UTILIZATION OF COLOR EXTRACT FROM PALASH FLOWERS (Butea Monospermous) IN TRADITIONAL SWEETS

Dewalrani M Rewatkar[1] and Sabiha Vali[2]

[1]Assistant Professor, Tuli College of Hotel Management
[2]Ex Professor & Head, Post Graduate Department of Home Science, Rastrasant Tukadoji Maharaj Nagpur University, Nagpur (Maharashtra)

Abstract:

Palash flowers **(Butea Monospermous)** are abundantly available in and around the forest areas and highways in Vidarbha region. The flowers are bright orange red in color and also known as "Flame of the Forest". There is scarce information on their use as a coloring agent in food preparation. Synthetic color commonly used in food preparation is known to have a harmful effect on health. It was therefore postulated to extract color of Palash flowers and use it in selected traditional recipes i.e. Coconut Burfi, Jalebi and Sweet Rice and evaluate the palatability and acceptability in comparison with control recipes prepared using synthetic color. Palash flowers were procured fresh and dried by sun and shade drying. Color was extracted by simple household method. The shade dried sample gave a brighter orange color and hence was used in the experiment. The recipes were standardized to ascertain the quantity of color to be added. Sensory evaluation was conducted by a panel of judges using a descriptive cum numerical score card to assess the color, taste, texture and overall acceptability. Data was analyzed by applying student's't' test to compare the scores of experimental with control recipes. Results proved that addition of Palash flower color extract in recipes did not alter their acceptability as reflected by insignificant differences in mean scores when compared to control recipes in all the charecteristics.Palash flowers thus offer a wide scope to the food color manufacturing industry and will additionally prove to be a useful strategy in waste management.

Keywords: *synthetic colour, jalebi, coconut burfi, sweet rice, palatability*

Introduction:

Color is a vital constituent of food. It is probably one of the first characteristics perceived by the senses. Color affects the overall judgments on the worth of food from both an aesthetic and a safety point of view. It plays an important role in taste thresholds, flavor identification. The color of food is a significant factor in determining its acceptance. The association of color and acceptance of foods is universal.

The main groups of natural coloring substances in food are carotenoids, anthocyanins, porphyrins and chlorophylls. The carotenoids

are responsible for many of the brilliant red, orange and yellow colors of edible fruits and berries, vegetables and mushrooms, flowers, and it is thought that the annual natural production of these compounds amounts to about 100 million tons. Natural extracts containing carotenoids have been used as food colors for centuries.

There has been a spurt in the use of synthetic colors in food industry. The use of permitted and non permitted colors in foods in India is being debated after reports of adverse effects A study to assess the risk of selected population to synthetic food colors showed that children had high intakes of colored solid and liquid foods. The study showed the predominant consumption of two colors such as tartazine and sunset yellow mainly from sweetmeats, beverages and fast foods while colors like carmoisine, ponceau 4R and erythrosine were consumed by the intake of confectionaries, jams, jellies showing that the preference of colors is based on the type of food consumed. The intakes of colors like tetrazzini, erythrosine and sunset yellow were high among children due to ingestion of foods containing high concentration of colors. The study emphasized the need to evaluate the risk of the population to colors on long-term basis (of the use of non permitted colors in experimental animal as well as human **(Pratima Rao and R. V. Sdershan 2008).**

Natural colors are now being considered as an alternative. Many countries have restricted the use of synthetic colors in food products (**IFT 1998**). Natural food colors also protect food from oxidation by enzymes. Therefore they not only enhance the appearance of the food but also protect them. **(Reddy et. al., 2005**).

According to Oke (2006), Palash flowers are used for preparation of natural orange red color. .Palash flowers thus offer a wide scope to the food color manufacturing industry and will additionally prove to be a useful strategy in waste management.

The present study aimed to extract natural color from the wildly grown orange red Palash flowers and use it in traditional sweet preparations..The acceptability of the products was compared with control products prepared using synthetic colors by conducting palatability trials.

