



ADULTARATION: A STUDY WITH RESPECT TO EATABLE HOUSE HOLD ITEMS IN KERALA

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Introduction:

The term adulteration is a chemical substance that should not be contained within other substances for legal or other reasons. The addition of adulterants is called adulteration. The word is quite matching only when the additions are unwanted by the recipient. Adulterants when used in illicit drugs are called cutting agents, while the deliberate addition of toxic adulterants to food or other products for the human concept is known as poisoning.

The Malayalee people also are known as the demonym of Kerala are the Dravidian ethnic group originated from the present-day state of Kerala in India. Some common words only for the Keralites uses are:” Tharavadu”-joint family practiced by Malayalee,” Nalukettu” a housing style in Kerala, “Vallamkali”-is the race of country-made boat. Malayalees celebrate a variety of festivals namely Onam, Christmas, Vishu, Easter, Ramadan, Bakrid. All Keralites are habituated to take more spices and coconut than any other part of people in India or we can generally say “Malayalees” is spicy.

Malayalees are special in our own way, in the way we speak, the way we eat food, how we drink like other worlds are about to end, the way we dress, and much more. Some things are typical for any Malayalee (Keralite) the” household”. They could almost be called the backbone of our homes, without which won’t go as planned.

Key words: *Food, adulteration,contamination,effect,Hazard,safety ,detection etc*



Review of Literature:

The addition or subtraction of any substances to or from food or any such things, so that the natural composition and quality of food substance or things is affected called adulteration. Food adulteration including mixing, substitution, concealing the quality, putting up decomposed food for sale, misbranding giving false labels, and addition of toxicants.

One of the serious problems facing India is adulteration. Almost all products starting from our daily groceries to life-saving medicines have adulteration. Food is one of the basic necessities for the existence of life. For the better health of the people pure, fresh, and healthy diet is essential. It is no wonder to say community health in national wealth.

Adulteration lowers the quality of food and sometimes, toxic chemicals are also added which can be hazardous to health. Adulteration of food cheats the consumer and poses a serious risk to health. Adulterant means any material which is or could be employed for making the food unsafe or substandard or misbranded or containing extraneous matter. When we take toxic contain adulterated food, it affects our health and it deprives the nutrients values for growth and development which indirectly leads to the conclusion that adulterated food is dangerous.

In India especially in Kerala, adulteration and contamination are encountered in food consumed at the household level, Hotels, Reasturants,BARs ,motels and street food”thattu kada” too. Non permitted colors are the most common additives to foods. Contamination of daily food and milk by mycotoxins, metals, and pesticides has been found highly toxic and carcinogenic. It is estimated that about 70% of the deaths are supposed to be the food borne origin. Measures are available /possible to prevent food adulteration and contamination and making awareness among the public about this. By arranging camps/campaign through local bodies we can make awareness to the citizens of the nation about adulteration and contamination.

Household of Keralites (Malayalees) includes both eatable and noneatable items. Some of them are Calendar, Talcum powder, Jackfruit Halva(Chackka varatty), Coconut, Slipper chapel, coconut crushing, and make a paste in flat stone(Ammiyil Thenga arackunnathu), Banana chips, news Paper, A stick to discipline the kids, etc.

Food adulteration is a social evil and a major problem in society. For most of people, food accounts for a large part of the family budget. Every consumer wants to get the maximum quantity of a commodity for as low as prices as possible. Food adulteration starts from the field itself where fertilizers and pesticides are overused.

Food purchased from unhygienic places may cause various diseases. During different festivals also people use varied composite food colors in excess that cause toxicity. Nowadays it is very common to hear or read news about the food items being adulterated and such products are being openly sold out and are consumed by people, which causes various health hazards.

Food adulteration is the act of intentionally debasing the quality of food offered for sale either by the admixture or substitution for inferior substances or by the removal of some



valuable ingredient. The majority of the adulterants used by the shop keepers are cheap substitutes which are easily available and adulteration run for economic profits.

Adulteration of food has become a national issue. The problem is not only ignoring the human rights for safer food but also endangering public health seriously with human acute and chronic diseases. No doubt, because of food adulteration the future generation will be seriously affected by vulnerable physical and mental growth. Adulteration is a broad and legal sense in the debasement of any article. So adulteration of food means substandard foods, which fails to comply with the definition of safe food by the FAO (Food and Agricultural Organization) and WHO.

