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Abstract

The present study was made with an attempt to produce yogurt by partial addition of different levels of soymilk to cow milk. Control was prepared with 100% cow milk and other samples prepared with cow milk and soymilk in the ratio of 95:5, 90:10, 85:15, 80:20, and 75:25 respectively. The control and different treatments of milk blends were analyzed for total solids and pH. The results found that the addition of soymilk leads to an increase of pH and total solids from 6.7, 11.94 % to 7.1 and 12.54 % for control and milk samples containing 25:75 levels of soymilk respectively. Yogurt samples were analyzed for some physicochemical analysis (pH, whey syneresis hardness) and organoleptic characteristics like (Appearance, flavor, body, texture acidity, and overall acceptability) during 14 days of storage at 4±1ºc. It was found that with increasing the levels of soymilk the syneresis decreased and the hardness was increased, the separated whey was (11.1 and 8.5 ml) and hardness of (6.5 and 19 gm cm-2) was obtained during 21 days of storage for control and sample containing 75:25 level. In general, the results of sensory properties as evaluated by the panelists indicates that the samples with increasing soymilk levels gained high scores of 13.8, 13.8 and 17.3 and low value of 21.0 and 11.2 in comparison to the results of the control sample which were recorded as 10.3, 7.8, 8.8, 28.0 and 13.0 for texture, body, appearance, flavor and acidity respectively during 14 days of storage.

Keywords

Glycine max, Soymilk, Soy yogurt, Fermented dairy products, Blends, Fortification

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RESEARCH ARTICLE

The Effect of Soymilk Addition on Chemical, Physical and Sensorial Properties of Cow Milk Yogurt

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ABSTRACT

The present study was made with an attempt to produce yogurt by partial addition of different levels of soymilk to cow milk. Control was prepared with 100% cow milk and other samples prepared with cow milk and soymilk in the ratio of 95:5, 90:10, 85:15, 80:20, and 75:25 respectively. The control and different treatments of milk blends were analyzed for total solids and pH. The results found that the addition of soymilk leads to an increase of pH and total solids from 6.7, 11.94 % to 7.1 and 12.54 % for control and milk samples containing 25:75 levels of soymilk respectively. Yogurt samples were analyzed for some physicochemical analysis (pH, whey syneresis hardness) and organoleptic characteristics like (Appearance, flavor, body, texture acidity, and overall acceptability) during 14 days of storage at 4±1ºc. It was found that with increasing the levels of soymilk the syneresis decreased and the hardness was increased, the separated whey was (11.1 and 8.5 ml) and hardness of (6.5 and 19 gm cm-2) was obtained during 21 days of storage for control and sample containing 75:25 level. In general, the results of sensory properties as evaluated by the panelists indicates that the samples with increasing soymilk levels gained high scores of 13.8, 13.8 and 17.3 and low value of 21.0 and 11.2 in comparison to the results of the control sample which were recorded as 10.3, 7.8, 8.8, 28.0 and 13.0 for texture, body, appearance, flavor and acidity respectively during 14 days of storage.

Keywords: *Glycine max*, Soymilk, Soy yogurt, Fermented dairy products, Blends, Fortification

INTRODUCTION

Soymilk also identified as soy juice and soy drink, is a leguminous plant-based product, and a water extract of soybeans (*Glycine max*). It is usually produced by grinding the overnight soaked whole dehulled or non-dehulled soybeans with water and filtering the mixture (Patil and Jha, 2008). It is considered as cheap low cost, accessible, and a proper source of high-quality proteins. It is additionally one of the main essential traditional products that are widely consumed in Asian nations, including China, Japan, Korea, Singapore, and Thailand. Today it is employed around the world and is readily available in several types throughout several nations because of properties that enhance health and increase the bioactivity of the human body (Kanawjia and Singh, 2000; Yuan and Chang,2007 and Jiang *et al*.,2013). Also, soymilk is employed as a food source to resolve the issues of malnutrition within developing countries (Paucar-Menacho *et al*., 2010 and - Mazumder and Begum, 2016).

Soymilk is one of the best products with a high nutritional value, it is a source of energy, an accomplished source of highly digestible good-quality protein that enhances bone health (George *et al.* 2020), soy protein is contains all the essential amino acids required for human growing, maintenance, and stress, although relatively low in methionine. It is a proper source of lysine, rich in both soluble and insoluble dietary fiber, carbohydrate, minerals, proteins, vitamins, and oil with a high amount of polyunsaturated essential fatty acids mainly omega- 6 linolic acid (Singh *et al*., 2008; Deshpande *et al.*, 2008; Kant and Broadway, 2015 and Mazumder and Begum,2016). It is suitable for people with lactose intolerance, heart health, those who follow a vegetarian diet, and who are allergic to milk protein since it contains a low quantity of saturated fatty acids, no cholesterol, and lactose. In addition, soymilk and its products are good nutritional supplements because they contain a high amount of isoflavones which are extremely important antioxidant compounds (Ikya *et al*.,2013 and Martinez *et al.*, 2011).

