

UTILIZATION OF HONEY AS SWEETENER FOR THE PREPARATION OF COW MILK LASSI

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ABSTRACT

The present investigation entitled “Utilization of honey as sweetener for the preparation of cow milk lassi” was undertaken during the year 2014-2015 at Animal Husbandry and Dairy science section, college of agriculture, Nagpur. Milk was standardized to 3.5 per cent fat and used for preparing dahi. Then lassi prepared with addition of sugar at 15% (T₁) and honey @ 10% (T₂), 12% (T₃) and 14% (T₄) by weight of dahi. The product was analyzed for chemical composition like fat, protein, total solids, titratable acidity, ash and moisture as well as for sensory attribute like colour and appearance, body and texture, flavour and overall acceptability. The cost of production was also calculated by considering the retail market prices of different ingredients used. The data revealed that total solid (%) of lassi were increased with increase in level of honey. While fat (%), protein (%), titratable acidity (%), ash (%) and moisture (%) were decreased with increase in level of honey. The fat content was decreased from 3.42 to 3.27 per cent, total solids content decreased from 17.30 to 21.34 per cent, protein content decreased from 3.10 to 2.62 per cent, titratable acidity decreased from 0.85 to 0.76, ash content decreased from 0.70 to 0.53 and moisture content decreased from 82.70 to 78.66 per cent respectively. The significantly highest score for colour and appearance (8.16 out of 9), body and texture (7.79 out of 9), flavour (7.89 out of 9) and overall acceptability (8.38 out of 9) were obtained in lassi containing 12 per cent of honey. The cost of production of lassi was increased with increase in the level of honey. The cost of production was higher with 14 per cent honey level (Rs. 93.78 kg⁻¹) while cost of the lassi prepared by blending with 12 parts of honey level was Rs. 86.86 kg⁻¹.

(Key words: Plain lassi, lassi blended with honey as sweetener, physicochemical parameters, sensory attributes, cost structure)

INTRODUCTION

Lassi is popular indigenous fermented milk beverage, which is usually prepared by mixing dahi and water in required proportions. The fermented milk products are prepared by the action of micro-organisms by adding starter culture, which modifies the substrates biochemically, and organoleptically into edible products and are thus, generally, palatable, safe and nutritious (Pawar *et al.*, 2010).

Lassi is described as a fermented milk beverage obtained after the growth of selected culture, usually *Lactis streptococci* in boiled and then cooled whole or partially skimmed milk followed by sweetening with sugar and blended with flavour. (Krishna *et al.*, 2013).

Ayurveda acknowledges honey as a wonder medicine capable of providing longevity. Osteoporosis is another condition, which can be prevented by taking honey regularly. Modern researches have underpinned the wonderful effects of honey, proving honey to be effective against advanced cases of stomach and bone cancer. Honey has several antioxidants, effective against cancer growth. You can take honey alone or with milk or water, with or without a pinch of cinnamon powder. Make honey a habit,

it will keep you healthy, strong and fruitful. Honey is anti-bacterial, anti-viral and anti-fungal, 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 because of the quality and sometimes mystical reputation and characteristics of most honey, their addition to other products usually enhances the value or quality of secondary products. In particular, the relatively new industry of “natural”, health and biological products uses honey abundantly as the sweetener of first choice, together with non refined sugar in substitution of refined sucrose from cane/beet sugar, (Krell, 1996), that produces the disinfectant hydrogen peroxide when it touches a damp surface like a wound (Kumar *et al.*, 2010).

Therefore, it was planned to study on utilization of honey as sweetener for the preparation of cow milk lassi with the objectives to standardize the acceptable level of honey along with physicochemical quality and its cost structure.

MATERIALS AND METHODS

The present investigation entitled “Utilization of

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honey as sweetener for the preparation of cow milk lassi” was undertaken during the year 2014-2015 at Animal Husbandry and Dairy Science section, College of Agriculture, Nagpur. 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 to room temperature. The freeze dried curd culture of *Streptococcus Lactis* and *Streptococcus cremoris* obtained from National Culture Collection Unit, N.D.R.I., Karnal was added in the 1:1 proportion @ 1 per cent to standardized milk. Then lassi was prepared with addition of sugar at 15% (T₁), honey 10% (T₂), 12% (T₃) and 14% (T₄) by weight of dahi. Honey available in the market was used as sweetener for the preparation of lassi. Clean crystallized sugar purchased from local market.