Effects of food adulteration:

Adulteration increases the impurity in food. Food lacks nutritional value. It leads to various diseases. Consumption of chemical added fruits and vegetables can provide disastrous for digestive systems, eyes, and liver. It can result in vomiting and diarrhea in children. Kidney failure. Oxytocins can leads to damage to the brain.

Reasons for food adulteration:

To earn more profits by merchants and traders. In order to increase the volume of trade by showing low prices when supply is less than the demand. To meet the market competition, cutting down the production costs. Availability/shortage of authentic/original ingredients at affordable rates/prices. Indifference and lethargy among consumers. The shortage of qualified hands to manage and the inability to update the processing techniques are also the reasons. Lack of knowledge on consequences and associated food safety risks. Timely updating of the information about the adulteration related food safety outbreaks and lack of awareness are some other reasons for food adulteration.

When is food said to be adulterated:

Inferior or cheap quality substances are substituted. The constituent is wholly or partly abstracted. Under insanitary condition articles are preparing, packing, or keeping. If the product/material contains rotten, decomposed or insects found. If the product(item) contains poisonous ingredients(MSG) or diseased animals(non –vegetable pups etc). If adding some unprescribed colors in food or adding some prohibited or excessive preservatives or the standards are not maintained.

Types of Adulteration: Qualitative, quantitative, and Informational:

S/No	Name of Food(article)	Adulteration(article)
1	milk	Water and starch
2	Edible oils	Argemone oil, mineral and castor oil
3	Sugar	Chock powder
4	Tea	Exhausted tea leafs, black gram dal,husk with color



5	Pulses	Khesari dal,clay,stones,gravel
6	Ghee	Vanspati,sweet potato, mashed potato and other starches of edible oils
7	Chilly powder	Stone or red brick powder and artificial color
8	Salt	White powder, stone ,rava
9	Soft drink	Mineral acid other than phosphoric acid
10	Wheat flour and semolina(suji)	Sand ,grit

Harmful effect of food adulteration: The adulterants are sure to bring about biochemical disorders, there by physiological disorder arise.

S/No	Adulterant	Effect
1	Argemone oil	Loss of sight, heart ailments, tumor's
2	Vanaspathi	Liver disorder,
3	Mineral oil	Liver damage, carcinogenic effects
4	Saw dust, colorants	Liver disorders
5	Toxic dyes	carcinogenic effects
6	Resins	Allergy,dysentry
7	Metanil yellow	Toxic ,carcinogenic
8	Washing soda	Diarrhoea,vomiting
9	Chicory	Deprived from nutritional value

Criteria for food selection:

The selection of wholesome and non-adulterated food is essential for daily life to make sure that such foods do not come to any health hazard. While purchasing the food consumer to be taken care of like date of manufacturing date, expiry date, usage time, visual fungus, foreign matters, etc. Try to avoid taking food from unhygienic places and preparing under unhygienic conditions. Avoid consumption of cut fruits in unhygienic conditions. It is advisable to take certified food from reputed shops.

Food standards:

The main objectives of food standards are-For getting and ensuring pure and wholesome food to the consumers .Give protection to the consumers from fraudulent and deceptive trade practices.

The Indian parliament has passed the food safety and standard act,2006 that overrides all other food-related laws. This act covers all points /loopholes which can come in connection with adulteration. The related old laws are

1.Prevention of food adulteration Act,1954.



2. Fruit Production Order 1955.
3. Meat Food product order 1973.
4. Vegetable oil products(control) order 1946.
5. Edible oil packaging (regulations) order 1988.
6. Milk and Milk products order in 1992.

Some of the standards are:

AGMARK STANDARDS: The directorate of marketing and inspection enforces the Agriculture produce(grading and marketing) act 1937, under this act grade standards are prescribed for agricultural and allied products.

CODEX ALIMENTARIUS: Principal organ of joint FAO/WHO food standards programs. Formulates standards for international markets. Food Standards in India based on this.