All of the nutritional properties of soymilk provide health benefits and have positive effects which prevent the consumers from many health risks and chronic diseases comprising; atherosclerosis, hypertension, and cardiovascular disease by lowering triglycerides, total

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cholesterol, and LDL cholesterol (Cavallini *et al.*, 2009; Kobayashi, *et al.*, 2012and Messina,2016). In addition, the antioxidants in soymilk act as bioactive compounds protecting human cells and DNA against oxidation (Ikya *et al.*,2013), play a vital role in fighting certain cancers (Messina, 2003, Toro-Funes *et al.*, 2012, Baglia *et al.*, 2016 and Zhao *et al*. 2019), preventing osteoporosis (Lydeking-Olsen *et al.*,2004) and has anti-obesity properties (Vij *et al.*, 2011 (likewise controls diabetes (Lee,2006). As a result of the previous benefits soymilk and it is products are considered to be attractive functional foods or as sources of functional ingredients enabling for its use in numerous foodstuff. Many processed soymilk products are available in the market which includes flavored soymilk, soya flour, soy yogurts, Okara, ice (Jiang *et al.*,2013; Al-Sharifi, 2013 and Temiz and Dağyıldız, 2017)) therefore partially replacement of cow milk by soymilk for yogurt processing could also be beneficial in terms of quality, health and economics and it might be better than if they used each of them alone. The cream soya curd, and tofu (soya paneer), (Wangcharon, 2008 and Zinia *et. al*,2019, as Kant and Broadway (2015), mentioned to growing interest of consumers in functional foods due to the increasing awareness to the link between health and diet.

Soymilk is described as an important raw material for functional foods manufacturing, it is described as such due to its nutritional and health benefits. However, it is characterized by some undesirable properties such as beany flavor, brown color, causes flatulence and contains anti-nutritional compounds, therefore mixing it with cow-milk can minimize these side effects. A Significant applications to create more appropriate and agreeable healthy products from it were studied
objective of this research is to determine the common physicochemical and sensorial properties of yogurt produced by mixing cow milk and soymilk at different ratios during storage.

MATERIALS AND METHODS

Materials

Fresh raw cow milk was obtained from the dairy field unit (Animal Resource Department, College of Agriculture, Salahaddin University-Erbil), a lyophilized mixed starter culture containing bacteria (Streptococcus salivarius Ssp. thermophilus) and (Lactobacillus delbueckii Ssp. bulgaricus) were supplied by France Rhodia Food company which was a gift from Delba dairy factory and soya bean seeds Lee variety were obtained from Erbil local market.

Methods

Yogurt samples were analyzed for some physicochemical analysis (pH, whey syneresis hardness) and organoleptic characteristics like (Appearance, flavor, body, texture acidity, and overall acceptability) during 14 days of storage at 4±2^{o}c .

Preparation of Soymilk

Soymilk was made according to the method described by Jiang et al., 2013 with some modifications, the whole dry beans, (100 gm) were sorted, cleaned, rinsed, and soaked in tap water overnight at a temperature of 4°C. Unabsorbed water was drained off and the rehydrated beans then were washed and grounded for five minutes with 400 ml of water using a home-style blender. Finally, the resulting slurry or purée was filtered using cheesecloth to remove insoluble residues (soy pulp fiber) and the filtrate was used in preparation of yogurt blends.

Chemical and physical tests of milk

Total solid of milk determination

Total solids of yogurt samples were determined according to A.O.A.C. (2000). The percentage of moisture content was determined by oven method, 3g of yogurt sample was dried in the oven at 105 ^{o}C for 3 hrs. until the weight of sample was fixed. The percentage moisture content was calculated by the following formula. $\% \boldsymbol{Moisture} = \boldsymbol{W1} - \frac{\boldsymbol{W2\ X\ 100}}{\boldsymbol{W1}}$

Where, W1=initial weight of sample; W2=weight of the dried sample

Determination of pH

pH values of milk and yogurt were determined according to the method of A.O.A.C
(2000) using the Wtw-pH530 pH meter.

Addition of soymilk on fermentation time

The blends were prepared via mixing fresh cow milk with readymade soymilk in the ratio of T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25, then were heated to 90 ± 2 °C for 5min., cooled down to 45 °C. All treatments were inoculated with 3% of activated starter. The inoculated milk samples were distributed into plastic cups then incubated at 42±2 °C and the pH was measured at zero, 1, 1.5, 2,2.5, and 3 hrs. according to the method used by Abdulqadr et al., 2015.

Manufacturing of yogurt

For yogurt manufacturing, all blends (T1, T2, T3, T4, T5, and T6) were heated to 90 ± 2 °C for 5min., cooled to 4 °C. All treatments were inoculated with 3% of activated starter. The inoculated milk samples were distributed into plastic cups then incubated at 42±2 °C for 3 hrs. (Tamime and Robinson,1999). All samples of yogurt were stored at 4±2 °C for 1, 3, 7, and 14 days. Samples were then subjected to some chemical, physical and sensory evaluation assessments.

