

## Development of Wholesome Nutrient Bar from Seasonally Available Fruits of Assam

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### ABSTRACT

**Background:** An experimental study was conducted on development of rich nutrient bar from seasonally available local fruits of Assam.

**Method:** A survey was conducted on the local market of Assam to see the different seasonally available fruits in the market. Among the available fruits, orange; grapes and olive were selected for formulation of the nutrient bars. Fiber rich dry ingredients such as rice flakes, almond, raisin, cashew nut, dates were procured from local markets of Guwahati, Assam. The nutrient bars were developed by trial and error method and an organoleptic evaluation was done for its acceptability.

**Results:** The nutrient bars were developed with six variations viz., A<sub>1</sub> (orange crunchy bar), A<sub>2</sub> (orange soft bar), B<sub>1</sub> (grapes crunchy bar), B<sub>2</sub> (grapes soft bar), C<sub>1</sub> (olive crunchy bar) and C<sub>2</sub> (olive soft bar). The organoleptic evaluation of the products were done for the attributes including appearance, colour, texture, taste and flavour for a period of 0-15 days from formulation.

**Conclusion:** From the overall result of organoleptic evaluation, it was found that the product A<sub>2</sub> was more acceptable in terms of all attributes both by the students and consumers.

**Keywords:** Nutrient bar, Fibre rich, Formulation, Ready to eat snack.

### INTRODUCTION

Human civilization has been undergoing several stages of development from its initial stage. People acquired different techniques to make life easier and comfortable. In case of diets also noticeable changes have been occurred. Though the food habits of the people of different parts of the world are not same, it

is generally seen that people use to incline themselves towards the tasty and delicious foods (Munoz et al, 2007). Therefore, they have been making endeavor to develop new delicious and easily digestible food product with the food articles readily available with them (Kenneth et al., 2013).

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Now a days, several people and nutritionist have been working for new product development from different food articles. To meet the customer's need, the producer should keep an eye on cost, time and quality of the product developed. They should also develop continuous practices and strategies so that the requirements of the customers are fulfilled and thereby increase their market demand. (Krishnan et al., 2001).

Presently, having long shelf life, nutritious and easily digestible foods made from different agricultural products are readily available in the market. Nutrient bars are one of them. By nutrient bar we mean bars made from cereals or fruits by some manual and mechanical methods. Nutrient bars are convenient for fueling the body both before and after work. These are ideal for quick boost of energy and endurance (Parimita *et.al*, 2015). They are one of the ready-to-eat convenient products occupying larger space in the consumer market which not only satisfy the hunger, but prove as a quality source of nutrients and a convenient means of replacement of a meal (Catherine et al., 2012).

These ready to eat nutrient bars perform specific functions and they have many physiological benefits to human being (Paul et al., 2010). In earlier time, these nutrient bar products were largely used by athletes and dieters as a workout aid and meal supplement. But now a days, consumers are become more and more health conscious, but they have less time to prepare healthful meals. Due to which the market demand for “minimally processed” or “lightly processed” foods has rapidly increased (Ajaykumar et al., 2012). Thus, people are reaching for energy and nutrition bars to supplement their regular eating habits. During the last decade, the researches gave importance on the development of nutrient bars, which become very popular all over the world (Supriya et al., 2014).

Keeping view of all these circumstances, a product development attempt

was made for formulation of nutri fruit bar is made with locally and seasonally available fruits from the different markets of Assam, with the title, ‘Development of seasonally available local fruits of Assam’. Though nutri bars made from different products are available in the market, here we try to develop a nutrient bar based on fiber rich locally available fruits.

Present investigation was planned with the following objectives.

- ❖ To conduct a survey on locally available seasonal fruits of Assam.
- ❖ To develop fruit bars from selected seasonal fruit.
- ❖ To standardize the developed product and to conduct an organoleptic evaluation for its acceptability.
- ❖ To evaluate the shelf life of the selected developed products.

