

Sensory perception of whey enriched cookies

Shikha, Rashmi Singh, M.P.S. Yadav and Anjani Singh

Whey is obtained from milk as a byproduct in the manufacturing of paneer and cheese. The whey contained 6.90% total solids. The protein, fat, ash and carbohydrate/lactose content of whey were 0.87, 0.36, 0.43 and 4.91%, respectively. Low value dairy products such as whey, pose a huge opportunity to be converted into value-added products. The development of nutritionally and highly acceptable balanced protein foods to feed the growing population in under developed countries is receiving increasing attention of the food scientists and nutritionists. This study was planned to evaluate the sensory characteristics of whey enriched cookies prepared from blends of whey and water in the ratio of 25:75, 50:50, 75:25 and 100:0, respectively and subjected to baking temperatures of 175 °C. However the cookies developed after the whey incorporation were equally accepted in following attributes *i.e.* taste and flavor, body and texture, colour and appearance and overall acceptability as the control samples. Browning of cookies was enhanced with the increased amount of whey due to the Maillard reaction between the additional protein and lactose. Crispiness also increases as whey incorporation increased. The ranking of the product ranged between liked slightly to liked very much. On the basis of nine point hedonic scale which means that the whey incorporated cookies were highly accepted and this fulfills the purpose of the present study.

Key Words : Whey, Cookies, Proximate composition, Cereals and dough, Whey utilization

How to cite this article : Shikha, Singh, Rashmi, Yadav, M.P.S. and Singh, Anjani (2018). Sensory perception of whey enriched cookies. *Food Sci. Res. J.*, 9(1): 205-207, DOI : 10.15740/HAS/FSRJ/9.1/205-207.

INTRODUCTION

Today, foods are not intended to only satisfy hunger and to provide necessary nutrients for humans but also food have good taste, flavor and overall acceptability. Baking industry is one of the largest organized processed food industries. The popularity of the bakery products is

mainly due to their ready-to-eat nature, convenience, low cost and available in large number of varieties of different tastes and textural profiles. Whey is a collective term referring to the serum of watery portion that separates from the curd during conventional cheese making (Chauhan and Chawla, 2011). Main proteins present in milk are whey protein and casein. It is rich in calcium, phosphorus, essential amino acids, and water-soluble vitamins, which makes whey a highly nutritious product (Davis, 2004). Whey can be incorporated advantageously into various food formulations, including cookies, breads, cake, crackers, pasta, confectionary products, ice creams, soups and gravies, frozen desserts beverages infant food formulations, and special dietetic food (Munaza *et al.*, 2012). Among the bakery products, cookies are most significant and an important food product used as snacks by children and adults all over the world.

MEMBERS OF RESEARCH FORUM

Author for correspondence :

Rashmi Singh, Department of Food Science and Nutrition, C.S.A. Agriculture University and Technology, Kanpur (U.P.) India
(Email : rsingh.csauk@gmail.com; rashmi_csau@yahoo.co.in)

Associate Authors' :

Shikha, Department of Food Science and Nutrition, C.S.A. Agriculture University and Technology, Kanpur (U.P.) India

M.P.S. Yadav, Department of Animal Husbandry and Dairy, C.S.A. Agriculture University and Technology, Kanpur (U.P.) India

Anjani Singh, Department of Agriculture Economics and Statistics, C.S.A. Agriculture University and Technology, Kanpur (U.P.) India

However, these are most commonly relished by school going children, who need more nutrients but they give more priority to taste keeping this in mind whey enriched cookies is acceptable without affecting its sensory attributes. Cookies hold an important position in snack foods due to variety in taste, crispiness and digestibility. Whey protein concentrates (WPCs) have found use in biscuits, cookies, cakes, sponges, icings and glazes to improve texture, flavor and appearance. There are specific functional properties that are associated with whey incorporated into baked products. They include: solubility, water binding/absorption, viscosity, gelation, cohesion, adhesion elasticity, emulsification, and foaming. Most of these characteristics are important in the processing of baked goods. Moreover, the sensory attributes coupled with the strict legislation on water pollution are valid reasons for utilization of whey for manufacturing quality products. Preparing cookies from whey-water blend is desirable both from economic and sensorial point of view.

METHODOLOGY

Buffalo milk was procured from (AHD Department) CSAUA&T, Kanpur, India and milk was coagulated using citric acid and whey was drained through muslin and filled into bottle for further use. Soft wheat flour, sugar, shortening (Amul Butter) were procured from local market of Kanpur (India) and kept at room temperature for further use. All chemicals used were of analytical grade.

Preparation of cookies :

Cookies were prepared using four levels of whey and water ratio along with wheat flour. The ingredients were mixed thoroughly. The dough was aged for 30 min and then sheeted manually by means of rolling pin. The cookies were cut with a cookie cutter. These were baked at 175°C for about 15-20 min in a baking oven. Then cooled at room temperature for 1 h and packed in air tight container for further analysis.

Sensory properties of cookies :

Sensory properties of cookies were analyzed using nine-point Hedonic scale (9-Like extremely, 8-Like very much, 7-Like moderately, 6-Like slightly, 5-Neither like nor dislike, 4-Dislike slightly, 3-Dislike moderately, 2-Dislike very much, 1-Dislike extremely). Cookie samples

prepared from each five blend were presented in coded form. The order of presentation of samples to the panel was randomized. Tap water was provided to rinse the mouth between evaluations. The panelists were instructed to evaluate the coded samples for color, taste, flavor, texture, appearance, and overall acceptability.

