In most countries, food adulteration is regulated by law and is punishable. Consuming adulterated food can lead to various health risks such as food poisoning, allergies, organ damage due to chemical contaminants, and long-term health effects from the consumption of inferior quality or nutritionally deficient food.

Through the case analysis, it is clear that the ignorance and selfish interest of the middleman have them into such malpractices.

An important aspect of this study was that there should be widespread awareness against this through education consumers as well as vendors. The government should invest more in such awareness programs to make people understand the hazards that food adulteration can cause. It requires close monitoring and strategic planning to combat such a widespread problem.

Currently, our most promising asset lies in the rapid strides of technology, which we harnessed to execute a successful, comprehensive survey on food adulteration, garnering invaluable responses from a staggering 404 individuals. The future of our nation's health and well-being depends on our unwavering commitment to safeguarding the purity of our food supply, ensuring that the fruits and vegetables we consume remain a source of vitality and nourishment for generations to come.

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SRI-VIPRA

REPORT OF ORAL PRESENTATION AT “EQUINOX 2023- The Annual International Conference” under the aegis of Vantage: Journal of Thematic Analysis and IQAC

Organized by Centre for Research, Maitreyi College, Delhi University

Title: Quality versus Deception: A Closer Look at Adulterated Fruits in the Market

Date: - August 23-25, 2023

Presented by: Undergraduate Students of Sri Venkateswara College, Delhi University (Chetna Sharma, Samarth Pratap Singh, Anushka Dhiman, Mayank Kumar, Vanshika Bhandari, Rajendra Phartyal*, Anita Verma*)

Abstract:

This report provides an overview of the oral presentation titled "*Quality versus Deception: A Closer Look at Adulterated Fruits in the Market*," which was delivered by undergraduate students from Sri Venkateswara College, Delhi University, during the Equinox International Conference. The presentation was conducted online.

The adulteration of fruits poses a significant threat to public health and consumer trust in India. This research paper aims to provide a comprehensive analysis of the prevalent practices and challenges associated with fruit adulteration in India. Through an extensive survey of existing literature, government reports and scientific studies, this review analyzes the current knowledge regarding the types of adulterants, adulteration techniques, their prevalence, and their impact on human health.

The study finds that fruit adulteration in India is a multifaceted issue, involving chemical additives, artificial ripening agents, and unapproved dyes. Adulteration techniques employed in the supply chain include wax coating, sugar syrup injection, artificial coloring, and the use of growth hormones which aim to enhance the taste, and visual appeal and extend the shelf life of fruits. However, these practices often lead to compromised nutritional value and potential health hazards.

This study is focused on adulteration in commonly consumed fruits such as Banana, Watermelon, Mango, Grapes, Citrus Fruits, and Pomegranate. Moreover, it highlights the challenges associated with detecting fruit adulteration, as traditional methods of inspection are often ineffective in identifying subtle adulteration techniques. Furthermore, inadequate regulation, limited infrastructure and a lack of stringent penalties contribute to the persistence of adulteration practices. The economic motivations behind fruit adulteration, driven by profit maximization and market demands, further exacerbate the problem.

To mitigate the adulteration crisis, this review underscores the importance of a multi-faceted approach involving collaboration between regulatory bodies, farmers, suppliers, and consumers. Strengthening regulatory frameworks, implementing stricter quality control measures, and enhancing consumer awareness through education and labeling initiatives are vital steps in combating fruit adulteration.

In conclusion, there is an urgent need for comprehensive reforms and effective enforcement to safeguard public health and ensure the supply of safe and nutritious fruits.

Conclusion: In conclusion, the presentation by our group provided a comprehensive overview of the issue of fruit adulteration. It raised awareness about the types of adulterants, adulteration techniques, their prevalence, and the potential health risks associated with consuming adulterated fruits. The presentation underscored the importance of regulatory measures and consumer vigilance in ensuring the availability of safe and quality fruits in the market. Overall, it was a significant learning experience.