PFA STANDARDS: To get /obtain the minimum level for quality of foodstuffs attainable under Indian conditions.

Bureau of Indian Standards (ISI): A guarantee for food quality.

FSSAI: Under the ministry of Health and Family Welfare, Government of India, The Food Safety & Standards Authority of India (FSSAI) has been established in 2006.FSSAI has been credited for laying down science-based standards for articles of food and to regulate their manufacturer, storage, distribution, sale, and important to ensure the availability of safe and wholesome food for the human concept.

Punishment award:

In the case of proven adulterations six months imprisonment and a fine of Rs1000.00.Adulteration cause grievous hurt or death –lifetime imprisonment& fine up to Rs 5000.00

Different type of food adulteration:

Adulteration can be generally classified into four.

1. Intentional: sand, marble chips, stones, mud, other filth, tale, chalk powder, water mineral oil, etc.
2. Incidental: pesticides, residues via from can, dropping of rodents, larvae in foods.
3. Metallic contamination: These are Arsenic from pesticides, Lead from water, mercury from the effluent of chemical industries, tin from cans, etc.



4. Packaging hazards: Polyethylene, polyvinyl chloride, and allied compounds are used to produce flexible packing material.

Household food items, Adulteration, Health hazards, and detection:

All the Malayalees (Keralites) household food items are the same where ever they are living, irrespective of religion. In general, we observed that if once adulteration detected/caught, it will appear in a different mode. Some of the household food items/eatable/using items are:

1.Milk: Cow /Buffalo milk can be adulterated with starch, milk powder, urea, formalin, and detergent.

Health effect-consuming adulterated milk causes cancer or acute renal failure.

Detection-1.Pure milk will flow slowly and leave a white trail, adulterated milk will flow fast and not leave a white trail .2. If milk is contaminated by starch then add a drop of tincture iodine to warm milk, original milk no change in color, adulterated milk change in color to blue.3. If milk is adulterated with detergent-take 5 ml to 10 ml of milk sample and add an equal amount of water. Shake the contents thoroughly. Formation of a dense lather shows the presence of detergent, pure milk will form a very thin foam layer due to agitation.

2. Ghee: *Adulterants*-ghee essence is used in cheaper oil and passed on pure ghee. This ghee will not solidify like normal ghee. It may also not have that grainy texture of pure ghee. Oleomargarine or lard(animal fat)added to butter, mashed potatoes, sweet potatoes, or other dirt is added to ghee. Argemone oil is also using for adulteration

Health effect- cancer or acute renal failure. while using argemone oil mixed ghee or butter is highly toxic. It causes a disease known as dropsy(Fluid collection in some parts of the body). It may also paralyze the limbs.

Detection- The presence of Mashed potatoes, sweet potatoes, and other starches in ghee/butter can be identified. Take ½ teaspoon of ghee/butter in a transparent glad bowl. Add 2-3 drops of tincture of iodine. If the color appears blue which indicates the presence of mashed potatoes, sweet potatoes, and other starches.

3.Sugar and salt: *Adulterants*-chack powder, white sand, washing soda, plastic crystals, urea, white/yellow color, Rawa/suji, stone, etc.

Health effect- Chalk powder is not toxic, but when inhaled for long, may cause respiratory problems. Washing soda(Na_2CO_3)(Sodium carbonate) causes nausea, diarrhea, and omitting.

Detection of white powder in the iodine salt- Testing method. Stir ¼ teaspoon of a sample of salt in a glass of water. Pure salt dissolves completely and gives a clear solution or gives a slightly turbid solution due to the presence of permitted anticaking agents in the salt. The adulterated salt solution turns dense white turbid in the presence of chalk powder and other insoluble impurities will settle down at the bottom.



Detection of chalk powder in sugar. Testing method: take a transparent glass of water. Dissolve 10 gm of the sample in water. If sugar /jaggery is mixed with chalk, the adulteration will settle down at the bottom.

4.Tea Powder: *Adulteration*-with used tea leaves, dye or artificial color, iron fillings. It can also be adulterated with iron flakes to increase their weight. The chances of adulteration are more if we buy loose tea. Used tea from tea stalls is dried in the sun, mixed with coal tar dyes and some amount of genuine tea to give it flavor.

