Journal of Pharma Research
Available online through
www.jprinfo.com

Research Article
ISSN: 2319-5622

Sensory Evaluation of Herbal Ghee prepared with different levels of Drum stick (*Moringa oleifera*) Leaves and Arjuna (*Terminalia arjuna*) Bark powder

Mohammad Ibrahim[1*], John David[2], Saiyyad Alamdar Husain[1], Mohd Nayeem Ali[1], Pragati Srivastava[1], Shahnawaz Sameem[3]

[1]Research Scholar, [2]Professor; [1&2]Warner school of food and Dairy Technology;
[3]Research Scholar, Faculty of Health Sciences, Christian School of Pharmacy,
Sam Higginbottom Institute of Agriculture Technology & Science (Deemed to be University) Allahabad, Uttar Pradesh – 211007, INDIA.

Received on: 26-10-2015; Revised and Accepted on: 02-11-2015

ABSTRACT

Herbal ghee was prepared by incorporating medicinal herbs. Arjuna and Moringa are popular medicinal plant and contain antimicrobial and nutritional value. Arjuna is effective for a variety of heart related conditions like high blood pressure, heart palpitations, rapid heartbeat and high cholesterol M. oleifera leaves are highly nutritious. Reports related to their herbs are very encouraging and indicate that there should be studied more extensively for their therapeutic benefits. The present study was carried out to find the sensory attributes of herbal powder inclusion in the ghee. The result shows that 0.5% level of Arjuna and 1% level of Moringa were best and highest in sensory evaluation.

Keywords: *Sensory evaluation, Drum stick, Arjuna, Herbal ghee.*

INTRODUCTION

Buffalo milk is a totally natural product that can be consumed like any other milk. Buffalo milk is nearly twice as rich in fat as compared to cow milk and the most important fraction responsible for its high energetic and nutritive value. Verrocchio *et, al*., (2007) reported the fact that the fat content has an average value of 8.3% but can also reach up to 15% under normal conditions. Tonhati *et al*., (2011) found the fat yield was 90.1±24·6 g.kg-1.

Ghee is a fat-rich dairy product, widely used in India from ancient time. It has been an integral part of our culture. It is mainly used as food and flavouring ingredient. But ghee contains cholesterol, which is one of the suspected culprits for heart disease and diabetes. Hence, health-conscious people are scared of taking ghee. To alleviate this fear, the present study was undertaken to develop a process for herbal ghee, i.e. Arjuna and Moringa ghee, with functionalities like resistance to heart diseases, property to regulate blood pressure, increase immunity of human health. Parmar *et, al.,* (2013) reported that ethanolic extract of *Arjuna* bark increased the shelf life of ghee as compare to control sample during storage at 80^0 C. Their findings also suggested that freshly prepared ghee from cow milk added with Arjuna bark had good potentiality to act as free radical scavenger. The application of medicinal plants to maintain health and treat disease started since time immemorial and still is a part of medical practice.

Terminalia arjuna is a tree with simple leaf, smooth and thick bark belonging to the family Combretaceae..Ancient Indian physicians used the tree bark powder of *Terminalia arjuna* a natural liver tonic, Arjuna regulates cholesterol by decreasing LDL levels in the liver. Arjuna is a best hepatitis reliever and heart strengthened for mankind. .Its stem bark possesses glycosides, large quantities of flavonoids, tannins and minerals. Arjuna contains specific active constituents namely Arjunilic acid, Tomentosic acid, Sitossterol, Triterpine glycosides like Arjunetosides, Arjunine and Arjunetein. The bark is rich in Saponnins, natural anti-oxidants (flavonoids arjunone,arjunolone,leteilin), gallic acid, ellagic acid, phytosterols.It is also rich in minerals like calcium, magnesium, zinc and copper, reducing sugars & coloring matter. *Terminalia Arjuna* is unique amongst currently used medicinal plants The extracts of Arjuna are known to help in strengthening the heart muscles, relieving stress, and hypertension. Arjuna is effective for a variety of heart related conditions like high blood pressure, heart palpitations, rapid heartbeat and high cholesterol. Their reports are very encouraging and indicate that this should be studied more extensively for their therapeutic benefits.