Methodology

Fresh Palash flowers are available only in the beginning of summer season. Palash flowers were collected from same area around periphery of Nagpur city. The Drying Procedure of Palash Flowers Used Has Been Shown In Fig 1

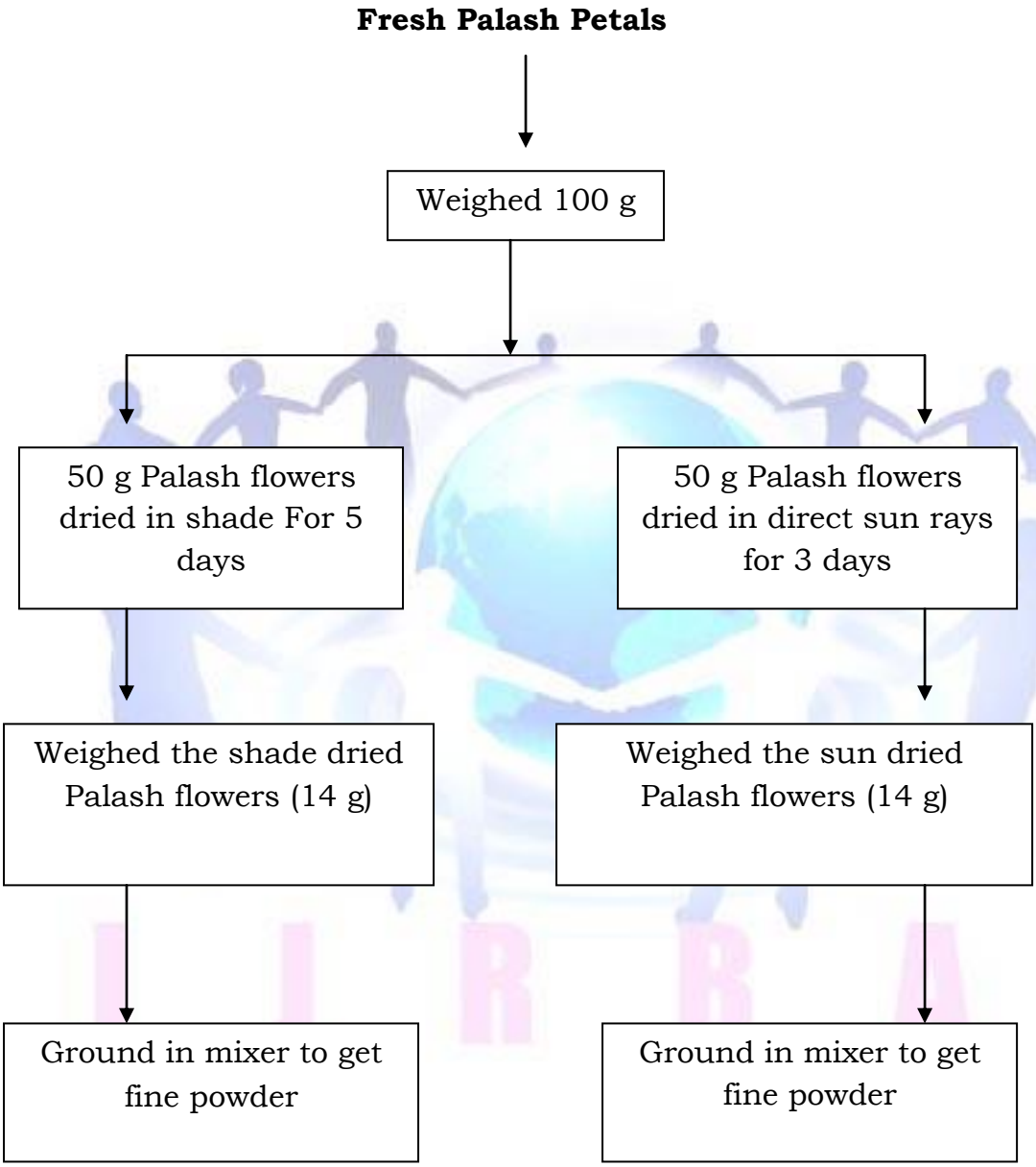

Fig. 1

Colour extraction from the sample

Dried palash flowers were selected to colour extraction (Fig 2)-----

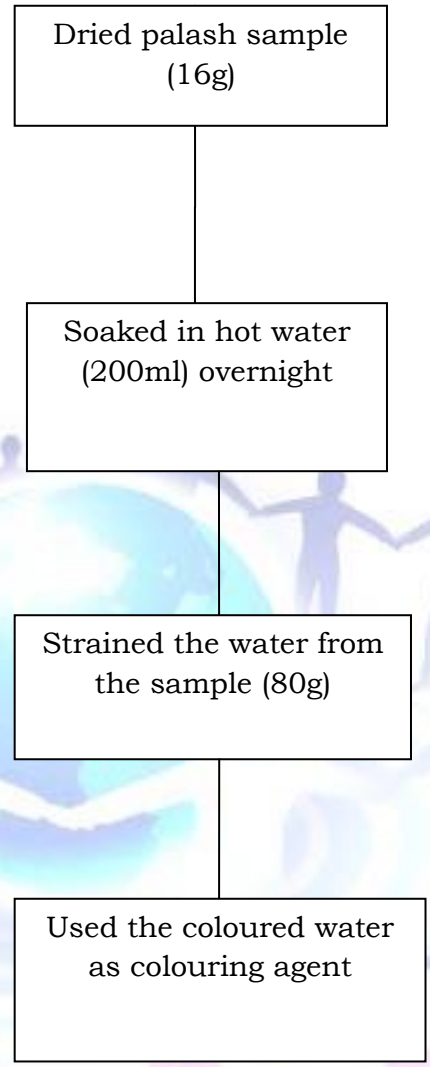

Fig. 2

Sensory Evaluation of Recipes:

Three popular traditional sweets viz coconut burfi, Jalebi, sweet rice were selected for the study. Before presenting the recipes for sensory evaluation a series of trials were conducted to standardize the recipes and to quantify the color addition.

Sensory evaluation of three traditional recipes i.e. Coconut burfi, Jalebi and Sweet rice in terms of the palatability attributes color, taste,

texture, and acceptability was done by six judges comprising of staff members from the Department of Home Science. All the recipes were coded and presented for evaluation with their respective control. A descriptive cum numerical score card was used to test the quality attributes of the experimental recipes prepared with incorporation of Palash flower colour extract in comparison to control recipes with synthetic colors. Three consecutive trials were done for evaluation of each recipe on different days following the laid down standard procedure.

Mean scores for palatability attributes were calculated and the data analyzed using't' test of significance.

Results & Discussion:

The mean scores for each sensory attribute of the three recipes and the statistical interpretation between mean score of control and experimental recipes have been tabulated and discussed in the following paragraphs.

Color:

Color is a vital constituent of food. It is probably one of the first characteristics perceived by the senses..The first impression of a food is usually visual and a major part of our willingness to accept a food depends upon its color. Mean scores of color of control and experimental recipes are shown in Table I and the statistical interpretation in Table II.

