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Research Article

A PRELIMINARY STUDY ON THE ADULTERATION IN SPICE OF UNRIPE MANGO POWDER IN INDIA

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ABSTRACT

In the modern time, a lot of standards and food authorities are working towards the negligible use of integrities in food and other types of materials such as spices, beverages, oil etc. Yet, the impurities and adulteration are often noticed in the food and related materials. The impurities or contents which are mixed within the materials have harmful dirt, straw, earthy material, lead, chalk etc. In this study, we focused on the different spices which are easily available in the Indian market and frequently used in our kitchen. The mango powder (Local name - amchur), which is used for taste in most of the Indian food and have a lot of integrities without our knowledge. This spice of mango is almost used in all over the country and even out too. During this pilot study, the integrities were observed in form of earthy material, chalk, starch, soap stones and lead in higher concentration which are detrimental for human health and originate the numerous diseases.

INTRODUCTION

In the present time, when the demand of the materials is becoming higher than the supplies in the markets. In this conditions, the impurities and integrities are adulterated in the foods, spices, oils, and other materials too. The prevailing policies and implementation on the existing laws are efficiently followed everywhere yet this problem is baffling for us (Satin Morton, 2007). The Food Safety and Standards Authority of all nations have provided a list of adulterants that are found in food substances (Accum F., 1920).

A number of different types of Amchur are available in the Indian markets depending on the species from which it was extracted and the country of origin. Amchoor (Mango powder) is an Indian spice made from unripe or green mangoes that are sliced and sundried. Mango trees are evergreen tropical trees which grow about 10-40m in height and lives for over 100 years (Brown C.A., 1925 & Smith S.D., 2001). The name comes from the Hindi word 'Aam' meaning mango. The spice is available either as whole or ground to powder. Sometimes amchur is seasoned with turmeric (Cole R.J. , 1925). Amuchr is also sold as dried mango slices, which practically fits the category. Also the category of Powdered spices is commonly found to contain starch, common salt and saw dust. The manual states soap stone or earthy materials, starch and foreign resin to be the common adulterants found in Amchur.

Figure 1 Dried slices of mango (Amchur)

Figure 2 Fine grinned powder of mango slices

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The dried mango slices have a light brown colour with a rough surface. Sometimes ripe mangoes are also used and these have an orange brown colour. Finely ground amchur has a fibrous texture and is beige in colour. Amchur is used as an acidifying agent in North Indian cuisines and are used akin to tamarind, lemon juice etc. The adulteration in this spice may have been in form of grit sand, dirt, filth, talcum powder, chalk, soap-stones, etc. some of them are basically withered rock particles containing a lot of other organic and inorganic materials. Their colour range from white to red to black. It's detrimental kidney and liver which causes the stomach problems. Some of the integrities are prepared from hydrated magnesium silicate [$H_2Mg_3(SiO_3)_4$ or $Mg_3Si_4O_{10}(OH)_2$] (Clayton E.G. & *et. al.* 1908). It is a white powder which has other industrial uses as well e.g. paper, plastic paint, rubber etc.. It causes diarrhea and stomach problems to human. Soap stones which is also known as steatite/ soaprock is majorly composed of mineral talc and thus constitutes magnesium. (Burnett J., 1966) It has been used as a medium for carving since a long time. Because of the high talc content, it is relatively soft and softer grades have a soapy feel to touch, giving it the name and frequently used in amchur.Lead has been detected in various exported Indian spices. The source of this heavy metal is mostly Environmental pollution and the contamination can occur during the cultivation, transport or processing of the spice. By the consumption of this material Chronic exposure to small doses produce toxic effects on various systems like renal, musculoskeletal, reproductive, ocular, neurological etc (Weise Elizabeth., 2006). So, in our study we focused on the amchur which was easily available in Indian markets to find out the adulteration in this spice. From this study, it was confirmed that several materials are used as an integrity in form of adulteration in our food.

MATERIALS AND METHODS

For this study, all the samples (12) were collected from the indispensable spice available in the Indian Kitchens market, the local market and some other different places. It was hypothesized and estimated that one or more adulteration of materials may be present in the Amchur. This study was based only on the preliminary examination which was conducted to determine the adulteration such as the presence of earth materials, chalk, lead or the foreign resin such as soapstone etc. All the samples were retained in small plastic zip-lock pouches, which were cleaned and dried prior to collection. Each pouch was then numbered and preserved in plastic bags.