Moringa oleifera. Jennifer *et al.* (2014) reported that *Moringa oleifera* is commonly known as "Drumstick". It is the most popular tropical crop. All its parts were used especially for their pharmacological, nutritional and water purification properties. Different parts of this plant contain a sketch of important minerals, and are a good source of protein, various phenolics, vitamins, β – carotene and amino acids.The Moringa plant offers a rich and exceptional combination of zeatin, kaempferom, quercetin and many other phytochemicals. It is very significant for its medicinal value. Numerous parts of the plant such as the roots, seed, bark, leaves, fruit, and immature pods, flowers act as cardiac and circulatory drugs, antipyretic, anti-ulcer, anti-inflammatory, antiepileptic. All its parts were used especially for their pharmacological, nutritional and water purification properties. Betel and curry leaves when added at 1.0 per cent level to ghee it showed higher resistance to oxidative deterioration than BHA and BHT mixture. These leaves also contained some ascorbic acid which might work as synergist Sethi and Aggarwal, (1956). When betel, curry and drumstick leaves were added at 1.0 and 3.0 per cent levels to ghee, which was subsequently stored for 12 m at ambient temperature, only curry leaves could protect ghee from hydrolytic rancidity and none could prevent oxidative deterioration Thakar *et, al*., (1984).According to above studies herbal ghee was prepared. The experiment aimed for sensory attributes of herbal ghee, incorporated with of *Moringa oleifera* dry leaves and *Arjuna* bark. Ghee samples were determined by the method described in Indian standard (IS: 3508-1966). All testing were done according to lab manual -1 manual of methods of analysis of foods and milk products food safety and standards authority of India Ministry of health and family welfare, government of India, New Delhi (2015).

MATERIAL AND METHODS

The experiment *"Process Optimization for Production of Herbal Ghee from Buffalo Milk Using Arjun (Terminalia arjuna) Bark and Drumstik (Moringa oleifera) Leaves"* was carried out in the

***Corresponding author:**
Mohammad Ibrahim
Research Scholar,
Sam Higginbottom Institute of Agriculture Technology & Science (Deemed to be University) Allahabad,
Uttar Pradesh – 211007, INDIA.
**E-Mail: muhibr1@gmail.com*

research Lab and Student's Training Dairy, Warner School of Food and Dairy Technology, Sam Higginbottom Institute of Agriculture, Technology and Sciences (Formerly Allahabad Agricultural Institute) (Deemed -to-be- University) Allahabad -211007,U.P. (India).

Collection of cream:

Buffalo cream with 60% fat was collected from Student's Training Dairy Allahabad, Sam Higginbottom Institute of Agriculture, Technology and Sciences (Deemed - to – be – University) Allahabad for each replication.

Collection of Herbs:

Arjuna bark and Moringa leave powder was procured from local market at Allahabad.

Chemicals:

All the chemicals used in the investigation were of 'AR' grade**.**

Sampling of cream: Sampling of cream was carried out as per the procedure laid down in IS: 3508**- 1966.**

Standardization of cream*:* cream was standardize to 60 per cent fat used for preparing herbal ghee.

Testing of Herbal Ghee: was determined as per **IS: 3508- 1966**

Treatment Combination:

Different combination ratio of herbs and cream were used in the present experimental work. Herbal ghee prepared from different treatment combinations were compared with each other.