Observations from the table reveal that the overall mean scores for color of the three products did not vary widely. The lowest mean score (7.3) was seen in control coconut burfi while the experimental product with natural Palash flower color scored higher (9.9). The mean scores of the control and experimental samples of Jalebi and sweet rice were similar (9.1 and 9.5 respectively).

Statistical analysis revealed significant difference in color of coconut burfi between the control and experimental product indicating a high acceptability with respect to the naturally extracted color concentrate used in Coconut burfi which also had a higher mean score compared to the control. Insignificant differences are reflected between the color acceptance of control and experimental Jalebi and Sweet rice as seen from II.

Texture:

Textural quality of foods depends on the basic ingredients used, the mixing or combining procedure and the method of preparation. Coconut Burfi has a firm but soft texture. Jalebi is fried dipped in sugar syrup and therefore has a characteristic texture ranging between soft and crisp. Sweet rice has a firm but cooked texture. Which particular texture predominates varies from food to food. The texture of food is important because of its effects on taste of food.

The overall mean scores for texture of the products is presented in Table III and the statistical interpretation in Table IV.

The texture of control and experimental recipes showed more or less similar scores. However the experimental sample of each scored slightly higher than its respective control as also seen from the data presented in Table III. The minimum mean score was 8.0 and the maximum was 10.0. It should be noted here that the basic ingredients and the preparation methods for the control and experimental products remained the same for each sweet and the use of synthetic or Palash color concentrate did not affect the texture. However in each of the three products the experimental one scored a higher mean score than the control samples as also observed from the table values. Statistical analysis revealed insignificant differences in the mean scores of texture for all the experimental products as compared to their respective controls as also seen from IV.