Acknowledgments: We express our gratitude to Maitreyi college’s faculty mentors, the Equinox Conference organizers, and our peers for their support and guidance throughout the research and presentation process.



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Certificate of Appreciation

This is to certify that **Ms. Chetna Sharma** of **Sri Venkateswara College, University of Delhi**, presented a paper titled **Quality versus Deception: a Closer Look at Adulterated Fruits in the Market** in the Conference on **Research, Development and Social Transformation** organized by the Centre for Research, Maitreyi College from **August 23 -25, 2023**

Haritma

Prof. Haritma Chopra
Coordinator

G.D.T.

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Convenor

P. Bajaj

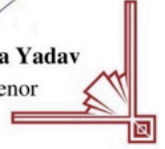
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Meena

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Convenor



SRI-V

REPORT OF POSTER PRESENTATION AT “EQUINOX 2023 – The annual international Conference” under the aegis of Vantage: Journal of thematic analysis and IQAC

Organized by: Centre of research Maitreyi college, University of Delhi

Title: An Insight into Vegetable Adulteration: Unveiling the Deceptive Practices

Date: August 23-25, 2023

Presented by: Undergraduate students of Sri Venkateswara college, University of Delhi (Akanshi sharma, Anushree Singh, Deepti Rana, Haya Dilshad, Itika Garg , Rajendra Phartyal*, Anita Verma*)

Abstract :

This report provides an overview of the poster presentation titled “ An Insight into Vegetable Adulteration” which was delivered by undergraduate students from Sri Venkateswara College, University of Delhi during the Equinox conference. The presentation was conducted offline.

Vegetables are vital components of a healthy diet, providing essential nutrients and promoting overall well-being. The increasing demand for vegetables and the desire for higher profits has led to instances of adulteration. This article addresses the pressing issue of adulteration of vegetables in India, thus providing an insight into the various aspects of the malpractices carried out, different adulterants used and their health implications. The article also delves into the consumer awareness programmes and strategies implemented by FSSAI under the guidance of the Ministry of Health and Family Welfare.

Adulteration in vegetables refers to the deliberate addition of hormones, synthetics, dyes, heavy metals and chemicals to whole or processed vegetables to enhance their appeal and shelf life. Consuming adulterated vegetables can lead to various health issues, including food poisoning, allergies, and long-term health problems.

In conclusion, continued efforts are needed to combat this issue through robust surveillance, enforcement and awareness-raising initiatives. By prioritizing food safety and quality, we can ensure that consumers have access to uncontaminated and nutritiously valuable vegetables. By addressing the challenges and identifying potential solutions, this study highlights the need for policymakers, researchers, and stakeholders to tackle the persistent problem of vegetable adulteration in India.

Conclusion: The presentation by our group provided a comprehensive overview of the issue of vegetable adulteration. It raises awareness about the types of adulteration, Different types of adulterants and their side effects, methods to counteract the adulteration, guidelines about the Fssai and our Mandi visit. The presentation underscored the importance of regulatory measures and consumed vigilance. In ensuring the availability of healthy vegetables in the market. Overall, It was a significant learning experience

Acknowledgement: We got the first position in this international Conference. We express our gratitude to Maitreyi college’s faculty mentors, The Equinox conference organizers and our corresponding Authors for their support and guidance. Throughout the research and presentation process.



The students received First Prize in Poster Presentation at the Conference .



Centre for Research
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EQUINOX 2023

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Certificate of Merit

This is to certify that **Ms. Akanshi Sharma** of **Sri Venkateswara College, University of Delhi**, secured the **First** position for the presentation of the poster titled **“AN INSIGHT INTO VEGETABLE ADULTERATION: UNVEILING THE DECEPTIVE PRACTICES”** in the Conference on **Research, Development and Social Transformation** organized by the Centre for Research, Maitreyi College from **August 23 -25, 2023**

Haritma

Prof. Haritma Chopra
Coordinator

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