Qualitative Assessment of Food Adulterants for Food Safety in Grocery Store at Avinashi (Tirupur District)

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Abstract

Food is any substance, composed of carbohydrates, water, fats and proteins, which can be eaten or drunk by animals, including humans, for nutrition or pleasure. By other words food is one of the basic needs for every living being and very important aspect for life. Food can be contaminated by different adulterants. Adulterants are chemical substances which should not be contained within other substances (e.g. food, beverages, fuels for legal or other reasons). The addition of adulterants is called adulteration. Adulterated foods are harmful for human health as they contain the unauthorized food ingredients. The harmful effects for human such as stomach disorder, giddiness and joint pain, diarrhoea, liver disorder, dropsy, gastrointestinal problems, respiratory distress, oedema, cardiac arrest, glaucoma carcinogenic effects, paralysis etc. The aim is to evaluate the presence of adulterant from daily uses food materials like Milk, Butter, Edible oil, Honey, Pulses, Wheat Flour, Black Pepper, Chilli powder, Coffee powder which we collected from different departmental and local grocery stores and checked the presence of individual adulterants by biochemical qualitative analysis. The colour change of the sample indicate the according to the reagents is indicates the presence of different adulterants. This information can help to grow the food safety and also people can be aware about the food brands for a healthy life.

Keywords: Adulterants; Branded and unbranded; Food safety; Human health; Qualitative analysis

Introduction

Adulteration of food stuffs is commonly practiced in India by the trade. The consumers like to get Maximum quantity for a price as low as possible. Adulteration includes 1) Intentional addition, substitution or abstraction or substances which adversely affect the purity and quality of foods. 2) Incidental contamination of foods with deleterious substances such as toxins and insecticides due to ignorance, negligence or lack of proper storage facilities. 3) Contamination of the food with harmful insects, micro-organism like bacteria, fungus, moulds etc. during production, storage and handling [1].

Adulteration is the act of either adding extraneous substances (adulterants) into food items or reducing essential nutrients partly or wholly for financial gain or due to carelessness and lack of proper hygiene condition during processing, storing, transportation and marketing. This ultimately results that the consumer is either cheated or often becomes victim of diseases. Adulterants are chemical substances which should not be contained within food or beverage, and may be intentionally added to more expensive substances to increase visible quantities and reduce manufacturing costs, or for some other deceptive or malicious purpose. Because of that it is important for the consumer to know the common adulterants and their effect on health since the increasing number of food producers and the outstanding amount of foodstuffs import enables the producers to mislead and cheat consumers [2].

Adulteration is present in society from a long time but is was not noticed due to its small scale use and its low impact. However, at the present era. Economic adulteration is a long term problem affecting the food industry at its most drastic level.

According to one survey conducted, adulteration were detected in milk to the tune of 70% with water, turmeric powder - 43% with chalk powder, red chili powder-100% with artificial colour, sugar 37% with chalk powder etc. [3].

The general objective of the study is 1) to assess the presence or absence of adulterants in collected sample. 2) To evaluate the foreign material used in food materials.

Materials and Methods

Selection of Study Area

Food is the basic necessity of life. One works hard and earns to satisfy our hunger and relax later. But at the end, many of us are not sure of what we eat. We may be eating a dangerous dye, sawdust, soap stone, industrial starch and aluminium foil. Contaminated foods and drinks are common sources of infection [4].

The sample for the study were selected is Avinashi (Town and village) under the Tirupur district. Avinashi is a special grade town panchayat and taluk head quarters in Tirupur district is the Indian state of Tamil Nadu (Tirupur.tn.nic.in). For assess the qualitative testing of presence or absence of food adulteration for the collected varies sample both branded and unbranded under random sampling method. The sample were collected from the selected 10 village from Avinashi taluka of Tirupur district. The list were follows.

Review Article
1. Ayyampalayam
2. Cheyur
3. Kaniampoondi
4. Kanur
5. M.S.V Palayam
6. Pongalur
7. Nambyapalayam
8. Uppilipalayam
9. Karuvalur
10. Naduvacheri

Collection of Samples

Adulteration means the addition of ingredients which are not permitted in food. They are added because of business profit only. Adulterated foods are harmful for human health as they contain the unauthorized food ingredients. Adulteration in foods also decreases our moral social value [5].

The regular usage of food ingredients by housewives and on the basis of basic food groups the samples of the food items were selected. The list of the food items were selected for the study. The list were given below in table 1.

