www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(3): 3720-3723

www.thepharmajournal.com
Received: 08-01-2023
Accepted: 11-02-2023

Nongmaithem Mangalleima
Ph.D Scholar, Food Science and Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Dr. John David
Professor and Dean, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Maske Sachin V
Ph.D Scholar, Food Science and Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Vishal Singh
Ph.D Scholar, Food Science and Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Nongmaithem Mangalleima
Ph.D Scholar, Food Science and Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Devolvement and cost estimation of milk dessert with different levels of avocado (*Persea americana*) pulp and whey protein concentrate

Nongmaithem Mangalleima, Dr. John David, Maske Sachin V and Vishal Singh

Abstract
The present study "Devolvement and cost estimation of milk dessert with different levels of Avocado (*Persea Americana*) pulp and Whey Protein Concentrate." was undertaken with the objectives to optimize the process of making Pudding with addition of Avocado (*Persea Americana*) and Whey Protein concentred to study about improvement of nutritional status and assess the chemical properties and cost estimation of the developed milk dessert. The experimental milk dessert was prepared using whole milk, avocado and whey protein concentrate with different combination of these ingredients. The study was conducted with 16 treatments combinations i.e. T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15 and T16 which were replicated 5 times each. The data obtained during investigation were statistically analysed by using ANOVA and critical difference between treatment combinations. The chemical properties were analysed and concluded the percentage of total solids and proteins it was increased with respectively increasing percentage of whey protein concentrate, while the percentage of moisture, fat, carbohydrates, ash and acidity it was decreased with respectively increasing percentage of whey protein concentrate.
Cost of the product was also worked out for different treatment combinations. It was concluded that in different treatment combination percentage of whey protein concentrate was decreases also the cost of final product was decreases, so final product cost was totally depending upon the quantity of whey protein concentrate used in the treatment.

Keywords: Milk dessert, whey protein concentrate, avocado

Introduction
Milk desserts are one of the most important industrial food products. Milk desserts typically include between 84 and 89% liquid milk, 6.5 to 10% sugar, 2% to 3.5% starch, 0.15 to 0.25% carrageenan, and 0.2% chocolate powder, among other ingredients. To enhance flavor and alter color, vanillin, carotenoids, or xanthophylls are sometimes added in trace amounts (less than 0.25) to the final product (Garawany *et al*., 2005) [8].
A tropical native American fruit is the avocado, or Persea americana Mill. The Lauraceae family includes it. The Aztec word "ahucatl" is the source of the term "avocado." Its other names are "butter fruit" and "alligator pear." Due to its rich nutritional content and therapeutic characteristics, it has historically been grown for food and medicine Yasir *et al*., (2010) [16].
The avocado, commonly referred to as the "Alligator pear," is a tropical fruit with American roots Ranade & Thiagarajan (2015) [13].
Avocados have been highly prized for their useful therapeutic properties and high nutrient density for quite some time. United States Department of Agriculture (USDA) (Bhuyan *et al.*, 2019) [3] includes a nutritional breakdown of avocados in Table 2. In terms of calories, an avocado may range from from 140 to 228 (or 585 to 1000 kilojoules) depending on its size and type. (Duarte *et al.*, 2016) [7]. Carbohydrates in an avocado average about 12 g per fruit (Table 2), with bigger avocados having a carbohydrate level closer to 13.5 g. Soluble fiber makes up 70% of the pulp and insoluble fiber 30%. (Caballero *et al.*, 2015) [5]. One serving of a meal with a glycemic index of 1 may include around 2 grams of protein and 2 grams of fiber. The fat content of an avocado accounts for the vast bulk of its calorie count. The bulk of the fat in an avocado (around 25 grams per 1000 calories) is healthy monounsaturated fatty acid (MUFA). (Bao *et al.*, 2011) [1]. A healthy digestive system is often linked to a diet rich in fiber. Cholesterol levels in the blood may be lowered and constipation avoided if bowel movements are stimulated.

Particularly, studies have shown that eating avocados might improve the bacteria in your intestines, suggesting that avocados may function as a prebiotic. (Dreher & Davenport, 2013) [6]. Avocados are rich in a variety of nutrients, including protein (more than any other fruit), sucrose etc. (Landahl *et al.*, 2009) [12]. The only fruit that has more lipids than any other is the avocado. Polar lipids (glycolipids and phospholipids), which make up the bulk of avocado lipids, are essential for numerous physiological processes, such as the second messenger function of cell membranes. (Wang *et al.*, 2015) [15]. The food, drug, and beauty industries may all benefit from these lipids. (Ranade & Thiagarajan, 2015) [13]. The potential health risks associated with synthetic antioxidants have prompted the food, nutraceutical, and pharmaceutical sectors to focus on extracting, isolating, and identifying antioxidants from natural sources. (Bhuyan *et al.*, 2016; Fu *et al.*, 2010; Vázquez *et al.*, 2012) [4, 10, 14].

