



## OPTIMIZATION AND SENSORY EVALUATION OF NUTRITIVE WEANING FOOD

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### ABSTRACT

*The main aim of the study was to develop the Indian weaning food by the locally available ingredients and to assess its organoleptic acceptability. Four different treatments were prepared using the locally available ingredient namely  $T_1$ ,  $T_2$ ,  $T_3$  and  $T_4$ . The ratio of Wheat flour: Chickpea: Potato: Carrot: linseed (W: Cp: P: C: L) in the treatments were as follows:  $T_1$  (35:30:20:10:5),  $T_2$  (40:25:20:10:5),  $T_3$  (45:25:15:10:5),  $T_4$  (50:20:15:10:5) respectively. The different treatments were subjected to organoleptic analysis for testing various sensory attributes via nine point hedonic scale. The results showed that  $T_2$  was liked very much while  $T_1$ ,  $T_3$  and  $T_4$  were moderately liked by the panel of judges. The results showed significant ( $P < 0.05$ ) difference between the overall acceptability of all the treatments. On the basis of findings, it was concluded that germinated wheat flour, dehydrated carrot flour, dehydrated potato flour, germinated chickpea flour, linseed with jaggery can be used for the preparation of nutritious weaning food, that can be served in the form of porridge.*

**Keywords:** Organoleptic analysis, Sensory attributes, Statistical technique, Weaning food and Weaning period

### INTRODUCTION

Weaning is the process of transition from a purely milk based intake of the child to a semi solid diet for the child. There is a gradual reduction in the intake of breast milk and/or baby

formula and the baby more often starts taking more solid food. It is very important for the baby's health and development. After 6 months, breast milk does not provide all the nutrients that the growing baby needs, in particular iron and calories that solid foods provide. Till the age of 3 to 4 months, the growth is quite normal. After this age, the nutritional needs of the fast growing infant increases but the mother's milk alone cannot meet these needs with the result that growth of infant falters. The commercial ready-to-eat infant foods such as Cerelac, Farex are very expensive, and mothers belonging to low income groups cannot afford to buy them. The mothers belonging to low income group are also working outside the house, and do not have time or facilities to prepare fresh weaning foods three times a day. Poor dietary quality or diversity is a significant contributing factor to malnutrition, specifically, micronutrient deficiencies. Hence, household food insecurity has been identified as a possible underlying determinant of malnutrition among children. The survey found 44.5 percent of the population to be food-insecure. This is a serious situation because food insecurity in infancy can cause growth and development deficits and increase susceptibility to diseases and infections (WFP, 2012). Therefore, to overcome these problems of malnutrition, a study is designed to develop weaning food using locally available ingredients such as wheat, chickpea, linseed, carrot, potato.

## **MATERIALS AND METHODS**

### **Procurement of raw materials:**

Germinated whole wheat flour, germinated chickpea flour, potato flour, carrot flour, linseed flour and jaggery were purchased from the local market of Allahabad district.

### **Preparation of wheat/chickpea flour:**

Wheat/chickpea were cleaned and then washed. They were soaked for 4-6 hours and germinated. After the germination process, the germinated grains were dehydrated and finally grinded to obtain the flour. (Srivastava and Kumar, 2002)

### **Preparation of linseed flour:**

Firstly linseed was cleaned. They were roasted and then grinded to obtain the flour. (Srivastava and Kumar, 2002)

### Preparation of potato/carrot flour:

Potato/carrot were firstly washed then peeled. After peeling they were cleaned to remove the dirt and cut into thin slices. Then they were blanched in 2% salt solution at boiling temperature, 100<sup>0</sup>C for the prevention of browning reaction. The blanched slices of potato/carrot were then spread on trays for dehydration. After dehydration they were grinded to obtain potato/carrot flour. (Srivastava and Kumar, 2002)

### Development of weaning food:

Four different treatments (T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>) were prepared using the locally available ingredients namely whole wheat, linseed, jaggery, chickpea, potato and carrot. The ratio of wheat flour: chickpea: potato: carrot: linseed (W: Cp: P: C: L) in the treatments was used as indicated in the Table 1.

**Table 1:** Treatment and replication of the prepared weaning food

Ingredients Treatments	Germinated Whole wheat flour (%)	Linseed flour (%)	Jaggery (%)	Chickpea flour (%)	Potato flour (%)	Carrot flour (%)
T <sub>1</sub>	35	5	40	30	20	10
T <sub>2</sub>	40	5	40	25	20	10
T <sub>3</sub>	45	5	40	25	15	10
T <sub>4</sub>	50	5	40	20	15	10

**Sensory analysis:** The prepared weaning food was evaluated organoleptically by a panel of five judges of professor rank, selected from Ethelind School of Home Science, SHIATS, Allahabad. The judges were requested to score the products with the help of score cards based on the Nine Point Hedonic Scale (Srilakshmi, 2007).

**Statistical analysis:** The data obtained from sensory evaluation were statistically analyzed by using analysis of variance technique (two way classification) and critical difference test (Gupta and Kapoor 2002).

## RESULTS AND DISCUSSION

All prepared weaning foods were accepted in terms of colour and appearance, consistency, taste and flavour and overall acceptability. Average sensory scores of different parameters in of different treatments of prepared weaning food are shown in Table 2.

