Practice of Using Metanil Yellow as Food Colour to Process Food in Bhopal Madhya Pradesh - A Case Study

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Abstract: We report here about the practice of using Metanil yellow, a non-permitted synthetic dye, in the adulteration of some food items produced different area in Bhopal, India. Metanil yellow is orange colour dye which is used in place of sunset yellow. Metanil yellow is low cost, cheap and easily available dye. We considered food item-Base ladoo for the detection of the presence of Metanil yellow. We observed that 22 of the 100 samples i.e. 22% of total samples contain Metanil yellow in which 30.0% of the positive samples contained the Metanil yellow below the maximum permissible limit i.e., below the 100 mg kg⁻¹ food samples and 70.0% of the positive samples contained above the maximum permissible limit i.e., above the 100 mg kg⁻¹ food samples as specified in the Prevention of Food Adulteration Act of India (PFA, 2008). Metanil yellow is harmful for human health. We requested to government to prevent food adulteration with Metanil yellow to avoid human health hazards.

Keywords: Food Dyes, Metanil yellow, Ladoo (Besan) Food adulteration

I. INTRODUCTION
Food dye is a substance in powder or liquid used to impart colour to food article both at commercial and domestic level. Food colour is used as additives for preservation. At present time food contamination is a major problem. Adulteration is nothing but mixing an unwanted material in food products for the purpose to increase the quantity of commodity and to earn large amount money by selling adulterated food material. Which harmful to human being and their causes several diseases, in our project work we chose food colour or dye for awaring the people to their quality and harmful effects. Majority of synthetic food colours are highly toxic synthetic chemicals and banned by the central and state administration. In most of the cases excessive amounts of food colours are used to bring the intended colour of the processed food to attract people ignoring the safe limit of food colours for use. The most common adultering colour used is Metanil yellow. Metanil yellow has been considered as one of the potent toxic chemicals due to its severe toxicity in some organ systems in animals. Metanil yellow is a banned dye as per PFA Act (1954), by Government of India, because the same dye has found to be carcinogenic in human. According to the Food Safety and Standard Authority of India permit the use of 8 synthetic colours in specified food commodities (PFA, 2008). The maximum limit of permissible colours to be added in any food shall be 100 mg kg⁻¹ or litre-1 of food as consumed.

II. MATERIAL AND METHOD
Food samples collected for testing the presence of metanil yellow. We have collected 100 food samples in different area of Bhopal city M.P. They are where sample was collected is New market, Station road, Karod chauraha, Lal ghati, Baragadh, Cholla naka. Specialties Private Limited was used for the preparation of standard curve and quantitative estimation of metanil yellow in food samples. Preparation of standard solution and regression curve at first a stock solution was prepared with a concentration of 100 µg mL⁻¹ of metanil yellow and then a series of standard solutions were prepared (ten different concentrations of metanil yellow were prepared: 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 µg mL⁻¹). Each standard solution was added with 50 µl of 1 (N) HCl and allowed to stand for at least 5 minutes for the development of pink colour. Then the absorbance was measured at 450 nm against a reagent blank prepared concurrently (Nath et al., 2013). Total 100 samples were prepared. To prepare a sample solution, 1 gm of each food samples was taken in a beaker and dissolved in 10 ml of distilled water. After homogeneous mixing, the solution was filtered by passing through a Whatman filter paper placed on a glass funnel fitted with a conical flask. After that, 0.5 ml of filtrate obtained in the conical flask was taken in a test tube and volume was made up to 3 ml by adding distilled water. 50 µl of 1 (N) HCl was added to the solution to develop specific pink color of the solution. The optical density of the solution was then obtained with systronics 118 single beam UV-VIS spectrophotometer. The concentration of metanil yellow present in the sample solution was then calculated from the equation obtained from the standard curve by plotting the value of optical density (Nath et al., 2013).

TABLE 1
Sample collected from different area of Bhopal m.p

<table>
<thead>
<tr>
<th>S.No</th>
<th>Area</th>
<th>Sample Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New Market</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Karod Chouraha</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Lal ghati</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Baragadh</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Cholla naka</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>Railway station</td>
<td>20</td>
</tr>
</tbody>
</table>
III. RESULT
We have examined 100 food samples which were collected from different areas of Bhopal to determine the percentage of metanil yellow, the non-permitted food colour present in different food products. We got 22 positive samples out of total 100 samples analyzed (i.e., the 22% of the total samples (Table 2)) contained the metanil yellow as food colour (Figure 1). Out of the total positive samples (22 samples). Further, we found 40.0% of the positive samples contained the metanil yellow below the maximum permissible limit i.e., below the 100 mg kg⁻¹ food samples and 60.0% of the positive samples contained above the maximum permissible limit i.e. above the 100 mg kg⁻¹ food samples as specified in the Prevention of Food Adulteration Act of India (PFA, 2008).

IV. DISCUSSION
It has been seen that 22% of the total samples contained the metanil yellow in a significant amount. Further, 60.0% and 40.0% of the positive samples showed the contamination of metanil yellow above the maximum permissible limit and below the maximum permissible limit respectively. It is an instinct phenomenon that humans are always attracted to food and drinks bearing pleasant colours. Additions of attractive colours can definitely enhance the appetizing value and the palatability of food and drinks for the consumers. So, from the manufacturer’s point of view, colour is very much effective to increase the selling of food products., which are mainly synthetic in nature.

Table 1. Sample collected from different area of Bhopal M.P

<table>
<thead>
<tr>
<th>S.No</th>
<th>Area</th>
<th>Positive Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New Market</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Karond Chauraha</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Lal ghati</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Bairagadh</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Cholla naka</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Railway station</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 2. Percentage of Positive sample containing Metanil Yellow obtained from selected areas of Bhopal M.P

Table 3. Table showing the percentage of positive samples containing the metanil yellow in selected areas of Bhopal, India.

Figure 1. Graphical representation of sample collected from different area of Bhopal M.P

Figure 2. Graphical representation of percentage of positive samples containing the Metanil yellow obtained from selected area in Bhopal, India.

The conclusion of our report is that 88% of samples (basan ladoo) are pure form, available in market and 22% samples are adulterated.

We request the government to take some steps to check the quality of coloured food items and food colours so that the health hazard can be prevented due to low quality food colours.

V. ACKNOWLEDGMENTS
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VI. REFERENCES
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