Health effects- Adulterated tea consumption makes cancer and leads to tetanus.

Detection- of exhausted tea in tea leaves: Take filter paper and spread a few tea leaves(powder).Sprinkle with water to wet the filter paper. Keep the filter paper under tap water for washing and observe the stains against the light. Pure tea leaves will immediately stain the filter paper.

5.Coffee Powder: *Adulterants* are chicory powder, ground tamarind, and dated seeds.

Health effects- Tamarind seed, date seed powder caused diarrhea, chicory powder causes stomach disorder, giddiness, and joint pain.

Detection- Take ½ teaspoon coffee powder each in two glasses having normal water and wait for 5 minutes, Unadulterated coffee powder has no sediments in the bottom of the glass, but in adulterated coffee pored glass have sediments at the bottom.

6.Chilly powder: *Adulterants* are Sudan dye, red brick powder, grit, sand dirt, on permitted colors, sawdust.

Health effects-brick powder, sawdust make stomach disorder and Sudan dye is carcinogenic.

Detection-Sprinkle the chilly powder in the container of water. Sawdust will float and added color will make the watercolored.

7. Turmeric powder: *Adulterated* with yellow aniline dyes, nonpermitted colorants like metanil yellow, tapioca, starch, lead chromate powder, etc.

Health effects-yellow aniline dyes cause carcinogenic. on permitted colorants like metanil yellow are highly carcinogenic. Tapioca, starch cause stomach disorder. Lead chromate added to turmeric powder and spices can cause anemia, paralysis, brain damage, and abortions.

Detection- Adda teaspoon of turmeric powder in a glass of water. Natural turmeric powder leaves a light yellow color while settling down. Adulterated turmeric powder will leave a strong yellow.

8 .Poultry and Fish: *Adulterant*- formalin, ammonia, and other type of chemicals, Mercury, etc.

Health effects- Mixed with formalin and other types of chemicals that are used to keep the food fresh are injurious to health, which causes different types of cancers, asthma and skin diseases.



Unhygienic meat and meat products can cause food infection usually with fever and chills. These are the immediate effect of food adulteration on public health. Mercury contaminated fish can cause brain damage, paralysis, and death.

Detection-In fish if the smell of ammonia/formalin comes we can understand that the fish is adulterated one. A chemical kit developed by CIFNET, by using this one, we can easily find /detect the fish is adulterated or not. Meat or poultry can be checked physically by watching it contaminated or not. If it is contaminated or damaged one foul smell may come out from the meat.

9.Dals and pulses: *Adulterant*-khesari dal, sand, marble chips, stones, filth, and other pulses

Health hazards-sand, marble chips, stones, filth, etc affect the digestive track .Khesari dal is highly carcinogenic, stomach disorders.

Detection-it can be separated by visual inspection

10.Coconut oil: *Adulterant*-other oils and paraffin wax

Health hazards-consumption of adulterated coconut oil leads to several ill-health issues.

Detection-take a 10 ml of oil in a glass templar and kept it in the fridge(freezer) for ten minutes, coconut oil gets solidify and other things remain as it is.

11.Rice- *Adulterant* plastic rice and small white stones, clay

Health hazards- plastic consumption leads to several stomach related diseases including appendicitis.

Detection- white stone can be physically identified. When rice boil in a pan, plastic get melted remain the original rice.

12. Black pepper: *Adulterant* papaya seeds.

Detection – papaya seeds easily floating on the water surface, but black pepper deposited at the bottom.

13. Coriander powder: *Adulterant* sawdust

Health hazards- saw dust leads to asthma and cancer

Detection-Take a little amount of teaspoon of coriander powder and sprinkle it in a bowl of water, spice powder gets sediment at the bottom and sawdust floats on the surface of the bowl.

14.Jaggery: *Adulterant*-Washing soda

Health hazards- adulterated jaggery can cause allergy, parasitic infection, and indigestions.



Detection- Small amount of jaggery solution is taken and added a few drops of concentrated hydrochloric acid (HCL). The formation of effervescence shows the presence of washing soda.