Statistical analysis :

Statistical analysis of the data obtained in the investigation was done using ANOVA technique according to the method described by Snedecor and Cochran (1968) on a Completely Randomized Block Design (CRD). Each treatment was replicated 4 times, SEm (\pm) (standard error of mean) was calculated and all the inferences were drawn at 5 per cent level of significance.

OBSERVATIONS AND ASSESSMENT

The results for the sensory evaluation of cookies are given in Table 1 and it is revealed that whey results in different impact on sensory attributes like color, texture, taste, flavor, and overall accept- ability. The results indicate that the mean score for the colour has been increased from (6.05 – 8.45). Highest score (8.45) was recorded for T₄ (100 % whey supplementation) while lowest mean score (6.05) was observed in T₀ (control). Sample was slightly superior to the control. As mentioned above T₄ level got maximum score followed by T₃ and T₂. T₄ got maximum score because of browning in cookies was enhanced as whey level increased due to Maillard reaction between the lactose and the free amino groups from the lysine incorporated with protein ingredients. The addition of whey reduced lysine availability and increased colour development. Similar results were obtained by Kumar and Sinha (2010) for soy based biscuits were developed by incorporation of millet flour at 70, 80, 90, and 100 % level and found that 90 % level of soy in biscuits give brown colour to cookies as compared to other. Body and texture of a product indicates its smoothness, softness, or hardness in the present study body and texture of whey incorporated cookies scored various numerical values, which varied from one level of whey incorporated to another. Mean score for body and texture was increased with increasing level of whey incorporation revealed that the T₀ has lowest score of (5.90) while highest mean score (8.30) was noticed in T₄ followed by T₃ (75 % whey and 25 % water) mean score (7.60). Similar results

Table 1 : Effect of whey incorporation on sensory properties of cookies

Various proportions of whey-water (%) in cookies	Characteristics			
	Colour and appearance	Taste and flavor	Body and texture	Overall acceptability
0:100 (T ₀)	6.05	6.05	5.90	6.05
25:75 (T ₁)	6.50	6.60	6.40	6.45
50:50 (T ₂)	7.10	6.85	7.00	7.10
75:25 (T ₃)	7.50	7.30	7.60	7.75
100:0 (T ₄)	8.45	8.15	8.30	8.30
S.E. _±	0.177	0.19	0.17	0.18
C.D. (P=0.05)	0.50	0.54	0.48	0.51

were observed by Mohammed *et al.* (2016) sensory characteristics of biscuits flour supplemented with difference levels of whey protein concentrate. The gluten quantity and quality was tested for biscuit flour and biscuit flour-whey mixture with different concentration 0, 5, 10 and 15% whey. The quality score in response to taste and flavor of the cookies depicted that it increased gradually upto the end of the experiment. As shown in Table 1 the maximum score of (8.15) was shown by T₄ while lowest mean score of (6.05) was observed in T₀. The T₃ was at bottom of the mean score of T₃ is 7.30. The result was also in favor of Jarita and Kulkarni (2007) reported that Concentrated whey was successfully used in the preparation of rusks and soup sticks and found that whey incorporation give good flavor. Overall acceptability was determined on the basis of quality scores obtained from the evaluation of colour, texture, taste and flavor of cookies. The mean score regarding overall acceptability of cookies revealed that T₄ also got the maximum score 8.30 as shown in Table 1. T₄ got maximum scores for entire sensory attributes than other treatments. The critical difference of data of Table 1 showed that all the sensory attributes are highly significant at 5% level. The results were in favor of the findings or research done by Paul (2014) revealed that whey concentrated upto 15% TS can be used to replace the dough water without adversely affecting the sensory properties provided the bread with best overall acceptability scores.

Conclusion :

Cookies sample with highly acceptable value were formulated from wheat flour and whey. It was found that the difference between the result of control and whey incorporated cookies showed a very small difference. However the mean of the whey incorporated sample was found to be higher by which we can conclude that whey

incorporated cookies were better. However the cookies developed after the whey incorporation was equally accepted as the control samples. The basis of the study was to prepare product which did not differ much in taste from the control cookies because the Indian people are bound to a particular taste regarding different products and they don't want to part away from the taste. Hence this aim was achieved in the present study.

LITERATURE CITED

- Chauhan, K. and Chawla, E. (2011).** Acceptability appraisal and nutritional quality of food products incorporated with whey protein concentrate and soy flour. *J. Food Sci. Res.*, **2**: 164–168.
- Davis, L. (2004).** Fortifying grain-based with whey protein. *AACC*, **49**: 55–58.
- Gayas, B., Shukla, R.N. and Khan, B.M. (2012).** Physico-chemical and sensory characteristics of carrot pomace powder enriched defatted soy flour fortified cookies. *Internat., J.*, 2250–3153.
- Jarita, M. and Kulkarni, S. (2007).** Incorporation of concentrated whey in the production of rusks and soup sticks. *Indian J. Food Sci.*, **14**: 24-28.
- Kumar, S.R. and Sinha, L.K. (2010).** Evaluation of quality characteristics of soy based millet cookies. *Adv. Appl. Sci. Res.*, **1**: 187–196.
- Mohammed, A.A., Babiker, E.M., Khalid, A.G., Mohammed, N.A., Khadir, E.K. and Eldirani (2016).** Nutritional evaluation and sensory characteristics of biscuits flour supplemented with difference levels of whey protein concentrates. *J. Food Process Technol.*, **7**: 545.
- Paul (2014).** Incorporation of concentrated whey in the production of bread. M. Tech. Thesis, NDRI Deemed University, Karnal.
- Snedecor and Cochran (1968).** *Statistical methods*, 6th Ed., Oxford and IBH Publication Company, New Delhi.

Received : 04.07.2017; Revised: 11.03.2018; Accepted : 26.03.2018