## MATERIALS AND METHODS

### SELECTION OF AREA

The study was formulated on the locally available fruits of Assam. Depending upon the climate different seasonal fruits are grown in the state. Some available fruits are orange, grapes, olives, grapefruit, peach, guava, pears, amla, carambola and black berry etc. The survey work of the study was carried out in Guwahati, the capital city of Assam. The market surveyed was done in Narengi, Sixmile and Ganesh guri. Narengi is situated in the North, Sixmile in the East and Ganeshguri in the middle part of the city.

### SELECTION OF MATERIAL

The raw material were selected from local market of Guwahati which consist of rice flakes, dry fruits such as dates, raisins, cashewnuts, almonds etc.

The first half of the study was conducted in the local market of Guwahati for the selection of seasonal fruits of Assam and the second half of the study was conducted in the food laboratory of the Department of Food, Nutrition and

Dietetics of Assam downtown University, Guwahati.

A survey was conducted to find some locally available seasonal fruits of Assam. From the survey it was found that twelve fruits are generally available in different markets of Guwahati, Assam. Among which three fruits i.e. orange, grapes and olive were selected for the development of nutri bars.

#### SAMPLE IDENTIFICATION

Six different nutrient bars were prepared from the juices of three fruits were given code numbers to enable easy identification. From each fruit two varieties of nutri bars were prepared i.e crunchy bar and soft bar. Orange

crunchy bar and orange soft bar were coded as  $A_1$  and  $A_2$ , where as grapes crunchy bar and soft bar were coded as  $B_1$  and  $B_2$  and lastly,  $C_1$  and  $C_2$  were the codes given for olive crunchy bar and soft bar respectively.

#### SAMPLE PREPARATION

The nutrient bar was prepared by using the juice of orange, grapes, olives and dry ingredients were rice flakes, dry fruits such as dates, raisins, cashew nuts and almonds. The nutrient bar was standardized taking the composition of selected fruit juices as-100 ml, rice flakes- 20 gm, dry fruits- 80 gm and sugar-100 gm etc.