METHOD

In this study, different methods were adopted to analyze the samples such as physical test, solubility test, test for starch test for soapstone and for lead.

During the solubility examination, the samples were taken in a test tube. In this test tube 2 gm. of sample was stir with 5 ml of distilled water. After shaking it very well, it was kept for one hour to settled down. The foreign material such as soap stone and other earthy materials were settled at bottom which later on separated from the extract. Now, the further examination was the chemical examination for the presence of starch in the sample. In this experiment, the sample was put in a test tube in which the Lugol's iodine solution was added (5ml.). After 5 minutes when it was observed, the change in colour was noticed (Blue colour) which indicates the presence of starch in the amchur in spices.

For the presence of chalk powder in the spice, 1 gm of sample was taken in a test tube. In which, 2 ml of carbonatetrachloride was added (Jeffery M. Pilcher., 2006). It was put down on the test tube stand so that the contaminants could be settle down at bottom. Now, the top layer of the extract was decanting followed by 2 ml of diluted hydrochloric acid which was added in the leftover residue. The effervescence indicates the presence of chalk in the spice.

Examination for lead: In this procedure, first of all the solution of sample was prepared following by 2 gm. of sample and 5 ml of distilled water. Now,2 ml of potassium iodide was added in the solution followed by 1 ml of sulphuric acid. It was noticed the change in colour (yellow) which indicates the presence of lead in spice.

Examination for soapstone: In this examination, the extract was prepared in the distilled water followed by few drops of Conc. Hydrochloric acid (2-3 drops). In this test, wine red colour formation was observed which is an indication of soapstone in the spice (Amchur)

RESULT AND DISCUSSION

During this pilot study, the adulteration of contamination in the spice of mango powder was observed. The concentration of these integrities were different and it was observed through the conducted experiments.

During the study, when the solubility experiment was conducted. It was observed that the mango powder (Amchur) settled down at the bottom of the test tube and no impurities were noticed to be floating over it. Further, when the test for starch was carried out to confirm the integrity, the colour changes slowly and becomes blue. The presence of starch may be labeled in the list of the content of the powder. During these observation, the notation differs in impurities of starch which may vary because of limited number of samples.

When the test for chalk was performed no effervescence was found then it confirms the presence of the chalk in the amchur. When the test for lead which is considered the metallic poison and gives the serious effects on human health was not found in form of the integrity in the powder of amchur. The soapstones, which are easily mixed with mango powder spice and are often hard to discriminate the difference between the crystals of them. In this study, presence of soapstone was confirmed in the spice. The change in colour (red wine colour), which confirm that some part of the integrity was present in it. The observation of all the experiments which were carried out, are given in the below table-1-

At the conclusion of the table, it was separately listed that in how many samples, integrity was found and what was the percentage? This study was carried out only to observe the integrity which were found in the spices of powder and comes under the adulteration.

During these experiments, it was observed that solubility test confirms 16.66 % adulteration in the sample of amchur, similar like it test for starch and burn test also confirms the content of integrity in the powder of asafetida. While, the experiment for

chalk (58.33%) and test for lead (33.33%) confirm their presence. It indicates that these types of spices of powder which are bought from the market contain the integrity as a content. While these observations rapidly increase in the soapstone presence (50%).

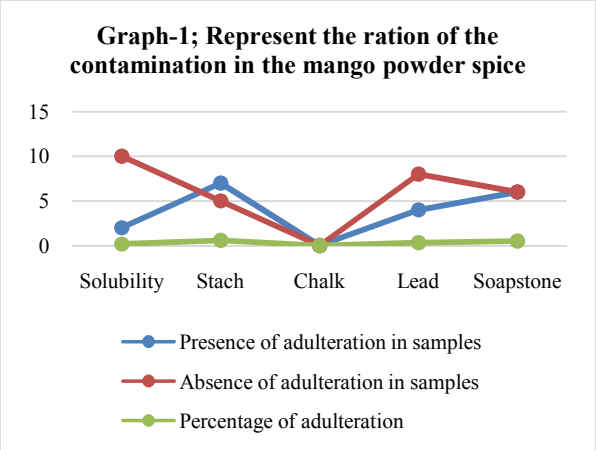
cause damages to the human health with whom we are not aware. The regular consumption of the integrity like lead which also act as a slow poison. While at other end, the soapstone particles are understood the most dangerous for kidney and liver of human.

