www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; 9(10): 555-556

www.thepharmajournal.com
Received: 11-08-2020
Accepted: 16-09-2020

Helna Pious
M. Tech Scholar, Department of Dairy Chemistry, College of Dairy Science and Technology, Kerala Veterinary and Animal Sciences University, Mannuthy, Kerala, India

Dr. Divya MP
Assistant Professor, Department of Dairy Chemistry, College of Dairy Science and Technology Kerala Veterinary and Animal Sciences University, Mannuthy, Kerala, India

Dr. P Sudheer Babu
Dean, Professor and Head, Department of Dairy Engineering College of Dairy Science and Technology, Mannuthy, India

Dr. AK Beena
Professor and Head, Department of Dairy Microbiology, College of Dairy Science and Technology, Kerala Veterinary and Animal Sciences University, Mannuthy, Kerala, India

Dr. Rachana CR
Assistant Professor, Department of Dairy Chemistry, College of Dairy Science and Technology, Thiruvananthapuram Kerala Veterinary and Animal Sciences University, Kerala, India

Corresponding Author:
Helna Pious
M. Tech Scholar, Department of Dairy Chemistry, College of Dairy Science and Technology, Kerala Veterinary and Animal Sciences University, Mannuthy, Kerala, India

Physico chemical characteristics of Skim milk yoghurt incorporated with sunflower wax canola oil Organogel

Helna Pious, Dr. Divya MP, Dr. P Sudheer Babu, Dr. AK Beena and Dr. Rachana CR

Abstract
Recently there is increased consumer awareness about the negative effects of saturated fat/trans fat on health and hence researches are going on to develop the alternatives. Organogelation is one of the novel technologies for structuring of edible oil. In this work, edible organogel prepared from sunflower wax and canola oil was incorporated in skim milk yoghurt and its physicochemical characteristics were studied. Organogel addition at 3% to the yoghurt did not exhibit a significant difference in pH and acidity but it was found out that a twofold decrease in syneresis percent due to the incorporation of organogel. A significant difference in protein, fat and lactose content was also observed.

Keywords: Organogel, canola oil, sunflower wax, skimmilk yoghurt, syneresis

1. Introduction
Since most primitive ages, in many part of the world, fermented milk and its products have been used for consumption by human. Out of these, yoghurt is considered to be the most widely consumed fermented milk product. But during the manufacture of low fat yoghurt, a weak body and syneresis is considered to be a major problem [1].
The weak body and syneresis of yoghurt can be effectively reduced by the incorporation of sunflower wax canola oil organogel with additional nutritional benefits of poly unsaturated fatty acids and monounsaturated fatty acids in canola oil. Organogels can be defined as a semi-solid system, in which an organic liquid phase is immobilized by a three-dimensional network composed of self assembled, entangled gelator fibers[2]. If the organic phase is edible oil, it is termed as oleogels. The application of organogels in food industry is still at its beginnings. Hence a study was conducted to evaluate the physicochemical characteristics of yoghurt incorporated with sunflower wax canola oil organogel.

2. Materials and methods
2.1. Materials
1. Skim milk powder (amul), sugar, canola oil and sunflower wax purchased from local market.
2. Yoghurt starter culture purchased from Dept. of Dairy Microbiology, CDST, KVASU, Mannuthy
3. All chemicals used were of analytical grade

2.2. Preparation of organogel
Sunflower wax were added at 3% to canola oil and heated to 90 ºC until the wax melts in the oil. The mix was agitated vigorously for uniform assimilation of wax in oil and allowed to cool to room temperature.

2.3. Preparation of yoghurt
Yoghurt was prepared as per Khalifa *et al*., 2011 [3] with slight modifications. Sunflower wax canola oil organogel were incorporated at 3% level to skimmilk yoghurt as detailed below.

Table 1: Experiment details

Ingredient (%)	Organogel incorporated yoghurt (OY)	Control yoghurt (CY)
Skim milk powder	9	12
Sugar	8	8
Organogel	3	0

2.4. Physicochemical Analysis
The prepared yoghurt samples were analyzed for its acidity, pH, fat and lactose as per IS:SP:18 [Part XI], 1981 [4] and total solids were estimated as stated on AOAC methods [5]. The protein content of the samples were analyzed by kjeldhal method (Menefee and Overman, 1940) [6] and syneresis percent of yoghurt samples were calculated as per the method described by Joon *et al.*, 2017 [7].

