**DEVELOPMENT OF PAPAYA AND CARROT ENRICHED MILK SHAKE AND ITS SENSORY EVALUATION**

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ABSTRACT

The present experiment has been undertaken to assess the optimisation of process of preparation of papaya and carrot enriched milk shake and its overall acceptability. Four treatment groups were formed i.e. Control (100% by weight of buffalo milk), T-1 (5% papaya+5%

carrot+90% buffalo milk), T-2 (10% papaya+5% carrot+85% buffalo milk) and T-3 (10% papaya+10% carrot+80% buffalo milk). From the four treatment groups the T-1 group showed significantly ($P<0.5$) higher results in consistency, mouth feel and overall acceptability and non significant ($P>0.05$) results in colour, flavour values compared to control group. So therefore it can be concluded that up to 5% papaya and 5% carrot could be incorporated to get effective results in overall acceptability of the milk shake among the consumers.

KEYWORDS: Papaya and Carrot, Milk shake, Sensory evaluation, Buffalo milk.

INTRODUCTION

Our country stands first in milk production at present with production of 137.7 million tonne with 51% contribution from buffaloes and population of buffaloes is 108.7 million numbers as per BAHS (2015). Though most of the Indian farmers from rural area are rearing buffaloes but there is no proportionate achievement in milk products. Simple technology driven milk products will give the opportunity for the farmers to earn financial stability in life and to become support to their family and also to utilise maximum in case of surplus milk at their hand. There will be more attraction arises in consumers towards a product when there is some new things will be introduced with the known traditional one. Various fruits, nuts and vegetables play a very important part in human nutrition, especially as sources of vitamins (C, A, B⁶, thiamine, niacin, E), minerals, and dietary fiber according to Wargovich (2000). Carrot, beet, turnip, and potato are some of the examples of root vegetables and among them yellow and orange varieties are rich in β -carotene which is the precursor of vitamin A. According to Bazilla et al. (2012) carrot is a rich source of - Carotene and vitamins like thiamine, riboflavin, vitamin B-complex and minerals. Besides this carrot are having antioxidant and anti-cancer activities according to Mridula (2011). Papaya contains vitamin C ranged from 60 to 84 mg/100 g as per Franke et al. (2004). Due to absence of cholesterol content in papaya (*Carica papaya L.*) as per Bose (1985) ripe papaya can be helpful in curing disease like piles and reduces the risk of cardio vascular diseases. Therefore with an objective of assessing the overall acceptability of healthy papaya and carrot milk shake, this experiment has been undertaken.

MATERIALS AND METHODS

Papaya and carrot enriched milk shake was prepared by the method of Pakalwad et al. (2010) with little modifications. Buffalo milk was standardised and sodium alginate was added as stabilizer for the milk shake. The processing steps are provided in the Table-1. The design of experiment is given in Table-2. Then the milk shake was subjected to sensory evaluation using nine-point hedonic scale as per Gupta (1999) by the consumers of the local area and those consumers were semi trained for proper judgement in sensory evaluation. The particulars studied were colour, flavour, consistency, mouth feel and overall acceptability. The data obtained in this study were analysed statistically in SPS software (version 20.0) as per the methods outlined by Snedecor and Cochran (1994). The significance between the treatments groups were analysed by the One Way Anova Test.

RESULTS AND DISCUSSION

The sensory characteristics such as colour, flavour, consistency, mouth feel and overall acceptability of papaya and carrot milk shake was presented in Table-3 and figure-1 with test of significance.

Colour

There was non-significant ($P > 0.05$) difference observed in colour value from control to treatment groups. However, control and T-3 group were comparable having values (8.00 ± 0.70) and (7.89 ± 0.60) respectively, whereas T-2 group was having lowest colour value i.e. (7.67 ± 0.70). Addition of papaya and carrot did not affect the colour of milk shake and this result was not in accordance with Pakalwad *et al.* (2010), but the value of colour obtained in this experiment is in agreement with Banigo *et al.* (2015) who reported a good colour value at the incorporation of 10% carrot in the soy/carrot drink flavoured with beetroot.

Flavour

There was non-significant ($P > 0.05$) difference observed in flavour value from control to treatment groups. However, control and T-2 group were comparable and T-3 group was having lowest colour value i.e. (7.78 ± 0.44) whereas T-1 was having highest flavour value (8.44 ± 0.53). Delays between times of harvest and time of consumption or processing could be one of the reasons of difference in flavour according to Lee and Kader (2000).

Consistency

There was significant ($P < 0.05$) difference observed in consistency value from control to treatment groups. However, T-1 was having highest i.e. (8.55 ± 0.53) and T-2 group was having lowest consistency value of (7.78 ± 0.44). This could be due to equal concentration of papaya pulp and carrot in milk.

Mouth feel

There was significant ($P < 0.05$) difference observed in mouth feel value from control to treatment groups. However, T-1 was having highest value of (8.33 ± 0.50) and T-3 group was having lowest mouth feel value i.e. (7.44 ± 0.53). This result is in agreement with Banigo *et al.* (2015). This might be due to the gritty nature of carrot in 10% addition in milk.