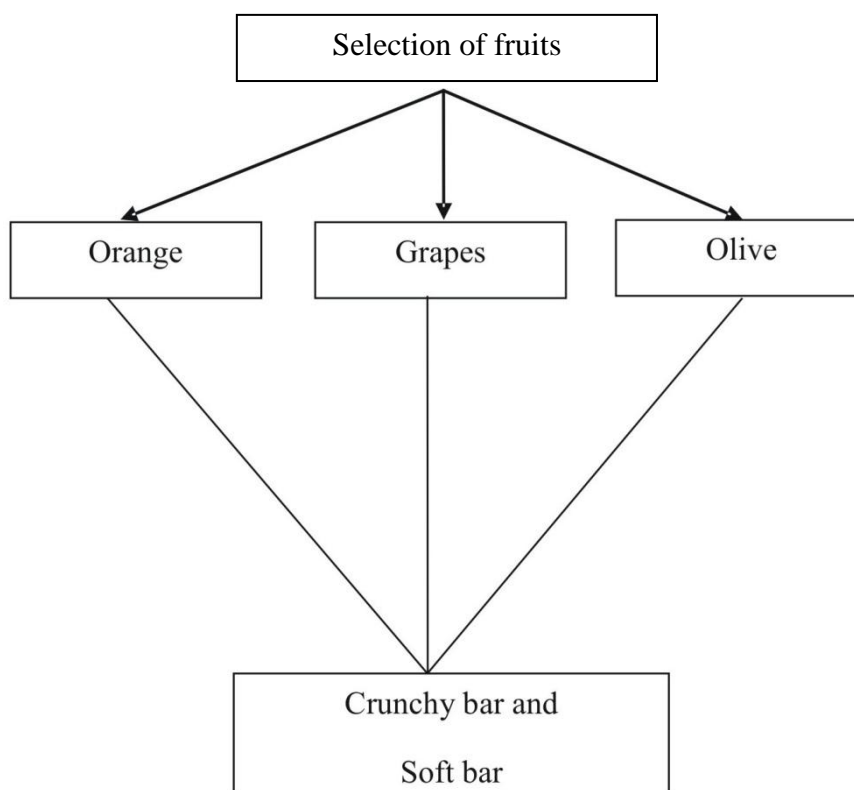


Fig. 1: Formulation of the nutrient bar

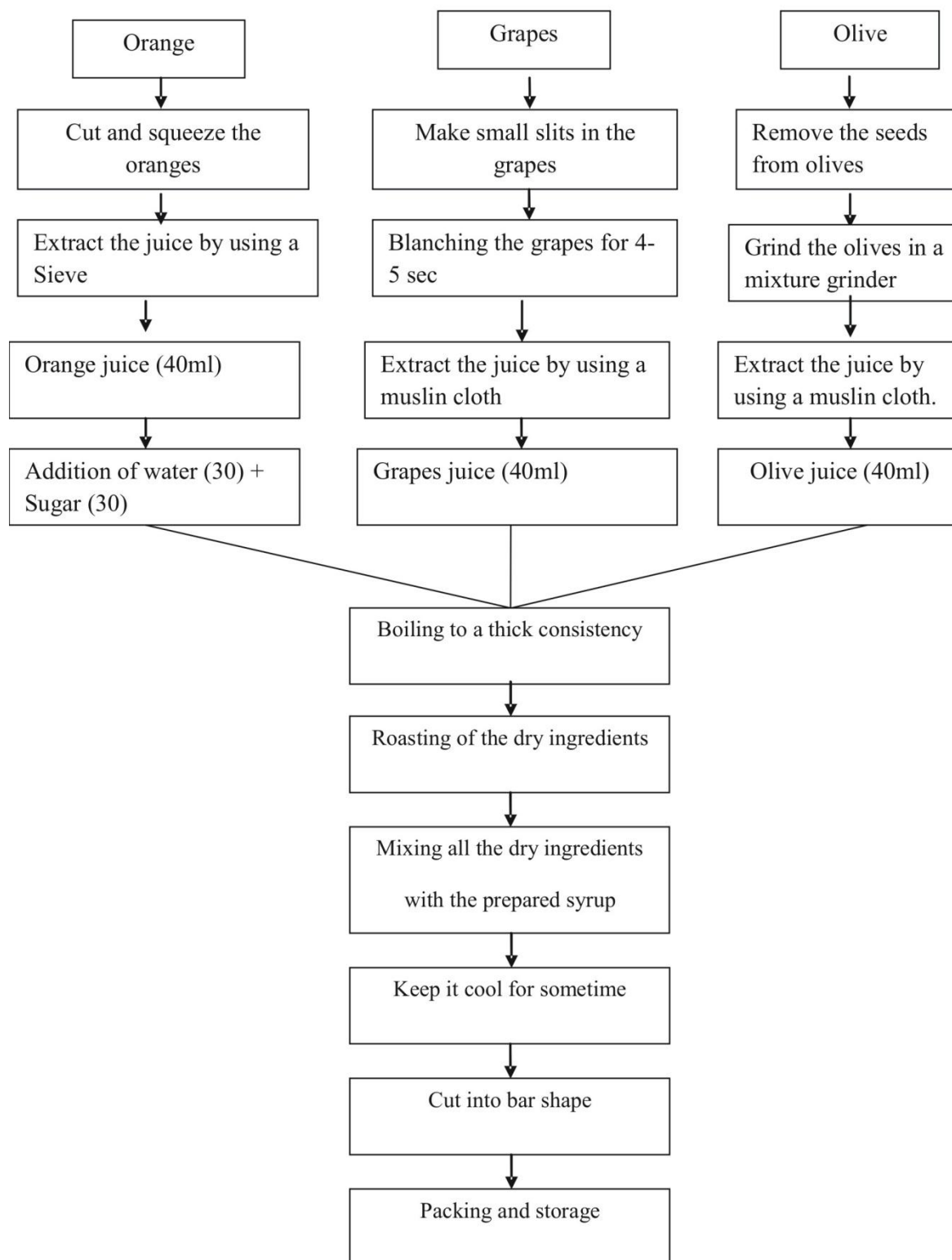
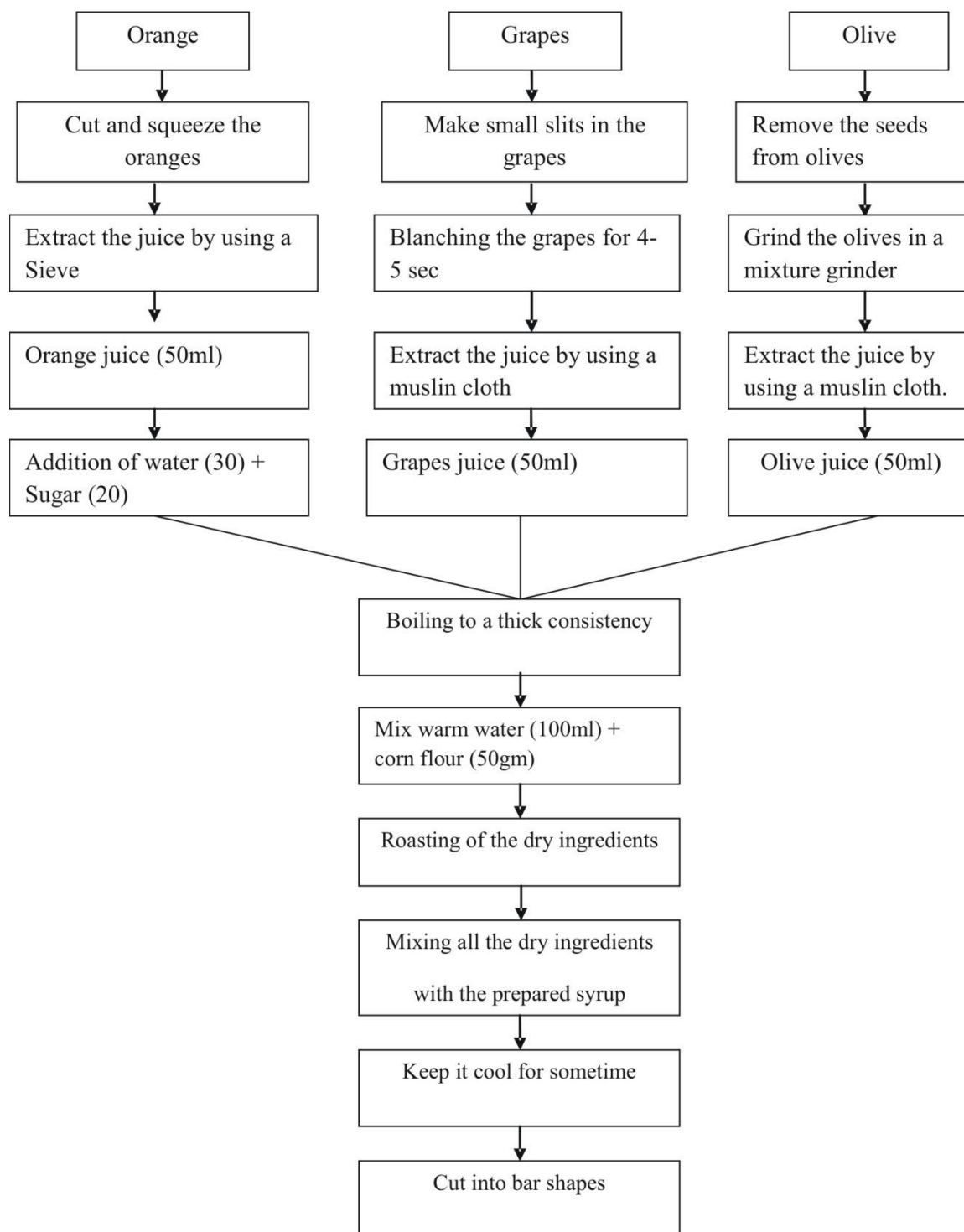


Fig. 2: Formulation of the crunchy fruit bar

**Fig. 3: Formulation of soft fruit bar**

## SAMPLE STORAGE

For the storage of nutrient bars clean cellophane papers were used. Each sample was packed individually with different cellophane papers. Then the packed nutrient bars were kept in an airtight container at room temperature.