Whey proteins are a common functional element in a wide variety of foods. The most noticeable proteins in whey protein isolates are immunoglobulins, although bovine serum albumin, alpha-lactalbumin, beta-lactoglobulin, and other smaller proteins are also present. One of whey protein's greatest assets as a food component is its gel-forming abilities. When salt is added to a whey protein dispersion before or after heating, gels may develop. (Barbut and Foegeding 1993; Mleko 2000) [2, 9].

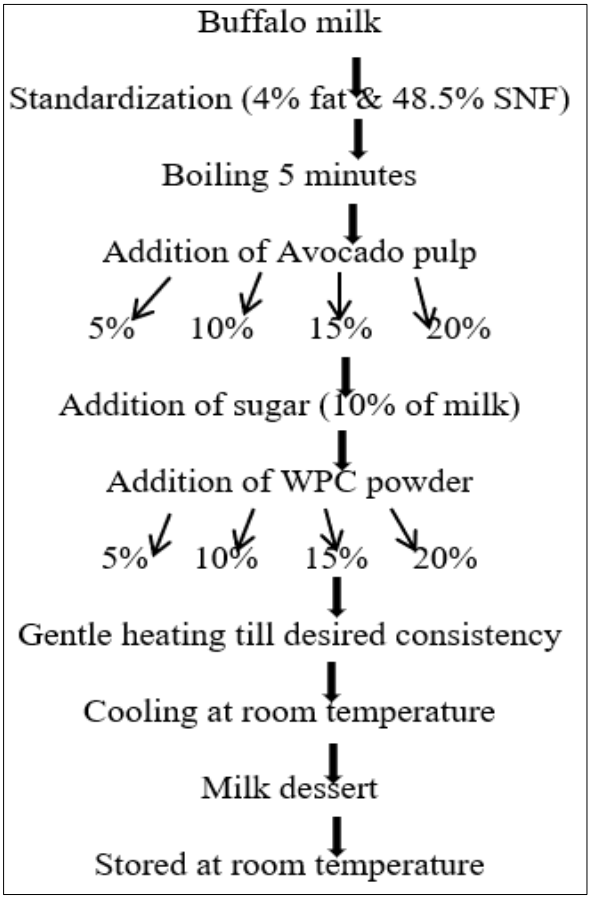
Materials and Methods

The experiments related to "Development of milk dessert manufactured by different levels of avocado pulp and whey protein concentrate" was carried out in the Laboratory of Food Technology, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj (Allahabad) (U.P.).

Procurement and Collection of Ingredients

1) **Buffalo milk:** Buffalo milk was purchased from local market in Allahabad.
2) **Avocado fruit:** It was purchased from Manipur.
3) **Sugar:** Sugar was purchased from local market in Allahabad.
4) **Whey protein concentrate:** It was purchased online.

Process flowchart or preparation of milk dessert



Treatment Combination

T1 - Dessert prepared from buffalo milk with addition of 5% Avocado & 5% WPC
T2- Dessert prepared from buffalo milk with addition of 5% Avocado & 10% WPC
T3- Dessert prepared from buffalo milk with addition of 5% Avocado & 15% WPC
T4- dessert prepared from buffalo milk with addition of 5% Avocado & 20% WPC
T5- dessert prepared from buffalo milk with addition of 10% Avocado & 5% WPC
T6- dessert prepared from buffalo milk with addition of 10% Avocado & 10% WPC
T7-dessert prepared from buffalo milk with addition of 10% Avocado & 15% WPC
T8- dessert prepared from buffalo milk with addition of 10% Avocado & 20% WPC
T9- dessert prepared from buffalo milk with addition of 15% Avocado & 5% WPC
T10- dessert prepared from buffalo milk with addition of 15%

Avocado & 10% WPC
T11- dessert prepared from buffalo milk with addition of 15% Avocado & 15% WPC
T12- dessert prepared from buffalo milk with addition of 15% Avocado & 20% WPC
T13-dessert prepared from buffalo milk with addition of 20% Avocado & 5% WPC
T14-dessert prepared from buffalo milk with addition of 20% Avocado & 10% WPC
T15-dessert prepared from buffalo milk with addition of 20% Avocado & 15% WPC
T16- dessert prepared from buffalo milk with addition of 20% Avocado & 20% WPC

Results and Discussions

The current research was done on the "Process optimization and quality evaluation of milk dessert manufactured by different levels of avocado pulp and whey protein concentrate" were done in the laboratories of department of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, U.P., India. The methodology's data collection on many elements was tallied and statistically analyzed. The discovery is also shown diagrammatically.