The different treatment combinations used in the experiment were represented as follows:

Detail Treatment Combination:

T_0 – buffalo ghee made from 60 per cent fat having in cream.
T_1 – herbal ghee prepared from Buffalo cream: (herbs.5% Arjuna+.5%moringa)
T_2 - herbal ghee prepared from Buffalo cream: (herbs.5% Arjuna+1%moringa)
T_3 - herbal ghee prepared from Buffalo cream: (herbs.5% Arjuna+1.5%moringa)
T_4 - herbal ghee prepared from Buffalo cream: (herbs.5% Arjuna+2%moringa)
T_5 - herbal ghee prepared from Buffalo cream: (herbs1% Arjuna+ 0.5%moringa)
T_6 - herbal ghee prepared from Buffalo cream: (herbs1% Arjuna+1%moringa)
T_7 - herbal ghee prepared from Buffalo cream: (herbs1% Arjuna+1.5%moringa)
T_8- herbal ghee prepared from Buffalo cream: (herbs1% Arjuna+2%moringa)
T_9 herbal ghee prepared from Buffalo cream: (herbs1.5% Arjuna+.5%moringa)
T_{10}- herbal ghee prepared from Buffalo cream: (herbs1.5% Arjuna+1%moringa)
T_{11} - herbal ghee prepared from Buffalo cream: (herbs1.5% Arjuna+1.5%moringa)
T_{12} - herbal ghee prepared from Buffalo cream: (herbs1.5% Arjuna+2%moringa)
T_{13} . herbal ghee prepared from Buffalo cream: (herbs2% Arjuna+.5%moringa)
T_{14} . herbal ghee prepared from Buffalo cream: (herbs2% Arjuna+1%moringa)
T_{15}- herbal ghee prepared from Buffalo cream: (herbs2% Arjuna+1.5%moringa)
T_{16}- herbal ghee prepared from Buffalo cream: (herbs2% Arjuna+2%moringa)

Detailed procedure for Manufacturing Control & Experimental Ghee:

Ghee and oil are widely used in *ayurvedic* system of medicine as mediums to administer herbal preparations. Prasher (1999) has reviewed different methods of preparations and compatibility of different ghee with the specific process. However a generalized method of preparation is described in detail in Sharangdhar Samhita, a classical *Ayurvedic* text.

For the manufacture of *Arjuna* and *moringa* herbal ghee, first *arjuna* bark was sorted, cleaned and dried at 60ºC in hot air oven for 2 hours and then made into small bits in mortar and pestle and then powdered using a grinder and Moringa leaf cleaned and dried in shade then ground the leaves in fine particle. The buffalo cream obtained from the student training Dairy of SHIATS, Allahabad was standardized to 60 % fat.. The standardized cream was then pasteurized at 80ºC for 2 min then cooled to 32ºC and then *Arjuna* bark and *Moringa* leaves powder was added to the cream and keep overnight. Clarification of ghee was done by boiling the above mixture on gas stove till complete evaporation of moisture. The clarification temperature was maintained between 110 and 120°C. The ghee was filtered first using muslin cloth and then allowed to settle for 30 min at 75-80°C and then filtration of fine particles was done using cotton filter pad. Filtered ghee was allowed to cool naturally to 25ºC for crystallization, better body and texture.

Sensory Evaluation:

Organoleptic Evolution: The products developed were subjected to sensory evaluation by a panel of five judges. The evaluation of the product was carried out by using the "9 point Hedonic scale. The herbal ghee samples of different treatments were analyzed for Organoleptic Quality (flavour & test, body & texture, colour & appearance, overall acceptability). Attributes were be rated on nine point Hedonic scale (Nelson and Trout, 1964).

Judging panel: Five experienced staff members of the Food and Dairy Technology Department served as a judging team and they evaluated the samples of control and experimental herbal ghee. Numerical scores were allocated for flavor, body and texture, and color of the herbal ghee. The numerical score were used as an indication of the quality. The Judges also identifed qualities and they will consider to unsatisfactory or satisfactory.

Statistical Analysis*:* The data on organoleptic evaluation was analyzed statistically. The percentages, standard error, analysis of variance and their statistical significance were ascertained using a computer program package (Cheema and Sidhu 2004).

RESULTS AND DISCUSSION

The results shown below indicate that the herbal powder based herbal ghee has good in sensory score, which was confirmed by the method used for sensory evaluation.

Table No.1: Average score for sensory parameters of control and experimental herbal ghee from buffalo milk using Arjun bark and drumstik leaves.