3. Results

Table 2: Titrable acidity, pH and syneresis of samples

Sample	Titrable acidity (% lactic acid)	pH	Syneresis (%)
OY	0.663 ± 0.01^{a}	4.27 ± 0.01^{a}	11.33 ± 0.67^{a}
CY	0.651 ± 0.01^{a}	4.30 ± 0.01^{a}	27.00 ± 0.58^{b}

Figures are mean ± standard error of three replications, $^{a-b}$Means with different superscript vary significantly within a column ($p< 0.05$)

Table 3: Protein, fat, lactose and total solid content of samples

Sample	Protein (%)	Fat (%)	Lactose (%)	Total solids (%)
OY	3.90 ± 0.20^{a}	3.49 ± 0.08^{a}	3.46 ± 0.00^{a}	19.77 ± 0.25^{a}
CY	4.40 ± 0.10^{b}	0.47 ± 0.06^{b}	3.83 ± 0.06^{b}	19.83 ± 0.31^{a}

Figures are mean ± standard error of three replications, $^{a-b}$Means with different superscript vary significantly within a column ($p<0.05$)

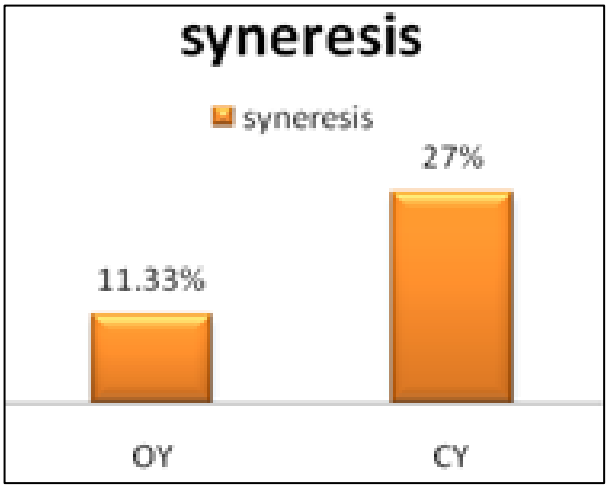

Fig 1: Syneresis (%) of OY and CY

4. Discussion
4.1. pH and Acidity
The acidity of organogel incorporated yoghurt (OY) and control yoghurt (CY) were 0.66% LA and 0.65% LA respectively. The pH of OY and CY were 4.27 and 4.30 respectively. No significant ($p>0.05$) differences were noted between the control and treatment sample in pH and acidity. Incorporation of organogel to yoghurt had no effect on pH and acidity of yoghurt

4.2. Syneresis
Syneresis is related to the instability of networks in a gel and its decreased ability to hold all serum part within the gel network [8]. The syneresis percentage of OY and CY were 11.33% and 27% respectively. A twofold decrease in syneresis was observed in OY compared to that of CY.

4.3. Chemical composition
Compositional analysis of OY and CY are depicted in Table 3. Among the components, protein, fat, and lactose content of OY and CY was found to be significant ($p<0.05$), but total solid content of both samples were non significant ($p>0.05$). A decrease in protein and lactose content in OY compared to that of CY may be due to the high SMP content[1]. A significant increase in fat content of OY is due to the presence of canola oil in organogel.

5. Conclusion
The physicochemical analysis of organogel incorporated yoghurt and control yoghurt exhibited a significant difference in syneresis percent, protein, fat and lactose content. A relevant significant decrease (2 fold) in syneresis percent of organogel incorporated yoghurt compared to that of control yoghurt indicates the improvement in textural characteristics due to organogel incorporation. There were no significant difference in pH and acidity due to organogel incorporation. This work point outs the potential application of organogels in low fat food products to improve its weaker texture and also to improve its nutritional quality.

6.Acknowledgment
The authors acknowledge Kerala Veterinary and Animal Sciences University, for the financial support as research grant.

7. References
1. Kanake UJ, Joshi SV, Chavan KD. Effect of skim milk powder and gelatin on chemical composition and sensory quality of yoghurt. Journal of Dairying, Foods and Home Sciences 2009;28(1):1-7.
2. Vintiloiu A, Leroux JC. Organogels and their use in drug delivery-a review. Journal of controlled release 2008; 125(3):179-92.
3. Khalifa ME, Elgasim AE, Zaghloul AH, Mahfouz MB. Applications of inulin and mucilage as stabilizers in yoghurt production. American Journal of Food Technology 2011;6(1):31-9.
4. IS: SP: 18 (part XI). Hand book of food analysis: Dairy Products. Bureau of Indian Standards, Manak Bhavan, New Delhi, 1981
5. AOAC. Official Methods of Analysis. (Volume 2) 17th Ed. Arlington, Virginia, USA, 2000.
6. Menefee SG, Overman OR. A semimicro-Kjeldahl method for the determination of total nitrogen in milk. Journal of Dairy Science 1940;23(12):1177-85.
7. Joon R, Mishra SK, Brar GS, Singh PK, Panwar H. Instrumental texture and syneresis analysis of yoghurt prepared from goat and cow milk. The Pharma Innovation 2017;6(7, Part G):971.
8. Lucey JA, Singh H. Formation and physical properties of acid milk gels:a review. Food Res. Int 1997;30:529-542.