## SENSORY EVALUATION OF NUTRIENT BARS

The control nutrient bar and six variations were evaluated just after preparation and within a period of 15 days. Sensory evaluation was performed to judge the acceptability to different formulated products by semi trained panelists, which were the teaching staff and students of the department of food nutrition and dietetics on the basis of 9 point hedonic scale.

## STORAGE STUDY

Thermometer was used for checking the temperature of the nutrient bars. The nutrient bars with control and six variations for organoleptic evaluation was stored in room temperature (26<sup>0</sup> C) for 15 days.

## STATISTICAL ANALYSIS

The data of sensory evaluation were statistically analyzed (Steel et al., 1996).

## RESULTS AND DISCUSSION

### PRODUCT DEVELOPMENT FROM THE SELECTED FRUITS

From the selected fruits, nutrient bar was formulated by using the fruit juices, rice flakes, and dry fruits such as cashew nuts, dates, raisins, and almond. Six variations of the nutrient bars were prepared with three selected fruits such as orange, grapes and olives. The variations are shown in table.

**Table 1: Formation of nutrient bars variation**

Variation	Fruit juice (ml)	Water (ml)	Sugar (gm)	Rice flakes (gm)	Dry fruits (gm)
A <sub>1</sub>	40	30	30	20	80
A <sub>2</sub>	50	30	20	20	80
B <sub>1</sub>	40	30	30	20	80
B <sub>2</sub>	50	30	20	20	80
C <sub>1</sub>	40	30	30	20	80
C <sub>2</sub>	50	30	20	20	80

\*A<sub>1</sub>= Orange crunchy bar

\*A<sub>2</sub>= Orange soft bar

\*B<sub>1</sub>= Grapes crunchy bar

\*B<sub>2</sub>= Grapes soft bar

\*C<sub>1</sub>= Olive crunchy bar

\*C<sub>2</sub>= Olive soft bar

## ORGANOLEPTIC EVALUATION FOR SENSORY ATTRIBUTES AND SHELF LIFE OF NUTRI BAR:

An organoleptic evaluation was done by using 9 point of hedonic scale. The evaluation was done by the semi trained panel of Food Nutrition and Dietetics department of Assam Down Town University and the selected products were further evaluated by the consumers.

### *Organoleptic evaluation by the semi trained panel*

An acceptability test was conducted for the prepared bars in six variations by evaluating the different sensory attributes like appearance, colour, flavor, texture, taste and overall acceptability by semi trained panel consisting of 15 panelists. The semi trained panelists were given 25 gm of each prepared nutrient bars prepared. Nine point hedonic scales was used to evaluate the nutri-bars.

