

## UTILIZATION OF HONEY AS SWEETENER FOR THE PREPARATION OF YOGHURT DRINK

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### ABSTRACT

The present investigation was conducted with an objective to study the sensory and chemical quality of honey based yoghurt. The yoghurt was prepared with different levels of honey 6, 8, 10, and 12 percent in treatment T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> and T<sub>5</sub> respectively. On the basis of sensory evaluation the yoghurt prepared with 12 per cent honey T<sub>5</sub> was found superior and accepted extremely by the panel of judges. In respect of chemical composition total solid and titratable acidity of yoghurt drink were increased with increase in level of honey. While fat, protein and ash were decreased with increase in level of honey. The cost of production of 1 kg yoghurt drink was increased with increase in the level of honey. The lowest cost of production (Rs. 46.58) was recorded in case of yoghurt drink prepared with addition of sugar at 10 per cent (T<sub>1</sub>). However, the highest cost of production (Rs.87.48) of yoghurt drink with 12 per cent honey (T<sub>5</sub>) was found is the best treatment selected by panel of judges for sensory evaluation.

**KEYWORDS:** Yoghurt, Honey, Sensory Evaluation, Chemical Composition, Cost of Structure

### INTRODUCTION

Yoghurt is one of the most popular fermented milk products worldwide because it has many health benefits such as improving lactose intolerance, reducing risk of certain cancers, anti-cholesterolaemic effects, prevention of genital and urinary tract infections and other health attributes associated with probiotic bacteria (Mckinley, 2005). Honey has good medicinal and antimicrobial properties and is used in different cuisines. Honey may serve as a natural food preservative due to its antimicrobial properties. Honey in combination with milk provides an excellent nutritional value and it is recommended for use for children as a main source of nutrition (Chen *et al.*, 2000). Honey consists of 80-85 per cent carbohydrate, 15-17 per cent water, 0.3 per cent proteins, 0.2 per cent ashes, minor quantities of amino acids and vitamins as well as other compounds in low levels of concentration. (Cantarelliet *al.*, 2008). Honey is anti-bacterial, anti-fungal and anti-viral and all of these properties make it ideal for healing wounds. It also dries out wounds effectively because of its low water content while its high sugar content keeps microorganisms from growing.

Honey also contains an enzyme that produces the disinfectant hydrogen peroxide when it touches a damp surface like a wound (Kumar *et al.*, 2010). Considering the nutritional qualities of yoghurt and honey the present investigation was

undertaken in department of Animal Husbandry and Dairy Science, Nagpur

## MATERIALS AND METHODS

During the entire study fresh, clean, whole cow milk was obtained from section of Animal Husbandry and Dairy Science, College of Agriculture, Nagpur. The milk was strained through clean muslin cloth and transferred into well cleaned and sterilized flat bottom stainless steel vessel and standardized at 3.5 per cent fat. The standardized milk was sterilized by boiling and cooling at room temperature. The freeze dried curd culture of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* from National Culture Collection Unit, N.D.R.I., Karnal was added in the 1:1 proportion @ 1 per cent to standardized milk. The experimental trials were conducting with five treatments viz; T<sub>1</sub>( 10 percent sugar), T<sub>2</sub>( 6 per cent honey ),T<sub>3</sub> ( 8 per cent honey ) T<sub>4</sub> ( 10 per cent honey ) and T<sub>5</sub> ( 12 per cent honey ) per cent by weight of yoghurt with four replication. The sensory evaluation of honey based yoghurt were carried out by the panel of 6 semi trained judges by adopting 9 point hedonic scale referred by Nelson and Trout, 1964. The chemical analysis was done by adopting A.O.A.C procedures. The cost of production of honey based yoghurt was calculated by considering the running cost of material used and expenses on labor, electricity, LPG and Packaging etc. The prices were as per the prevailing market rates during study period. The combined effect of treatments were assessed by Complete Randomized Design (CRD)

## RESULTS AND DISCUSSIONS

The results obtained from the present investigation are presented below:

### Sensory Evaluation

**Table 1: Sensory Evaluation of Honey Based Yoghurt Drink**

Treatments	Colour and Appearance	Body and Texture	Flavour	Overall Acceptability
T <sub>1</sub> 10 per cent sugar	7.91 <sup>b</sup>	7.76 <sup>b</sup>	7.63 <sup>b</sup>	7.35 <sup>b</sup>
T <sub>2</sub> 06 per cent honey	7.37 <sup>e</sup>	6.75 <sup>e</sup>	6.82 <sup>e</sup>	6.50 <sup>e</sup>
T <sub>3</sub> 08 per cent honey	7.54 <sup>d</sup>	7.11 <sup>d</sup>	7.28 <sup>d</sup>	6.80 <sup>d</sup>
T <sub>4</sub> 10 per cent honey	7.72 <sup>c</sup>	7.41 <sup>c</sup>	7.45 <sup>c</sup>	7.07 <sup>c</sup>
T <sub>5</sub> 12 per cent honey	8.21 <sup>a</sup>	8.17 <sup>a</sup>	8.20 <sup>a</sup>	8.15 <sup>a</sup>
SE ±	0.054	0.060	0.050	0.081
CD @ 5%	0.164	0.182	0.151	0.243

Values with different superscripts differ significantly (P<0.05)

### Colour and Appearance

From table1, it is observed that in respect of colour and appearances the highest score (8.21±0.054) was obtained for treatment T<sub>5</sub> as compared to other treatments. The yoghurt prepared with 12 per cent honey (T<sub>5</sub>) was appreciated highly followed by T<sub>4</sub>, T<sub>3</sub>, T<sub>2</sub> and T<sub>1</sub>. This indicated that increase in the level of honey resulted in better colour and appearance

Body and texture -The mean score of body and texture for honey based yoghurt drink were 7.76, 6.75, 7.11, 7.41 and 8.17 under the treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub>, respectively. The body and texture of yoghurt drink was significantly affected due to addition of honey. The significantly highest score (8.17±0.060) was obtained for the treatment T<sub>5</sub>.

### Flavour

The flavour score for honey based yoghurt drink were 7.63, 6.82, 7.28, 7.45 and 8.20 under the treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub>, respectively. The significantly highest score 8.20±0.050 was recorded for the treatment T<sub>5</sub> with 12 per cent

honey and this treatment seemed to be significantly superior overall the treatments. As increase in the level of honey resulted in increased better flavour score (6.82 to 8.20) proportionately.

### Overall Acceptability

From the table 1, it is revealed that the overall acceptability is the consensus on the overall quality of product. Overall acceptability of the product influenced significantly ( $p < 0.05$ ) by addition of honey as sweetener. The overall acceptability scores of sample T<sub>5</sub> was at higher side (8.15) of all treatments, whereas the treatment T<sub>2</sub> scored the least (6.50). The yoghurt prepared with 12 per cent honey (T<sub>5</sub>) was appreciated highly followed by T<sub>1</sub>, T<sub>4</sub>, and T<sub>3</sub> and T<sub>2</sub>. This indicated that increase in the level of honey resulted in better colour and pleasant flavor of yogurt

### Chemical Composition

Chemical composition of honey based yoghurt drink was evaluated with respect to fat, total solids, protein, titratable acidity and ash in table 2.

**Table 2: Chemical Composition of Honey Yoghurt Drink**

Treatments	Fat	Total solids	Protein	Titratable acidity	Ash
T <sub>1</sub> 10 per cent sugar	3.43 <sup>a</sup>	20.17 <sup>e</sup>	3.24 <sup>a</sup>	0.78 <sup>e</sup>	0.77 <sup>a</sup>
T <sub>2</sub> 06 per cent honey	3.33 <sup>b</sup>	20.77 <sup>d</sup>	3.17 <sup>b</sup>	0.81 <sup>d</sup>	0.74 <sup>b</sup>
T <sub>3</sub> 08 per cent honey	3.27 <sup>c</sup>	21.92 <sup>c</sup>	2.92 <sup>c</sup>	0.84 <sup>c</sup>	0.68 <sup>c</sup>
T <sub>4</sub> 10 per cent honey	3.19 <sup>d</sup>	22.39 <sup>b</sup>	2.82 <sup>d</sup>	0.88 <sup>b</sup>	0.63 <sup>d</sup>
T <sub>5</sub> 12 per cent honey	3.09 <sup>e</sup>	23.26 <sup>a</sup>	2.76 <sup>e</sup>	0.90 <sup>a</sup>	0.59 <sup>e</sup>
SE ±	0.013	0.110	0.02	0.006	0.009
CD @ 5 %	0.040	0.331	0.060	0.020	0.028

Values with different superscripts differ significantly ( $P < 0.05$ )

### Fat Content

The mean fat per centage in honey yoghurt drink was 3.43, 3.33, 3.27, 3.19 and 3.09 per cent in treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> respectively. The highest fat percentage was noticed in treatment T<sub>1</sub> (i.e. 3.43) percent and lowest fat was in treatment T<sub>5</sub> (3.09) per cent the results indicated that with the increase in level of honey, there was significant reduction in fat percentage of yoghurt drink. This might be due to the fact that the negligible amount of fat content in honey as compared to the fat content in milk.