To find out where the branded or unbranded which product have maximum adulteration is taken place the sample were collected on both branded and unbranded on the listed food items. The selected area of the 10 village from Avinashi Taluk on random sampling method the available departmental and local grocery stores in the selected village both branded and unbranded sample were collected. Five sample of each food items (n=24) were collected from both branded and 52 unbranded at 55 stores. After the collection of the sample, the quality tests were done.

Analysis of Samples

Adulteration is commonly practiced in both branded and unbranded foods in daily life. From local market to the hyper market adulteration is prevalent everywhere. Majority of adulteration in India is Intentional adulteration and it affects the people of all the age group. Even today many people in India are unaware about adulteration and its harmful effects. Even if they know, they seldom take steps to stop adulteration. The carelessness of the buyers makes/encourages the traders to add unpermitted additives [6]. In collected samples to qualitative test are done for detecting presence or absence of adulterant by using standard procedure (FSSAI). Since the analysis of food adulteration was completed for five or six months.

Results and Discussion

Lakshmi V [7], reported adulteration in Turmeric dals and pulses such as moong or channa were the adulterant is metanil yellow and kesari dha (added to enhance the yellow colour of a food substance). It is harmful effect is that it is highly carcinogenic and if consumed over a continous period of time it can also cause stomach disorders. Green chillies, green peas and other vegetables were adulterants with malachite green. Argenone seeds that is a coloured dye that has proven to be carcinogenic for humans if consumed over a long period of time. Mustard seeds and mustard oil were adulterant is argenone seeds and papaya seeds that the consumption of these could cause epidemic dropsy and severe glaucoma.

The results of qualitative analysis of food adulteration in selected food products are shown in table 2. The results of food items were discussed below.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Food Items</th>
<th>Adulterant</th>
<th>Brand Tested</th>
<th>Result for Adulterant</th>
<th>Un Brand Tested</th>
<th>Result for Adulterant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wheat flour</td>
<td>Bran</td>
<td>Sample A</td>
<td>Absent</td>
<td>Sample A</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chalk powder</td>
<td>Sample B</td>
<td>Absent</td>
<td>Sample B</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample C</td>
<td>Present</td>
<td>Sample C</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample D</td>
<td>Present</td>
<td>Sample D</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample E</td>
<td>Present</td>
<td>Sample E</td>
<td>Absent</td>
</tr>
<tr>
<td>2</td>
<td>Rice flour</td>
<td>Chalk powder or Lime powder</td>
<td>Sample A</td>
<td>Present</td>
<td>Sample A</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample B</td>
<td>Present</td>
<td>Sample B</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample C</td>
<td>Present</td>
<td>Sample C</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample D</td>
<td>Present</td>
<td>Sample D</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sample E</td>
<td>Present</td>
<td>Sample E</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Table 1: List of the food items were selected for the study.
Table 2: Results of qualitative analysis of food adulteration in selected food products.

<table>
<thead>
<tr>
<th>Sample Code</th>
<th>Food Item</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Butter Sambar</td>
<td>Sample</td>
<td>Sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>B</td>
<td>Rice, unpolished</td>
<td>Sample</td>
<td>Sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>C</td>
<td>Wheat, whole</td>
<td>Sample</td>
<td>Sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>D</td>
<td>Rice, polished</td>
<td>Sample</td>
<td>Sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>E</td>
<td>Wheat, white</td>
<td>Sample</td>
<td>Sample</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>B</td>
</tr>
</tbody>
</table>

*Note: The table contains a list of food items and their presence or absence in samples labeled A to E.*
In this study, the adulteration is practiced both in branded and unbranded food items of Avinashi town and village. Adulteration is intentional added to the food items and now a day it was increasing randomly. The regularly consumption of adulterant like metanil yellow and invert sugar and in unbranded sample were adulterated with brick powder.

**Conclusion**

The results of all the products from each Avinashi town and village were adulterated with metanil yellow and invert sugar. It was observed from the results that the food items are not safe for the consumers and they should be careful while buying the products from the market. The results of this study are important for the consumers to make an awareness about the food adulteration and to take necessary actions for their safety.

Conflicts of Interest: The author declared that they have no conflicts of interest.

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**Ethical Approval:** The researcher explained the study objectives to participants. Before taking part in the study, participants provided written informed consent. The study was approved by the Institutional Human Ethics Committee of Avinashilingam University and approval no is AUW/IHEC/RVS-20-21/XPD-01.

**Consent of Participate:** Not applicable.

**Consent of Publication:** Not applicable.

**Availability of Data and Material:** The analysed during current study are available from corresponding author.

**Code Availability:** Not applicable.

**Author Contributions:** Both author design the research and writing the field work. Author read and approved the final manuscript.

**References**

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