A. Chemical Properties of milk dessert

Table 1: Showed that the chemical properties of milk dessert

Treatments	Total Solids	Moisture	Fat	Proteins	Carbohydrates	Ash	Acidity
T1	45.22	54.78	7.08	7.50	28.67	1.97	0.21
T2	45.47	54.53	5.90	11.50	26.29	1.78	0.19
T3	46.54	53.46	5.60	15.50	23.74	1.70	0.18
T4	46.74	53.26	5.10	19.50	20.49	1.65	0.18
T5	45.39	54.61	7.90	7.60	27.91	1.98	0.19
T6	45.51	54.49	6.65	11.60	25.38	1.88	0.18
T7	46.14	53.86	6.20	15.60	22.58	1.76	0.18
T8	46.21	53.79	5.95	19.60	18.97	1.69	0.17
T9	45.03	54.97	8.70	7.85	26.91	1.97	0.20
T10	45.77	54.23	7.60	11.85	24.54	1.78	0.17
T11	46.11	53.89	7.15	15.85	21.52	1.59	0.17
T12	46.54	53.46	6.85	19.85	18.36	1.48	0.19
T13	45.11	54.89	9.60	8.20	25.37	1.94	0.21
T14	45.65	54.35	8.45	12.20	23.12	1.88	0.19
T15	46.08	53.92	7.95	16.20	20.14	1.79	0.17
T16	46.45	53.55	7.40	20.20	17.19	1.66	0.18
Maximum	46.74	54.97	9.6	20.2	28.67	1.98	0.21
Minimum	45.03	53.26	5.1	7.5	17.19	1.48	0.17

The table no. 1 was showed that the chemical properties in those total solids, moisture fat, protein, carbohydrates, ash as well as acidity of final prepared product milk dessert was calculated. It was also showed that the maximum value and minimum value of the chemical properties, in that the maximum total solid was obtained in treatment No. T4 it was 46.74 as well as minimum value of total solid was obtained in treatment No. T9 was 45.03. The maximum to moisture was obtained in treatment No. T9 it was 54.97 as well as minimum value of moisture was obtained in treatment No. T4 was 53.36. For the fat percentage maximum value was obtained in treatment No. T13 it was 9.60 as well as minimum value was obtained in treatment No. T4 was 5.10. The maximum protein was obtained in treatment No. T16 it was 20.20 as well as minimum value of protein was obtained in treatment No. T1 was 7.50. The maximum carbohydrates percentage was obtained in treatment No. T1 it was 28.67 as well as minimum value of carbohydrates was obtained in treatment No. T16 was 17.19. The maximum percentages of ash were obtained in treatment No. T5 it was 1.98 as well as minimum value of ash was obtained in treatment No. T12 was 1.48. The maximum percentages of acidity were obtained in treatment No. T1 and T13 it was 0.21 as well as minimum value of acidity were obtained in treatment No. T9, T10, T11, T15 it was 0.17 respectively.

B. Cost Estimation of milk dessert

Table 2: Showed that cost estimation of milk dessert

Treatments	Milk cost in Rs.	Avocado Pulp (gm)/ Cost in Rs.	Sugar (gm)/ Cost in Rs.	WPC Powder (gm)/ Cost in Rs.	Overall Expenses in Rs.	Total cost per gm of yield	Price prepared sample in Rs/Kg
T1	11.6	2	4	6	23.60	0.42	420
T2	11.6	2	4	12	29.60	0.50	500
T3	11.6	2	4	18	35.60	0.57	570
T4	11.6	2	4	24	41.60	0.64	640
T5	11.6	4	4	6	25.60	0.44	440
T6	11.6	4	4	12	31.60	0.52	520
T7	11.6	4	4	18	37.60	0.59	590
T8	11.6	4	4	24	43.60	0.65	650
T9	11.6	6	4	6	27.60	0.47	470
T10	11.6	6	4	12	33.60	0.55	550
T11	11.6	6	4	18	39.60	0.61	610

T12	11.6	6	4	24	45.60	0.68	680
T13	11.6	8	4	6	29.60	0.50	500
T14	11.6	8	4	12	35.60	0.57	570
T15	11.6	8	4	18	41.60	0.64	640
T16	11.6	8	4	24	47.60	0.70	700

The cost analysis data along with formulations is shown in table No. 2 The cost of the final product included 20% of the expenses which were expended other than the total cost of the ingredients. The production cost ranged depending upon the price of the ingredients in experimental dessert. It was also observed that the highest mean cost was recorded in treatment T16 of the experimental dessert prepared with the combination of avocado fruit and whey protein concentrate which cost 700/kg followed by lowest cost was recorded by Treatment T2 and Treatment T13 was 500/Kg. It was concluded that in different treatment combination percentage of whey protein concentrate was decreases also the cost of final product was decreases, so final product cost was totally depending upon the quantity of whey protein concentrate used in the treatment.