Flavor:

The flavor of a food has three components; odor, taste and mouth feel. The odor of a food contributes to the pleasure of eating; Odor like color may be a valuable index to the quality of a food.

The mean scores for flavor of the products is presented in Table V and the statistical interpretation of data in Table VI.

The mean scores for flavor of Coconut burfi were similar for both control and experimental products (9.7). However the mean scores for flavor of Jalebi and Sweet rice were slightly higher in the experimental products (10.0 and 9.5 respectively) as compared to the control (9.8 and 9.4respectively). The scoring pattern showed a variation as observed from

the range of scores of each product. Insignificant differences in flavor of experimental and control products were reflected from the results of statistical test as observed from Table VI.

Taste:

Taste is as important as odor in sensory evaluation of food. A given food may not be attractive in color but may be accepted by virtue of its good taste and vice versa. Taste of food decides to a large extent its acceptance and rejection.

Results on mean scores of the control and experimental products is presented in TableVII and statistical interpretation in Table VIII.

The mean scores for control and experimental product of coconut burfi was similar (10.0).

This reflected an equally good taste of experimental Coconut burfi as compared to the control sample. As observed in case of flavor the mean scores for taste of Jalebi and Sweet rice (9.8 and 9.7 respectively) and were slightly higher the control products (9.5 and 9.4).

Statistical analysis revealed insignificant differences in the taste of the experimental products as compared to the control ones. The former was found to be more acceptable than the latter controls of each of the products.

Acceptability:

The acceptability of a product depends on a combination of its palatability attributes; appearance, color, flavor, odor, mouth feel, taste and doneness. The overall acceptability of the three traditional products prepared by altering the colouring agent while the ingredients and other cooking parameters remained the same has been evaluated. The results are presented in Table IX and the statistical interpretation in Table X.

It is observed from the table 5 (a) that the mean scores for the experimental Jalebi was amongst all the products followed by highest for Jalebi (10.0). The control Jalebi scored 9.8 for acceptability. The difference in scores for overall acceptability is found to be insignificant Similarly the acceptability mean score of experimental Coconut burfi is seen to be higher (9.8) than its control (9.3) the difference being statistically insignificant. The acceptability mean scores for sweet rice is observed to be similar (9.8) for

experimental and control products both thereby indicating equal acceptability.

The results of palatability trials thus indicate the feasibility of the use of Palash flower concentrate as food color. There is a need to popularize the concept of the use of Palash flowers which otherwise goes as a waste.

Summary and Conclusion

This investigation compared the use of natural color extract from Palash flowers (Butea monospermous) against synthetic color in food preparation. Palash flowers were collected and dried under two conditions viz. sun drying and shade drying. The dried samples were powdered and a color concentrate made indigenously. The color of shade dried flower powder was brighter hence it was used for the study Coconut burfi, Jalebi and Sweet rice were prepared with the incorporation of natural and synthetic colors and evaluated for sensory attributes. All the experimental products prepared using Palash color concentrate were found to be highly acceptable in all sensory attributes as compared to their respective controls with synthetic colors. Natural colours are now being considered as an alternative and many countries have restricted the use of synthetic colours in food products .Natural food colours also protect food from oxidation by enzymes. Therefore they not only enhance the appearance of the food but also protect them. Hence based on the results of the study the use of natural color in food preparation is propagated.

Recommendation:

Palash trees are grown widely in India. It grows on a wide variety of soils including shallow, black cotton soil, clay loams and even saline or waterlogged soils. These Palash trees are mostly grown in the forest region so that Palash flowers are wasted in large quantity without any use. This study has made use of indigenous household method for extracting color from Palash flowers. Methods to extract and test the presence of any toxic constituents need to be taken up by the scientific community to make the best use of the colossal waste of Palash flowers.