Thus, there were four treatments which were replicated 5 times. The content of lassi due to addition of sugar or honey was by weight into weight basis. e.g. For preparation of plain lassi, 15 g sugar was added to 85 g dahi.

Method of preparation of lassi used was as suggested by Aneja (1994), who developed a process for conversion of milk into lassi with a view of modernizing traditional methods. Fat content in lassi was determined by Rose Gottlieb method as per SP: 18 (part XI) (Anonymous, 1981a). The total solid percentage in lassi was determined by using gravimetric method as described in BIS Hand book of Food Analysis of Dairy products in SP: 18 part XI (Anonymous, 1981b). The protein content in lassi was determined as per the procedure recommended in IS: 1479 (Part II), (Anonymous, 1961). Acidity percentage of lassi was determined as per the procedure recommended in BIS Hand book for Food Analysis of Dairy products in IS: 1166 (part I) (Anonymous, 1973). Ash content of lassi was determined as per the procedure recommended in Hand book of Food Analysis of Dairy Products in SP: 18 part XI (Anonymous, 1981c). Moisture content in the sample was determined by subtracting the total solids content from 100 in the sample.

The quality of lassi was judged by sensory evaluation in respect of body and texture, flavour, colour and appearance and overall acceptability by a trained sensory panel (minimum of 6 members) on a 9-point hedonic scale as prescribed by Amerine *et al.* (1965).

The experiment was laid out in CRD with 4 treatments and 5 replications. The data obtained was analyzed statistically according to method described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Chemical quality of lassi was evaluated with respect to fat, total solids, protein, titratable acidity, ash and moisture content and data are presented in table 1.

Fat content

The fat percentage was significantly highest (3.42 per cent) in lassi prepared without addition of honey (plain lassi) i.e. addition of 15% sugar. While fat content was the lowest (3.27 per cent) in lassi prepared with addition of 14 per cent honey. The results indicated that with the increase in level of honey, there was significant reduction in fat percentage of lassi. This may be due to the fact that fat content of honey was considerably less as compared to the fat content in dahi. Shuwu *et al.* (2011) observed that with the increase in the levels of honey, there was proportionate decrease in the level of fat content in lassi. Thus, the present results agree with their revelations.

Total solids content

The total solids percentage was significantly highest (21.34 %) in lassi prepared with addition of 14 per cent honey while total solids content was the lowest (17.10 %) in lassi prepared without addition of honey. The statistical analysis showed that total solids content of lassi 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 lassi. This might be due to higher total solid contents of honey. The result obtained in present study are in agreement with the results reported by Shuwu *et al.* (2011), who noted that with the increase in the levels of honey, there was proportionate increase in the level of total solids content in lassi. Jangale (2011) reported that with the increase in the custard apple pulp level, there was proportionate increase in the total solids content of lassi.

Protein content

The protein percentage was significantly highest (3.10 %) in the lassi prepared without addition of honey, while protein content was the lowest (2.60 %) in lassi prepared with addition of 14 per cent honey. It was observed from the present study that as in the level of honey increased, there was decrease in the protein content in the lassi. Shuwu *et al.* (2011) reported that with the increase in the levels of honey, there was proportionate decrease in the level of protein content in lassi. Labade (2007) also reported that with the increase in the levels of pineapple pulp, there was proportionate decrease in the level of protein.

Titratable acidity content

The acidity percentage was the highest (0.85 %) in lassi prepared without addition of honey while acidity content was the lowest (0.76 %) in lassi prepared with addition of 14 per cent honey. It was observed that addition of different levels of honey did not significantly affect the level of acidity of lassi, but there was a declining trend in the acidity level with increase in honey content. Shuwu *et al.* (2011) reported that with the increase in the levels of honey, there was proportionate decrease in the level of titratable acidity content in lassi.

Ash content

The ash percentage was the highest (0.70 %) in

lassi prepared without addition of honey, while ash content was the lowest (0.53 %) in lassi prepared with addition of 14 per cent honey. It was observed that with the increase in the level of honey in lassi, there was decrease in the ash content. This may be due to the low content of minerals in honey. The results of present study agree with the results of Shuwu *et al.* (2011). They reported that with the increase in the levels of honey, there was proportionate decrease in the level of ash content in lassi.

Moisture content

The moisture percentage was significantly highest (82.70 %) in lassi prepared without addition of honey while moisture content was the lowest (78.66 %) in lassi prepared with addition of 14 per cent honey. It was observed that with increase in the level of honey in lassi, there was decrease in the moisture content. Shuwu *et al.* (2011) also earlier reported that with the increase in the levels of honey, there was proportionate decrease in the level of moisture content in lassi. Rashid and Thakur (2012) reported that with the increase the percentage of honey, there was proportionate decrease in the level of moisture content in yoghurt.