Overall acceptability

There was significant ($P < 0.05$) difference observed in overall acceptability value from control to treatment groups. However, T-1 was having highest value of (8.22 ± 0.45) and T-3 group was having lowest mouth feel value i.e. (7.56 ± 0.53). It was observed that as inclusion level of carrot and papaya increased in milk shake, the acceptability decreases and this result was in agreement with Pakalwad *et al.* (2010) who reported that the addition of higher proportion of papaya pulp in the blend scored towards lower values by a panel members and not in agreement with Hingane P *et al.* (2016) who reported the highest overall acceptability of papaya milk shake from cow milk with 15% inclusion of papaya ingredient.

Table 1: Preparation procedure of papaya and carrot enriched milk shake.

S. No.	Steps to be follow
1	Papaya and carrot cleaned properly
2	Pulp made from both
3	Heat at 70 degree centigrade for 20 minutes
4	Store in refrigerator
5	Buffalo milk taken in container and papaya and carrot added @ 5%, 10%.
6	Sugar added @ 20%
7	Packed in bottle and cooked in water bath at 5 minutes in 80 degree centigrade.
8	Chilling of bottle and kept until use.

Table 2: Design of experiment.

Treatment	Composition
Control	100% by weight of buffalo milk
T-1	5% papaya+5% carrot+90% buffalo milk
T-2	10% papaya+5% carrot+85% buffalo milk
T-3	10% papaya+10% carrot+80% buffalo milk

Table 3: Sensory evaluation of Carrot and papaya milk shake.

Treatment	Control	T1	T2	T3	F value
Colour	$8.00^{ab} \pm 0.70$	$8.33^b \pm 0.50$	$7.67^a \pm 0.70$	$7.89^{ab} \pm 0.60$	1.72 ^{NS}
Flavour	$7.89^{ab} \pm 0.60$	$8.44^b \pm 0.53$	$8.11^{ab} \pm 0.78$	$7.78^a \pm 0.44$	2.15 ^{NS}
Consistency	$8.22^{ab} \pm 0.44$	$8.55^b \pm 0.53$	$7.78^a \pm 0.44$	$7.89^a \pm 0.60$	4.32*
Mouth feel	$8.00^{ab} \pm 0.50$	$8.33^b \pm 0.50$	$7.67^a \pm 0.70$	$7.44^a \pm 0.53$	4.26*
Overall acceptability	$8.11^b \pm 0.33$	$8.22^b \pm 0.45$	$7.89^{ab} \pm 0.33$	$7.56^a \pm 0.53$	4.48*

No. of samples-9, means bearing different superscripts differ significantly.

* = significant ($P < 0.05$), ** = highly significant ($P < 0.01$), NS = Non-significant ($P > 0.05$).

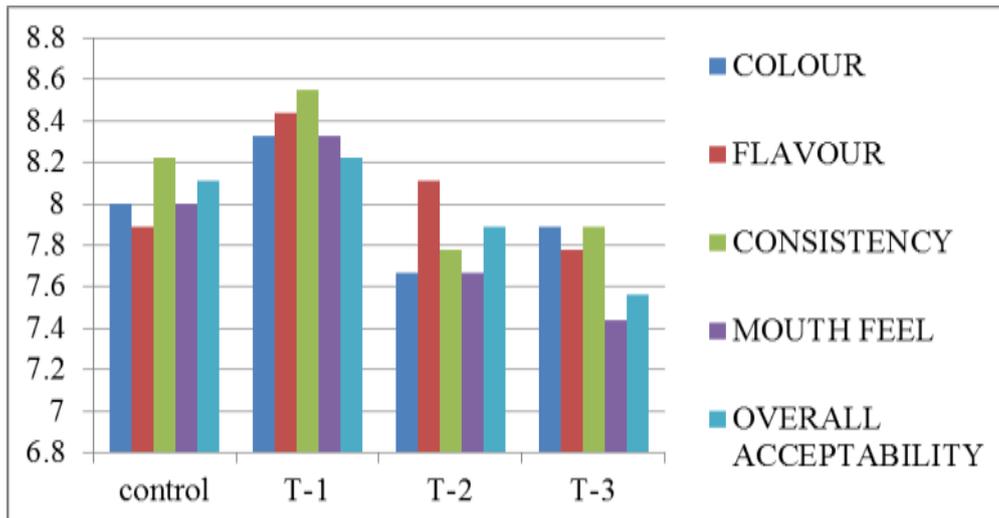


Figure 1: Variation in sensory particulars of papaya and carrot enriched milk shake.

CONCLUSION

Incorporation of papaya and carrot increased the quality of milk shake but the incorporation of higher amount of papaya and carrot decreases the overall acceptability of milk shake. As the T-1 was having highest value in all the sensory characteristics it can be concluded that 5% papaya and 5% carrot enriched milk shake is acceptable among consumers.

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