### Total Solids

The average total solids contents of yoghurt drink in treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> were 20.17, 20.77, 21.92, 22.39 and 23.26 per cent, respectively. The total solids percentage was significantly highest (23.26 per cent) in yoghurt drink prepared with addition of 12 per cent honey (T<sub>5</sub>), while total solids content was lowest (20.17 per cent) in yoghurt drink prepared without addition of honey (T<sub>1</sub>). It was noticed that total solids content of yoghurt drink was significantly increased with the addition of honey. It was seen that as the level of honey increases, there was an increase in content of total solids in yoghurt drink. This might be due to higher total solids content of honey.

### Protein Content

The Protein content in yoghurt drink was ranged from 2.76 to 3.24 percent. The yoghurt prepared with 10 per cent sugar (T<sub>1</sub>) had highest protein content (3.24 %) while yoghurt prepared with 12 per cent honey (T<sub>5</sub>) had lowest protein

content (3.24 %). Protein content in the yoghurt drink was decreased as the addition of the honey increased. This might be due to the negligible amount of protein content in honey as compared to milk.

### Titrateable Acidity Content

The average score for acidity content in yoghurt drink under treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> were 0.78, 0.81, 0.84, 0.88 and 0.90 per cent, respectively. The highest percentage of acidity was noticed in treatment T<sub>5</sub> (0.90 per cent) and lowest percentage of acidity was observed in treatment T<sub>1</sub> (0.81 per cent). The level of honey increased the acidity of yoghurt also increased. This might be due to honey is in acidic nature.

### Ash Content

Ash content in yoghurt drink under treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> were 0.77, 0.74, 0.68, 0.63 and 0.59 per cent, respectively. The ash content in yoghurt drink was highest in treatment T<sub>5</sub> (0.77 per cent) and lowest ash (0.59 Per cent) recorded in treatment T<sub>1</sub>. It indicates that as the level of honey increased in yoghurt the ash content was decreased significantly. This might be due to the low content of mineral in honey.

### Cost of Production

The list of items of expenditure and their contribution for calculating per liter cost of honey based yoghurt tabulated in Table 3. The cost of production of, honey based yoghurt worked out by taking into account prevailing markets rates of various inputs.

**Table 3: Cost of Production of, Honey Based Yoghurt**

Sr.No	Material	Rates Rs. Kg/Lit	Quantity Used for Different Treatment and its Cost									
			Treatments									
			T <sub>1</sub>		T <sub>2</sub>		T <sub>3</sub>		T <sub>4</sub>		T <sub>5</sub>	
		Wt	Price	Wt	Price	Wt	Price	Wt	Price	Wt	Price	
1	Milk	40	1	40	1	40	1	40	1	40	1	40
2	Culture	110	10 gm	2.00	10 gm	2.00	10 gm	2.00	10 gm	2.00	10 gm	2.00
3	Honey	280	-	-	60 gm	16	80 gm	22.00	100gm	28.58	120gm	34.00
4	Sugar	40	100 gm	4.00	-	-	-	-	-	-	-	-
5	Other charges Electricity and fuel	110/hr		10.00		10.00		10.00		10.00		10.00
6	Cost/1 lit	-	-	56	-	68	-	74	-	80.58	-	86.34

Cost of production of 1 kg. Yoghurt drink prepared yoghurt drink under various treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> were Rs.56.00 Rs.68.00 Rs.74.00, Rs.80.58 and Rs.86.34, respectively. The cost of production increase with increase with increased levels of honey. Lowest cost of production (Rs.56.00) was recorded in case of yoghurt drink prepared with addition of sugar at 10 per cent (T<sub>1</sub>). However, the highest cost of production (Rs.86.34) of yoghurt drink with 12 per cent honey... These differences were mainly because of more cost of honey.

### CONCLUSIONS

The good quality honey based yoghurt prepared with 12 per cent honey was found superior and accepted extremely by the panel of judges. In respect of chemical composition total solid and titrateable acidity of yoghurt drink were increased with increase in level of honey. While fat, protein and ash were decreased with increase in level of honey. The cost of production of 1 kg yoghurt drink was increased with increase in the level of honey.

## ACKNOWLEDGEMENTS

Authors are grateful to Department of Animal Husbandry and Dairy Science, College of Agriculture, Nagpur for giving the good guidance for doing the research work.

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