Sensory evaluation of lassi

The data with respect to sensory evaluation of lassi are presented in table 2.

Colour and appearance score

The highest score (8.16 out of 9) was obtained by lassi with 12 per cent honey followed by 14 per cent honey blended lassi (7.89). The remaining two treatments 10 per cent addition of honey and 15 per cent sugar had significantly low score. Hence, it indicated that increase in the level of honey resulted in better colour and appearance of lassi up to 12 per cent addition of honey and there after it decreased proportionately.

Body and texture

The body and texture of lassi was significantly affected due to addition of honey. The significantly highest per cent of honey followed by lassi prepared with 14 per cent honey (7.49). From the results obtained, it is revealed

that as the levels of honey increased, the score for body and texture of lassi also increased upto 12 per cent honey and thereafter, it decreased gradually. It was also lower in sugar added plain lassi and lassi prepared with 10 per cent honey.

Flavour

Significantly highest score (7.89 out of 9) was obtained by lassi prepared with 12 per cent honey followed by lassi prepared with 14 per cent honey (7.57). Hence, it indicated that increase in the level of honey resulted in better flavour of lassi upto 12 per cent honey addition.

Overall Acceptability

The overall acceptability of lassi was significantly affected due to addition of honey at different levels. The average score for overall acceptability attributes of lassi prepared under each treatment ranged from 6.52 to 8.38. The significantly highest score of 8.38 was received by lassi prepared with addition of 12 per cent of honey which was superior to remaining treatments. Hence, it is inferred that increase in the level of honey resulted in better overall acceptability score of lassi up to 12 per cent addition of honey and thereafter, it decreased proportionately.

Cost of production

The data presented in table 2 indicated that cost of production of kg⁻¹ lassi prepared with addition of sugar at 15% (T₁), honey @ 10% (T₂), honey @ 12% (T₃) and honey @ 14% (T₄) was Rs. 46.24, 79.94, 86.86 and 93.78 respectively. The increase in the level of honey showed the increase in cost of production. These differences were mainly because of cost of honey.

The lowest cost of production Rs. 46.24/- kg⁻¹ was calculated in case of lassi prepared with addition of sugar at 15 per cent treatment. The highest cost of production (Rs. 93.78/- kg⁻¹) was recorded in case of lassi prepared with addition of 14 % honey. However, the cost of production of lassi prepared with 12 % honey was found to be Rs. 86.86/- kg⁻¹ which was the best treatment selected by judges for sensory evaluation.

Table 1. Chemical composition of honey lassi

Treatments	Fat	Total solids	Protein	Titrateable acidity	Ash	Moisture
T ₁ 15 per cent sugar	3.42 ^a	17.30 ^d	3.10 ^a	0.85	0.70 ^a	82.70 ^a
T ₂ 10 per cent honey	3.36 ^b	18.21 ^c	2.91 ^b	0.82	0.64 ^b	81.79 ^b
T ₃ 12 per cent honey	3.31 ^c	20.11 ^b	2.80 ^c	0.79	0.59 ^c	79.89 ^c
T ₄ 14 per cent honey	3.27 ^d	21.34 ^a	2.62 ^d	0.76	0.53 ^d	78.66 ^d
SE ±	0.008	0.09	0.05	0.04	0.002	0.30
CD @ 5 %	0.026	0.28	0.16	—	0.007	0.89

Values with different superscripts differ significantly (P<0.05)

Table2. Table for sensory evaluation of lassi as affected by different levels of honey

Treatments	Colour and appearance	Body and texture	Flavour	Overall acceptability
T ₁ 15 per cent sugar	7.49 ^d	7.18 ^d	7.01 ^d	6.52 ^d
T ₂ 10 per cent honey	7.69 ^c	7.28 ^c	7.27 ^c	7.13 ^c
T ₃ 12 per cent honey	8.16 ^a	7.79 ^a	7.89 ^a	8.38 ^a
T ₄ 14 per cent honey	7.89 ^b	7.49 ^b	7.57 ^b	7.34 ^b
SE(m)	0.15	0.14	0.08	0.03
CD@ 5 %	0.45	0.42	0.24	0.10

Values with different superscripts differ significantly (P<0.05)

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Rec. on 01.05.2016 & Acc. on 30.05.2016