Conclusion

Desserts prepared using milk as one of the main ingredients provide great health benefits to consumers as milk is considered a wholesome food which contains almost all nutrients needed for a healthy life. Dairy dessert is very common in India however this experimental dessert is very unique and nutritious as it contains avocado and whey protein concentrate as one of the main ingredients. Avocados are rich sources of antioxidants such and leutin and zeanthin which benefits for eye health. This magical fruit is known for it's property to inhibit growth of prostate cancer cells and possess other anti-inflamatory properties. Avocado reduces cholesterol and improves cardiovascular health and enhances the absorption of important nutrients, improves skin and helps in wound healing. The whey protein concentrate (WPC) which is considered as a complete protein owing to its content of many essential amino acids such as leucine, isoleucine etc, is another main ingredient for this experimental dessert. WPC helps to improve muscle protein synthesis and promote the growth of lean muscle mass. It was concluded that in different treatment combination percentage of whey protein concentrate was decreases also the cost of final product was decreases, so final product cost was totally depending upon the quantity of whey protein concentrate used in the treatment.

References

1. Bao J, Atkinson F, Petocz P, Willett WC, Brand-Miller JC. Prediction of postprandial glycemia and insulinemia in lean, young, healthy adults: glycemic load compared with carbohydrate content alone. The American journal of clinical nutrition. 2011;93(5):984-996.
2. Barbut S, Foegeding EA. Ca^{2+}-induced gelation of pre-heated whey protein isolate. Journal of Food Science. 1993;58(4):867-871. https://doi.org/10.1111/j.1365-2621.1993.tb09379.x
3. Bhuyan DJ, Alsherbiny MA, Perera S, Low M, Basu A, Devi OA, *et al*. The odyssey of bioactive compounds in avocado (*Persea americana*) and their health benefits. Antioxidants. 2019;8(10):426.
4. Bhuyan DJ, Vuong QV, Chalmers AC, van Altena IA, Bowyer MC, *et al*. Investigation of phytochemicals and antioxidant capacity of selected *Eucalyptus* species using conventional extraction. Chemical Papers. 2016;70(5):567-575.
5. Caballero B, Finglas P, Toldrá F. Encyclopedia of food and health. Academic Press. 2015.
6. Dreher ML, Davenport AJ. Hass avocado composition and potential health effects. Critical reviews in food science and nutrition. 2013;53(7):738-750.
7. Duarte PF, Chaves MA, Borges CD, Mendonça CRB. Avocado: characteristics, health benefits and uses. Ciência rural. 2016;46:747-754
8. Duester KC. Avocados a look beyond basic nutrition for one of nature's whole foods. Nutrition Today. 2000;35(4):151-157.
9. Foegeding E, Li L, Pernell C, Mleko S. A comparison of the gelling and foaming properties of whey and egg proteins. Hydrocolloids. 2000, 357-366. https://doi.org/10.1016/b978-044450178-3/50046-9
10. Fu L, Xu BT, Xu XR, Qin XS, Gan RY, Li HB. Antioxidant capacities and total phenolic contents of 56 wild fruits from South China. Molecules. 2010;15(12):8602-8617.
11. Garawany G, Salam ME. Preparation and rheological properties of a dairy dessert based on whey protein/potato starch. Food Chemistry. 2005;91(2):261-267. https://doi.org/10.1016/j.foodchem.2004.01.073
12. Landahl S, Meyer MD, Terry LA. Spatial and temporal analysis of textural and biochemical changes of imported avocado cv. Hass during fruit ripening. Journal of Agricultural and Food Chemistry. 2009;57(15):7039-7047.
13. Ranade SS, Thiagarajan P. A review on *Persea americana* Mill. (Avocado)-Its fruit and oil. Int. J. PharmTech Res. 2015;8(6):72-77.
14. Vázquez G, Santos J, Freire MS, Antorrena G, González-Álvarez J. Extraction of antioxidants from eucalyptus (*Eucalyptus globulus*) bark. Wood science and technology. 2012;46(1):443-457.
15. Wang L, Bordi PL, Fleming JA, Hill AM, Kris-Etherton PM. Effect of a moderate fat diet with and without avocados on lipoprotein particle number, size and subclasses in overweight and obese adults: A randomized, controlled trial. Journal of the American Heart Association. 2015;4(1):e001355.
16. Yasir M, Das S, Kharya MD. The phytochemical and pharmacological profile of Persea americana Mill. Pharmacognosy reviews. 2010;4(7):77.