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INCIDENCE OF ADULTERATION IN MUSTARD OIL

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ABSTRACT

A total of 60-samples of mustard oil were taken for laboratory analysis to find out the incidence of adulteration. The samples were collected from different types of shops and households and tested for the presence of argemone oil, acid value, saponification value, specific gravity, for the presence of artificial colour and til oil. All the test samples were found to be different from their standard values in one test or the other indicating the presence, of various adulterants. 100% mustard oil samples, specifically, showed the presence of argemone oil which is presumed to be deliberately added to the mustard oil during manufacturing process. The incidence of adulteration in edible mustard oil samples in the locality was concluded to be 100% following the principles of the prevention of Food Adulteration Act, 1954 of the Union of India.

Adulteration in foodstuffs, especially in edible fats and oils, often creates health problems in our country. The major and the minor health problems include "epidemic dropsy" (characterised by gastro-intestinal disturbances, oedema of face and limbs, glaucoma, erythematous nodules), itching, hyperacidity, indigestion etc. The adulteration in edible fats and oils may be possible at the following levels–(a) manufacturer, (b) wholesaler, (c) retailer, (d) co-operative store etc.

It has been felt that the adulteration in edible oils, especially in mustard oil has been very much increased during these days. Hence to verify this idea, the housewives were interviewed and it was noted that they suspected more than 75% of mustard oil purchased from shops were adulterated. Their crude way of suspicions were due to the following reasons :

When mustard oil is kept in a container, the thick and suspended materials gradually settle in the lower portion of the container forming a dirty layer with a different colour from the normal.

When the, oil is put into the frying pan, it gives off a peculiar smell producing more pungent smokes.

The mustard oil when used as hair oil the hair becomes sticky and this stickiness does not go even after repeated soap washing.

Further health problems like gastro-enteritis, indigestion, hyperacidity etc. are observed after consuming the suspected adulterated mustard oil which is presumed to support the above mentioned suspicions of housewives.

The present pilot study was, therefore, undertaken to record the scientific data on adulteration of edible mustard oil samples.

MATERIALS AND METHODS

A total of 60 samples of mustard oil collected from different types of shops and households (as shown in Table 1) were taken for laboratory analysis. The collected samples were analysed for different tests like—(1) Nitric Acid test for the presence of argemone oil in mustard oil samples, (2) Specific gravity test, (3) Acid value (4) Saponification number.

Table-1 : Mustard oil samples taken from different sources.

Sources	No. of Samples
1. Mill/or Manufacture	12
2. Wholesaler	12
3. Retailer	12
4. Co-operative stores	12
5. Households	12
Total	60

The principles and procedures for these tests were strictly followed according to the ICMR-Manual[7], and the test samples were declared as adulterated following the standards and specifications laid down by the Prevention of Food Adulteration Acts[8], (PFA Act, 1954).

RESULTS AND DISCUSSION

According to the PFA Acts, any mustard oil sample to be known as a genuine one, should confirm to all the standards specified for it in the Act and in case, there is deviation in any one or more than one such standards,

Table-2 : Results of laboratory analysis of mustard oil samples.

Tests	Standard values	Test values	% of samples below the normal range	% of samples above the normal range	% of samples within the normal range	Deviation from normal in % of sample
1. Nitric Acid	Original yellowish colour	Change in colour red (+Ve)	-	-	Nil	100
2. Specific Gravity	0.915-0.919	0.826-0.827 (36) 0.943-0.988 (24)	60	40	Nil	100
3. Acid Value	< 2.00	1.35-2.00 (60)	Nil	Nil	100	Nil
4. Sopaonification value	168-177	153-160	40	20	40	60

the particular sample shall be deemed to be adulterated. But due to many limitations, all the 10 tests specified in the Act could not be performed for the samples; however, some possible tests (Table-2) have been performed and the positive results were noted indicating the incidence of adulteration as 100%.

The results of the study have been summarized in Table-2. The incidence of adulteration in all the test samples taken for analysis was found to be 100%. All the mustard oil (100%) samples were found to have the presence of argemone oil. With regards to specific gravity test 100% mustard oil samples had values either above or below the standard range. Acid values and saponification numbers of some of the samples (Table 2) were also different from the normal values set for them in the PFA Act[8].

Few studies already carried out in this respect state that there is a positive relationship between different types of shops and the incidence of adulteration. Accordingly, Girl et alt reported that the co-operative stores provide people with quality products. But in the present study, it has been observed that even the co-operative store also sells adulterated mustard oil . All the samples showed the presence of adulteration of one kind or the other regardless of the source from where it was obtained. Hence it is presumed that mustard oil samples are especially adulterated in the very beginning, i.e. at the level of the producer or the manufacturer and then pass through different phases and finally reach the consumer ,although the possibility of further adulteration at retailer level is not ruled out. As the incidence was found to be 100%, again it might be presumed that the adulteration is of deliberate or intentional nature. If it would have been of an incidental type, all the mustard samples studied would not have been found to be adulterated.

Therefore, argemone oil is suspected to be deliberately mixed with mustard oil because its seeds very much resemble mustard seeds ,is cheaper and yields more oil than the mustard oil regardless of its toxicity. Nagarajan[6] in his decade long study (1961-71) on argemone toxicity has established that a toxic dose of ml. argemone oil/Kg. body weight causes epidemic dropsy. Though the present study shows the incidence of adulteration in mustard oil due to at argemone Oil as 100% , acute cases of epidemic dropsy, however, were not reported by any member of the households surveyed for the purpose.

However, the non-specific and mild health problems like gastro-intestinal disturbances, itching, hyperacidity etc. were suspected due to such adulteration in the studied samples of mustard oils.

Scientific investigations carried out by Bhalla *et al*[1], Lady Irwin Colleges and Giri *et al*[2] etc reported an average incidence of 50%, 35%, 30% adulteration respectively in different edible oils and mentioned that the over-all incidence of adulteration has increased during these days. But Khanna *et a1*[4] reported that the overall incidence of adulteration in mustard oil has decreased to a range of 14-17% during a decade time. But the present study showed that the incidence of adulteration, in mustard oil is 100% in the particular locality.

CONCLUSIONS AND RECOMMENDATIONS

The incidence of adulteration in edible mustard oil samples in the locality is exceptionally high (100%) and the nature of such an adulteration is probably

deliberate. Mustard oil samples taken from the manufacturer, wholesaler, retailer, cooperative stores and households were all found to be adulterated. Therefore, the following conclusions/suggestions were rendered as a measure of public health concern in the particular locality.

Analytical laboratories should be set up in each locality to analyze the local foodstuffs, especially edible fats and oils and test results should be made available to the public at large.

There should be strict. implementation of the PFA-Actby the Local Health Authority of the area to have a" control over the incidence of adulteration in different food-articles, 'especially in mustard oil'.

Housewives and general consumers should be educated to develop a resistance against adulteration and to learn simple domestic techniques for easy detection of adulteration in mustard oil used for domestic consumption.

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