Treatments	Colour and appearance	Body and texture	Flavour and taste	Overall acceptability
T_0	7.12	7.54	7.70	7.45
T_1	6.84	7.06	7.26	7.05
T_2	7.18	7.64	7.44	7.42
T_3	6.56	6.56	7.38	6.83
T_4	6.78	6.78	7.32	6.96
T_5	6.58	6.58	7.26	6.81
T_6	6.58	6.58	7.26	6.81
T_7	6.44	6.44	6.90	6.59
T_8	6.34	6.34	6.78	6.49
T_9	6.20	6.20	6.58	6.32
T_{10}	6.26	6.26	6.58	6.37
T_{11}	6.04	6.04	6.44	6.17

T_{12}	5.78	5.78	6.34	5.97
T_{13}	6.20	6.20	6.20	6.20
T_{14}	5.86	5.86	6.26	5.99
T_{15}	5.68	5.68	6.04	5.80
T_{16}	5.48	5.48	5.78	5.58
Mean	**6.35**	**6.41**	**6.80**	**6.52**
Minimum	**5.48**	**5.48**	**5.78**	**5.58**
Maximum	**7.18**	**7.64**	**7.70**	**7.45**
F test	**S**	**S**	**S**	**S**
S. Ed. (±)	**0.139**	**0.151**	**0.169**	**0.094**
C. D. (P = 0.05)	**0.278**	**0.301**	**0.337**	**0.189**

Colour and appearance:

The highest mean for colour and appearance was recorded in treatment T_2 (7.18), T_0 (7.12), T_1 (6.84), T_4 (6.78), T_5 (6.58), T_6 (6.58), T_3 (6.56), T_7 (6.44), T_8 (6.34), T_{10} (6.26), T_9 (6.20), T_{13} (6.20), T_{11} (6.04), T_{14} (5.86), T_{12} (5.78), T_{15} (5.68), and T_{16} (5.48).as per Fig-1, T_2 was found to be the best treatment for colour and appearance of the product.

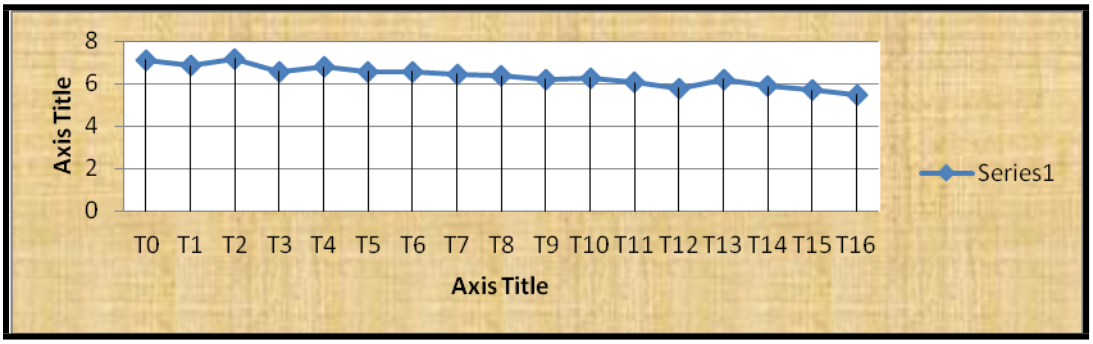

Fig. 1: Colour and appearance of control and experimental herbal ghee from buffalo milk using Arjun bark and drumstik leaves

Body and texture:

The highest mean for body and texture was recorded in treatment T_2 (7.64), T_0 (7.54), T_1 (7.06), T_4 (6.78), T_5 (6.58), T_6 (6.58), T_3 (6.56), T_7 (6.44), T_8 (6.34), T_{10} (6.26), T_9 (6.20), T_{13} (6.20), T_{11} (6.04), T_{14} (5.86), T_{12} (5.78), T_{15} (5.68), and T_{16} (5.48). T_2 was found to be the best for Body and texture of the ghee as per Fig.-2.