Table I: Mean Scores for Color of Control and Experimental Products

Sr No	Products	Overall Mean Scores	Minimum to Maximum Scores
1	Coconut Burfi (C)	7.3	6.6 - 8.6
2.	Coconut Burfi (E)	9.9	9.3 - 10
3.	Jalebi (C)	9.1	8.0 - 10
4.	Jalebi (E)	9.5	8.6 - 10
5.	Sweet Rice (C)	9.1	8.0 - 10
6.	Sweet Rice (E)	9.5	8.6 - 10

C Control
E Experimental

Table II: Statistical Interpretation of Scores for Color of Products

Result of 't' test for Coconut Burfi	Result of 't' test for Jalebi	Result of 't' test for Sweet rice
Calculated value of 't'=2.4 df(10) at 5%=2.228 1%=3.169	Calculated value of't'=0.4 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=0.6 df(10) at 5%=2.228 1%=3.169

Table III: Mean Scores for Texture of Control and Experimental Products

Sr No	Products	Overall Mean Scores	Minimum to Maximum Scores
1	Coconut Burfi (C)	9.2	8 - 10
2.	Coconut Burfi (E)	9.7	9.3 -10
3.	Jalebi (C)	9.9	9.3-10
4.	Jalebi (E)	10	10 - 10
5.	Sweet Rice (C)	9.7	8.6 -10
6.	Sweet Rice (E)	9.8	9.3 -10

C Control
E Experimental

Table IV: Statistical Interpretation of Scores for Texture of Products

Result of 't' test for Coconut burfi	Result of 't' test for Jalebi	Result of 't' test for Sweet rice
Calculated value of 't'=0.83 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=1.66 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=0.40 df(10) at 5%=2.228 1%=3.169

Table V: Mean Scores of Flavor of Control and Experimental Recipes

Sr No	Products	Overall Mean Scores	Minimum to Maximum Scores
1	Coconut Burfi (C)	9.7	8.6-10
2.	Coconut Burfi (E)	9.7	9.3 -10
3.	Jalebi (C)	9.8	9.3- 10
4.	Jalebi (E)	10	9.3 -10
5.	Sweet Rice (C)	9.4	7.3 -10
6.	Sweet Rice (E)	9.5	8.6 -10

C Control
E Experimental

Table VI: Statistical Interpretation of Scores for Flavor of Products

Result of 't' test for Coconut burfi	Result of 't' test for Jalebi	Result of 't' test forSweet rice
Calculated value of 't'=0.83 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=1.66 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=0.40 df(10) at 5%=2.228 1%=3.169

Table VII: Mean Scores of Taste of Control and Experimental Recipes

Sr No	Products	Overall Mean Scores	Minimum to Maximum Scores
1	Coconut Burfi (C)	10	10 - 10
2.	Coconut Burfi (E)	10	10 - 10
3.	Jalebi (C)	9.5	8.6 - 10
4.	Jalebi (E)	9.8	8.6 - 10
5.	Sweet Rice (C)	9.4	7.3 - 10
6.	Sweet Rice (E)	9.7	9.3 - 10

C Control
E Experimental

Table VIII: Statistical Interpretation of Scores for Taste of Products

Result of 't' test for Coconut burfi	Result of 't' test for Jalebi	Result of 't' test for Sweet rice
Calculated value of 't'=0 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=0.53 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=1.13 df(10) at 5%=2.228 1%=3.169

Table IX: Mean Scores for Acceptability of Control and Experimental Products

Sr No	Products	Overall Mean Scores	Minimum to Maximum Scores
1	Coconut Burfi (C)	9.3	8 - 10
2.	Coconut Burfi (E)	9.8	9.3-10
3.	Jalebi (C)	9.8	9.3-10
4.	Jalebi (E)	10	10 -10
5.	Sweet Rice (C)	9.8	9.3 -10
6.	Sweet Rice (E)	9.8	9.3 -10

C Control
E Experimental

Table X: Statistical Interpretation of Scores for Acceptability of Products

Result of 't' test for Coconut burfi	Result of 't' test for Jalebi	Result of 't' test for Sweet rice
Calculated value of 't'=1.367 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=0.24 df(10) at 5%=2.228 1%=3.169	Calculated value of 't'=0 df(10) at 5%=2.228 1%=3.169

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