Table 1 showing the observation of the samples during various experiments

Sample no	Physical tests	Chemical tests			
	Solubility tests	Test for statch	Tset for chalk	Test for lead	Tset for soap stone
1	Amchur powder settled, leaving no floating impurities.	Blue colour not formed.	No effervescence.	Light brown precipitate formed.	formation of red colour.
2	Amchur powder settled, leaving no floating impurities.	Blue colour formed.	No effervescence.	Yellow precipitate formed.	No formation of red colour.
3	Amchurpowder settled, leaving some suspended impurities.	Blue colourformed.	No effervescence.	Yellow precipitate not formed.	formation of red colour.
4	Amchur powder settled, leaving no floating impurities.	Blue colour formed.	No effervescence.	Yellow precipitate formed.	formation of red colour.
5	Amchur powder settled, leaving no floating impurities.	Blue colour not formed.	No effervescence.	Yellow precipitate not formed.	Brown colour formed.
6	Amchur powder settled, leaving some suspended impurities.	Blue colour formed.	No effervescence.	Yellow precipitate formed.	No formation of red colour.
7	Amchur powder settled, leaving no floating impurities.	Blue colour not formed.	No effervescence.	Yellow precipitate not formed.	formation of red colour.
8	Amchur powder settled, leaving no floating impurities.	Blue colour not formed.	No effervescence.	Yellow precipitate not formed.	No formation of red colour.
9	Amchur powder settled, leaving no floating impurities.	Blue colour not formed.	No effervescence.	Yellow precipitate not formed.	No formation of red colour.
10	Amchur powder didn't settled, floating impurities.	Blue colour formed.	No effervescence.	Yellow precipitate formed.	formation of red colour.
11	Amchur powder settled, leaving no floating impurities.	Blue colour formed.	No effervescence.	Yellow precipitate not formed.	No formation of red colour.
12	Amchur powder didn't settled, some floating impurities were observed.	Blue colour formed.	No effervescence.	Yellow precipitate not formed.	formation of red colour.

Table 2 represent the analysis of samples and the calculative presence of adulteration

Adulteration	Presence of adulteration in samples	Absence of adulteration in samples	Percentage of adulteration
Solubility	2	10	16.66%
Stach	7	5	58.33%
Chalk	0	0	0
Lead	4	8	33.33%
Soapstone	6	6	50%



Graph 1 Represent the graph of presence of integrity in the powder.

Graph 1; which is representing the percentage of the integrity present in the amchur that were observed during the experiments. After the different types of conduction, it was observed that the solubility test, test for starch confirms the extreme integrity about (58.33%) in the powder of amchur. While test for lead (33.33%) and test for soapstone (50%) confirm the concentration of integrity. These types of integrity

We consume these spice in our regular food without our knowledge and later on this causes severe disease to human health (Noel G. Coley 2005).

CONCLUSION

By this pilot study on the spices of powder, we tried to find out the adulteration in our food and spices what we consume in our daily food without our knowledge. In this case of mango powder (Amchur), samples were suspected to be having the physical adulteration and presence of chemicals were negligible. But the results were opposite of expectations. The concentration of lead and soap stones were higher in comparison of other physical integrities. The concentration of starch was also noticed to be higher in comparison of other contents such as earthy material and chalk powder. Among the conducted experiments, major work indicated the adulteration in spices. The reason behind this could be the ample availability of the spices. These integrities in spices were above the standard composition that can be responsible for the serious health issues.

The presence of the earthy material could be considered because this type ofintegrity could be presence due to environmental pollution. From the obtained results of the above study, it inferred that Ammchur, are less likely to be adulterated intentionally as compared to chili powder, turmeric etc. The samples in this study showed positive results to the adulterant detection tests and this is likely to be accidental contamination. The reason behind this could be the ample availability of the spices.

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