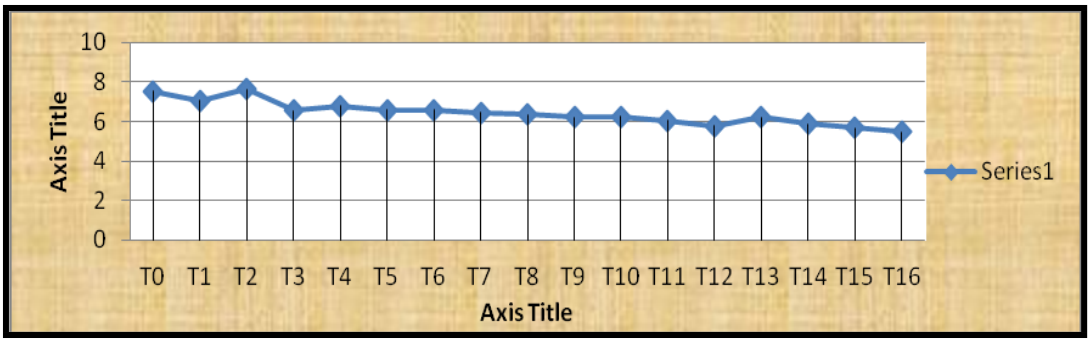

Fig. 2: Body and texture control and experimental herbal ghee from buffalo milk using Arjun bark and drumstik leaves

Flavour and taste:

The highest mean flavour and taste was recorded in treatment T0 (7.70), T2 (7.44), T3 (7.38), T4 (7.32), T1 (7.26), T5 (7.26), T6 (7.26), T7 (6.90), T8 (6.78), T9 (6.58), T10 (6.58), T11 (6.44), T12 (6.34), T14 (6.26), T13 (6.20), T15 (6.04), T16 (5.78). As per Fig.-3 T_2 was found to be the best for flavour and taste.

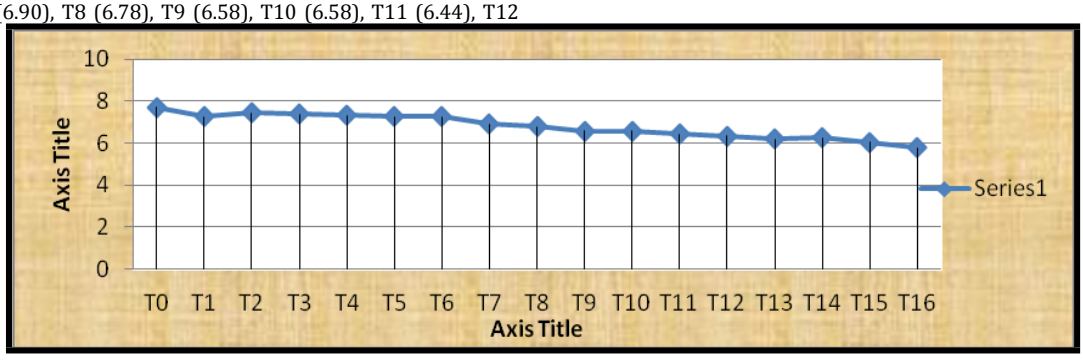

Fig. 3: Flavour and test in experimental herbal ghee from buffalo milk using Arjun bark and drumstik leaves of different treatments

Overall acceptability:

The highest mean for overall acceptability was recorded in treatment T_0 (7.45), T_2 (7.42), T_1 (7.05), T_4 (6.96), T_3 (6.83), T_5 (6.81), T_6 (6.81), T_7 (6.59), T_8 (6.49), T_{10} (6.37), T_9 (6.32), T_{13} (6.20), T_{11} (6.17), T_{14} (5.99), T_{12} (5.97), T_{15} (5.80) and T_{16} (5.58).once again T_2 rated as best treatment as per overall acceptability.