**Table 2:** Average sensory scores of different parameters in of different treatments of prepared weaning food

<u>Parameter</u>	<b>Colour and Appearance</b>	<b>Consistency</b>	<b>Taste and Flavour</b>	<b>Overall Acceptability</b>
<u>Treatment</u>				
<b>T<sub>1</sub></b>	8.00±0.00	7.00±0.00	7.66±0.27	7.5±0.08
<b>T<sub>2</sub></b>	8.33±0.27	8.66±0.27	8.66±0.27	8.4±0.07
<b>T<sub>3</sub></b>	8.66±0.27	7.33±0.27	7.00±0.00	7.76±0.19
<b>T<sub>4</sub></b>	6.66±0.27	6.00±0.00	6.00±0.00	7.2±0.08
<b>F<sub>cal</sub></b>	0.933	25.97*	34.25*	10.57*
<b>F<sub>tab</sub></b>	4.76	4.76	4.76	4.76
<b>C. D.</b>	2.850	0.159	0.124	0.07

\*Significant at 0.05 %

The table 1 shows the mean scores of weaning food in relation to colour and appearance which indicates that T<sub>3</sub> (8.66) had the highest score followed by T<sub>2</sub> (8.33), T<sub>1</sub> (8.00), and T<sub>4</sub> (6.66) respectively. Scoring shows that the treatment T<sub>3</sub> was liked very much while T<sub>1</sub>, T<sub>2</sub> and T<sub>4</sub> were moderately liked by the panel of judges. The calculated value of F (0.933) was lesser than the table value of F (4.76) at 5% probability level. Therefore, it is calculated that there is no significant difference between the treatments of colour and appearance. The consistency of weaning food clearly indicates that the treatment T<sub>2</sub> (8.66) had the highest score for the consistency of weaning food followed by T<sub>3</sub> (7.33), T<sub>1</sub> (7.00) and T<sub>4</sub> (6.00) respectively. The calculated value of F (25.97) was greater than the table value of F (4.76) at 5% probability level. Therefore, it is calculated that there is a significant difference between the treatments of consistency. The mean score of taste and flavour of weaning food indicates that treatment T<sub>2</sub> (8.66) held the maximum scores as compared to T<sub>1</sub> (7.66), T<sub>3</sub> (7.00) and T<sub>4</sub> (6.00). The calculated value of F (34.25) was greater than the table value of F (4.76) at 5% probability level. Therefore, it is calculated that there is a significant difference between the treatments of taste and flavour. The mean scores of overall acceptability of weaning food indicate that the treatment T<sub>2</sub> (8.4) scored maximum followed by treatment T<sub>3</sub> (7.76), T<sub>1</sub> (7.5) and T<sub>4</sub> (7.2) respectively. The calculated value of F (10.57) was greater than the table value of F (4.76) at 5% probability level, indicating a significant difference between the treatments of overall acceptability.

The report by **UNICEF, 1998**, indicated that breast milk, even from well-nourished mothers, might be inadequate to meet the nutritional needs of the infant after the first three months of life; hence the need for a supplementary or weaning food. This weaning period is a very

critical period in the life of a child and if not well managed, might lead to malnutrition and other health implications (Tontisrin et al., 1981; Pedersen et al, 1989; Keithod and Udipo, 1999 and Ozumba et al, 2002).

Imtiaz, H. et. al., (2011); also studied the flavor of F<sub>3</sub> weaning food (7.37) was significantly ( $p < 0.05$ ) higher than that of F<sub>1</sub> and F<sub>5</sub> (6.60) for both weaning foods. The mean scores for mouth feel, color appearance, and consistency of weaning foods were significantly different ( $p > 0.05$ ). The mean score for mouth feel (7.40) was highest in F<sub>5</sub> which were significantly different ( $p > 0.05$ ). While the mean scores for colour and appearance for F<sub>3</sub> (7.60) were highest among the all weaning formulations and differed significantly at ( $p > 0.05$ ). The mean score for consistency highest (7.40) in the F<sub>3</sub> formulation significantly different ( $p > 0.05$ ). The overall acceptability score exhibited highest (7.45) in F<sub>3</sub> weaning food followed by F<sub>4</sub> (7.20). Generally the F<sub>3</sub> weaning food was satisfactorily acceptable. Sensory evaluation shows that although five formulations were slight variations in taste, flavour and overall acceptability, all the formulations were liked by the trained panelists.

Raheleh and Ghavidel (2011) reported that weaning food was formulated with 60% roasted wheat flour, 25% germinated lentil flour, 10% skim milk powder and 5% carrot powder was best among the various sensory attributes whereas the formulations of the present study contains about 10% carrot flour and 40% germinated whole wheat flour. Similarly another study was conducted by Livingstone *et. al.* (2007) in which about 60% wheat, 30% chickpea, 5% skim milk powder and 5% sucrose scored good acceptability.

## Conclusion

All the treatments were liked by the panel of judges but the treatment T<sub>2</sub> (germinated whole wheat flour 40%, linseed flour 5%, jaggery 40%, chickpea flour 25%, potato flour 20% and carrot flour 10%) was found the best among all the other treatments. Hence it can be concluded that germinated wheat flour, dehydrated carrot flour, dehydrated potato flour, germinated chickpea flour, linseed with jaggery can be used for the preparation of nutritious weaning food, that can be served in the form of porridge at the household level.

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