**Table 2: Mean scores obtained of organoleptic evaluation by semi trained panel**

Evaluation chart								
Quality attributes								
Name of the fruits	Processing variables	Days	Appearance	Colour	Texture	Taste	Flavour	Overall acceptability
Orange (A)	Crunchy bar (A <sub>1</sub> )	0 day	7.2 ± 1.09	6.5 ± 0.73	6.7 ± 0.73	7.0 ± 0.69	6.8 ± 1.02	6.0 ± 1.00
		15 day	5.7 ± 0.89	5.2 ± 0.56	5.0 ± 0.56	5.2 ± 0.43	5.1 ± 0.94	4.8 ± 0.89
	Soft bar (A <sub>2</sub> )	0 day	7.5 ± 0.74	7.0 ± 1.15	7.2 ± 1.08	7.4 ± 0.84	6.6 ± 0.72	7.6 ± 0.85
		15 day	6.0 ± 0.65	5.6 ± 0.98	5.4 ± 0.94	5.5 ± 0.72	4.9 ± 0.64	6.0 ± 0.75
Grapes (B)	Crunchy bar (B <sub>1</sub> )	0 day	6.5 ± 1.01	6.4 ± 0.93	6.0 ± 1.54	6.4 ± 1.40	6.8 ± 1.13	5.8 ± 1.51
		15 day	5.2 ± 0.96	5.1 ± 0.84	4.5 ± 1.00	4.8 ± 1.02	5.1 ± 1.03	4.6 ± 1.15
	Soft bar (B <sub>2</sub> )	0 day	7.4 ± 0.93	7.2 ± 0.97	6.8 ± 1.34	7.5 ± 0.82	7.3 ± 1.54	5.8 ± 0.91
		15 day	5.9 ± 0.74	5.7 ± 0.78	4.5 ± 1.00	5.5 ± 0.69	5.1 ± 0.76	4.6 ± 0.81
Olive (C)	Crunchy bar (C <sub>1</sub> )	0 day	6.8 ± 1.09	6.5 ± 1.34	6.1 ± 1.15	7.4 ± 1.23	6.0 ± 0.84	6.5 ± 1.13
		15 day	5.4 ± 0.97	5.2 ± 1.13	5.1 ± 1.13	5.6 ± 1.09	5.4 ± 1.20	5.2 ± 0.99
	Soft bar (C <sub>2</sub> )	0 day	7.2 ± 1.06	7.2 ± 0.97	7.0 ± 1.12	7.1 ± 0.94	7.0 ± 1.26	6.8 ± 1.02
		15 day	5.2 ± 0.98	5.7 ± 0.85	5.2 ± 0.99	5.3 ± 0.79	5.2 ± 1.00	5.4 ± 0.96

\*Data are expressed as mean±Sd

From above result, it was found that out of the six variations, two variations viz., A<sub>2</sub> i.e orange soft bar and B<sub>2</sub> grapes soft bar were highly acceptable among the students surveyed. Therefore, it was decided to take these two products to the consumer and to perform an organoleptic evaluation among them.

#### Organoleptic evaluation by consumer:

The nutri bars were also subjected to organoleptic evaluation by the consumers. The focus group considered was from younger adults to older adults with an age ranging from 18 to 55 years. Total 30 numbers of consumers were selected for the evaluation and they were asked to score products using the score card after testing. They were given 25 gm of each nutrient bars prepared.

**Table 3: Mean scores obtained of organoleptic evaluation by consumer panel**

Evaluation chart						
Processing variables	Quality attributes					
	Appearance	Colour	Texture	Taste	Flavour	Overall acceptability
Orange soft bar (A <sub>2</sub> )	7.8 ± 0.77	7.9 ± 0.87	7.1 ± 1.22	7.7 ± 1.33	7.3 ± 1.10	7.0 ± 1.81
Grapes soft bar (B <sub>2</sub> )	7.6 ± 1.12	7.7 ± 1.20	7.2 ± 1.21	7.5 ± 1.46	7.2 ± 1.43	6.8 ± 1.66

\*Data are expressed as mean±Sd

Table 3 indicated the mean scores of nutri bars for appearance, colour, texture, taste, flavour and consistency. From the mean values it can be said that the product the A<sub>2</sub> i.e. orange soft bar was well accepted by all the panelists. Because, the product was more attractive in terms of its appearance and it has better taste and texture as compared to all the other products prepared.

#### CONCLUSION

With an aim to develop a nutrient rich energy bar from seasonally available local fruits of Assam. As fruits are one of the major sources of fiber and also beneficial to human health, a market survey was done on the locally available seasonal fruits of Assam. Since, the survey was conducted on the winter season there were varieties of fruits were available,

viz orange, grapes, olives, grapefruit, peach, guava, pears, amla, carambola and black berry etc. Out of the different varieties, three fruits such as orange, grapes and olive were selected for the study. The result and findings established that prepared nutrient bars were fiber dense and nutritionally adequate for consumption. The strength of the study is that this nutrient bar can be easily prepared at home and it will be helpful for vulnerable group of people, to correct any nutritional deficiency and enhances the nutritional status.

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