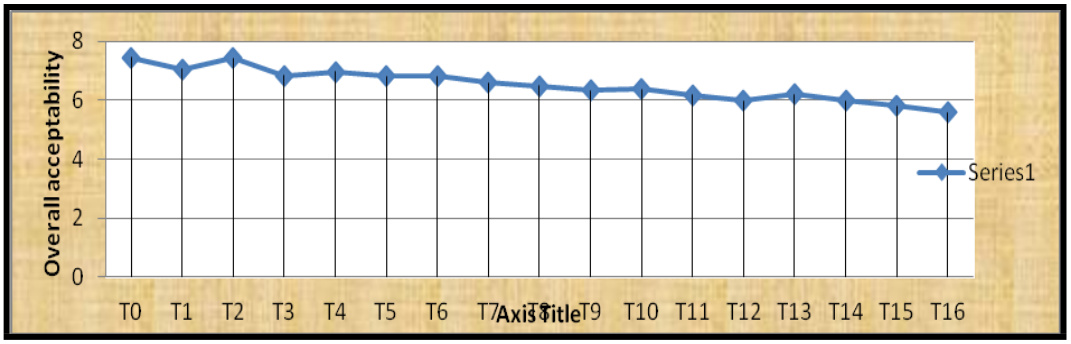

Fig. 4: Overall acceptability in experimental herbal ghee from buffalo milk using Arjun bark and drumstik leaves of different treatments

CONCLUSION

The Sensory attributes of herbal ghee prepared by different level of selected medicinal herbs can be determined accurately, conveniently, and rapidly, using sensory methods. The results of the present study revealed that the inclusion of herbs powder in the buffalo milk cream in T_2 was the best with high overall score followed by other treatments.

REFRENCES:

1. Food Safety and Standards Authority of India (**2015**): Manual of Methods of Analysis of foods and milk products, Ministry of Health and Family Welfare, Government of India.
2. IS: 3508 (**1966**). Indian Standards, Methods for Sampling and Test for Ghee (Butterfat), New Delhi, Bureau of Indian Standards.
3. Jennifer A., Anchana D. a study on phytochemical screening and antibacterial activity of *Moringa oleifera.* : International Journal of Research in Applied,Natural and Social Sciences, **2014**; 2(5): May, 169-176
4. Parmar P, Kaushik K, Devaraja HC and Singh RRB (2013). The effects of alcoholic extract of Arjuna (*Terminalia arjuna*.) bark on stability of clarified butterfat. *Journal of Medicinal Plants Research, **2013**;* 7(35): 2245.
5. Prasher, R. (**1999**). Standardisation of Vasa Ghrita and its extract form and their comperative pharmaco-clinical study with special reference of Swasa Roga (Asthama). M. D. Thesis, Gujarat Ayurved Universitry, Jamnagar, India.
6. Sethi SC and Aggarwal JS. Stabilization of fats by spices: Part II. A new antioxidant from betel leaf. Journal of Science and Industrial Research, **1956**; 15B: 34.
7. Thakar PN, Prajapati PS, Pandya AJ, Upadhyay KG and Vyas SH. Effect of some natural antioxidant on free fatty acid and peroxide value of ghee during storage. Gujarat Agriculture University Research Journal, **1984**; 9: 40.
8. Tonhati, H., Lima A. L., Lanna D. P., de Camargo G. M., F. de Baldi, Albuquerque L. G., and Montrezor J. M. Milk fatty acid characterization and genetic parameter estimates for milk conjugated linoleic acid in buffaloes. J. Dairy Res., **2011**; 4: 1-6.
9. Varrichio, M. L., Francia A. D., Masucci F., Romano R.,and Proto V. Fatty acid composition of Mediterranean buffalo milk fat. Italian J. Animal Sci., **2007**; 6: 509-511
10. Nelson JA, Trout JM., (**1964**), Judging of Dairy Product, 255.
11. Cheema HS, Sidhu SS. A Software Package for PG Students of PAU. Punjab Agricultural University, Ludhiana, India, 2004.

How to cite this article:

Mohammad Ibrahim et al.,: Sensory Evaluation of Herbal Ghee prepared with different levels of Drum stick (*Moringa oleifera*) Leaves and Arjuna (*Terminalia arjuna*) Bark powder, J. Pharm. Res., 2015; 4(10): 331-334.

Conflict of interest: The authors have declared that no conflict of interest exists.

Source of support: Nil