15. Ice cream: *Adulterant* pepperoni, ethyl acetate, butraldehyde, nitrate, washing powder etc.

Health hazard- Ethyl acetate causes diseases affecting lungs, kidneys, and heart, and pepperoni is a pesticide

Detection- Pour a few drops of lemon juice on the ice cream. If it starts to froth and bubble, it makes the presence of washing powder, Float the sample in alcohol. Mature black peppercorns will sink, where papaya seeds will float to the surface.

16. Honey: *Adulterant*-sugar solution

Health hazards-adulterated honey will make obesity.

Detection- cotton wick is dipped in honey and burnt over the flame. The presence of water will not allow the honey to burn and it will produce a cracking sound.

17. Green chilies, green peas, and other vegetables: *Adulterant*-malachite green.

Health hazard- If such adulterated vegetables taking for a prolonged time it makes the body carcinogenic.

Detection-Take a small part of the sample to be tested and place it on a piece of moistened white blotting paper. The impression/mark of color on the paper indicates the use of malachite green or any other low priced artificial color.

18. Sweets: *Adulterants* are Non permitted color or permitted color like metal yellow.

Health effects- Beyond the safe limit in colored food can cause allergies, hyperactivity, liver damage, infertility, anemia, cancer, and birth defects. 100 ppm color allowed in sweets.

Detection-Some sweets adulterated with the less quality silver folder. If the folder can remove simply by rubbing it is ok, if the silver folder in the sweets is adulterated, the folder will not come easily. To detect starch adulteration- take a piece of sweet in a test tube and pour water shake well and then pour iodine 2-3 drops. If it turns yellow color sweet is adulterated one.

19. Wheat flour (Atta):-*Adulterant* –chalk powder, ergot(poisonous fungus)

Health hazards- cause Gastrointestinal damage, Stomach pain, Diarrhea

Detection-Take a spoon of wheat powder add 2-3-drops of diluted hydrochloric acid, we observe the liberation of CO₂ from the flour.

In addition to the above items, some other items are also coming in front of the Malaya lees (Keralites) as eatable households using items. Some among them and details as



S/No	Items	Adulterant	Health hazards	Detection
1	Butter	Vegetable oil,anatta,banana,oleomargarine, vanaspathi	Several diseases connected with stomach	Take about one teaspoon melted butter with equal quantity of H ₂ SO ₄ in a test tube ,add a pinch of sugar and shake well and keep for five minutes, appearance of crimson color in lower shows presence of vanaspathi or margarine
2	Fruit juices	Diluting with inferior quality juice, artificial flavors and colors.	Affect digestive system, ulcer and gastric problems	
3	Apple	Wax coating	Harm to digestive systems, ulceration and gastric problems	Put in boil water for few minutes, take out and apply slight scratches ,will come out the light wax coloring.
4	Rava(suji)	Iron fillings, sand, soil ,rodent hair etc	Harmful to important organs of our body	They can be identified by visual examinations.
5	Green Vegetables	Coloring agents,cowdungs	carcinogenic	Shake with little water ,coloring of water shows the presence of coloring/cowdungs
6	Mangoes and banana	Calcium carbide	Harmful to digestive	By viewing physically as



			systems and liver	carbide coated /spread fruits have deep yellow color than nor ripen color
7	Common salt(crystal)	White powder stone /chalk	Problems in digestion	Take water in a glass tumbler, pour ½ teaspoon salt. Salt will get dissolve ,other things will not dissolve.
8	Edible oil	Mineral oil	Leads to several ill health issues.	Take oil in a spoon and heat for some time, if a green color appears, it show the presence of mineral oil.
9	tamarind	Adding used old tamarind and some edible oil	Stomach pain	Keep two-three pieces in water ,oil come out and tamarind settle down the utensil
10	Hing(Asafetida)		Several stomach problems	Burn in spoon ,if it burn ,it is ok ,if fake not dissolve in water.
11	Cereals	Stone pieces ,mud ,ergot seeds	Stomach disorder	By hand picking

Almost all vegetables, fish, spices having adulteration in Kerala. Even though the health department catching them, not coming in any paper (particular brand) or in any visual media. It is very sad to know that Government authorities in Kerala not taking any initiative to arrest the culprit and banning the firm from production/stopping adulteration, even though adulteration is a non-bail offense.

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