Determination of yogurt gel firmness or hardness

The firmness and hardness of stored yogurt were measured using a texture analyzer Steven–LFRA. With probes TA7 using penetration speed of 1.0 and 0.5 mms-1 and penetration distance of 10 and 0.5 mm, respectively using texture analyzer Steven–LFRA. Yogurt gel strength or hardness was expressed in gm/cm^{-2} indicating the force required to break the gel as described by Bourne, 1978.

Determination of Yogurt whey syneresis

Whey syneresis of yogurt was determined according to the method reported by Isanga and Zhang, 2009 with some modifications. 25gm of yogurt sample at 4-6 °C was filtered by a filter paper filtered (Whatman No.1). The volume of drained whey was collected for 2 hrs.

Sensory evaluation of Yogurt

Sensory evaluation was conducted by 7, members selected from the college staff at the Department of Food Science, Salahaddin University. Yogurt samples were evaluated for appearance, texture, body, flavor, and acidity). Overall acceptability was based on a 100 point according to Nelson and Trout, 1964.

Statistical analysis

All data were analyzed using CRD (Completely Randomized Design) by the SAS institute program (SAS, 2005). Duncan's multiple range tests were used to compare differences among the treatments.

RESULTS and DISCUSSION

Blends tests

The results in table -1- shows the total solid % and pH values of cow milk and soymilk blends, the result indicates that the addition of soymilk leads to increasing of total solid % and pH values which were proportional with the increasing amount of soymilk added, the increase was significant between T1 and T2 compared with the T6 this is due to the soymilk that contained higher total solids than cow milk.

Table-1-Total solid % and pH of cow milk and its blends with soy milk.

Treatments	Total solid %	pH
T1	11.95^{b}	6.60^{b}
T2	12.05^{b}	6.79^{b}
T3	12.14^{ab}	6.89^{ab}
T4	12.26^{ab}	6.95^{ab}
T5	12.39^{ab}	7.08^{ab}
T6	12.61^{a}	7.14^{a}
SEM	0.33	0.28

T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25. $^{a, b}$ means within columns with different superscripts differ significantly at (P≤ 0.05).

Similar results have been reported by Osman and Razig, 2010, while the results obtained in the current study differed with studies carried out by Onuorah *et al*.,2007 Al-Sharifi, 2013 and Ugoch, *et al*. 2015, where the percentage of solids was less, and this may be due to a difference in the method of extraction especially in the amount of added water during extraction, the duration of seeds soaking and the types of varieties. Regarding the results of pH, it was also differed compared to the results found by Udeozor, 2012 and Al-Sharifi, 2013, they were higher indicating that it is slightly alkaline in nature compared to the cow milk, which may be due to the different extraction methods, percentage of total solids and the quality of extracted proteins and the percentage of phosphates. However, the result of the present study was in agreement with findings that have been reported by Arora, *et al*., 2018.

Effect of addition soymilk on yogurt fermentation time
The pH of yogurt samples was determined each 30 min during fermentation time of 3 hrs. at 42±2 ºC. The results in Table -2- showed that control and cow milk mixed with soymilk samples reached the close values of pH within 3 hrs. of incubation, even though practically the coagulation was observed for samples to which soymilk was added at a shorter time, ranging between 2.30 and 2.45 fermentation time with increasing of soymilk percentage.

This may be due to the increase in total solids in mixtures, as shown in Table -1-, besides that it has been stated by Riaz, 2006 and Svejstil *et al.*, 2015 Soymilk contains many soluble oligosaccharides including Stachyose, Raffinose, and sucrose, as well as those sugars, are metabolized by many species of lactic acid bacteria as a source of energy to produce many types of fermented dairy products Hassanzadeh-Rostami *et al.*, 2014. Also, the coagulation rate of samples resulting from mixing cow's milk with soymilk may be due to the difference in the isoelectric point (PI) between cow's milk with soymilk, as Hsia *et al.*, 2016 mentioned that different fractions of the soymilk protein have an electric point ranging from 5.07 to 5.88 in which for cow's milk is 4.6-4.

Table-2-Effect of soymilk addition on yogurt fermentation time

Treatments	Fermentation time (pH)					
	0.5hr.	1hr.	1.5hrs.	2hrs.	2.5hrs.	3hrs.
T1	6.41 [a]	6.27 [a]	5.83 [a]	5.50 [a]	5.50 [a]	4.65 [a]
T2	6.59 [a]	6.38 [a]	5.60 [ab]	5.13 [ab]	4.93 [b]	4.64 [a]
T3	6.58 [a]	6.28 [a]	5.55 [ab]	5.06 [b]	4.99 [b]	4.63 [a]
T4	6.47 [a]	6.22 [a]	5.33 [b]	5.03 [b]	4.96 [b]	4.62 [a]
T5	6.43 [a]	6.17 [a]	5.21 [b]	5.08 [b]	4.95 [b]	4.60 [a]
T6	6.28 [a]	5.90 [a]	5.12 [b]	5.04 [b]	4.92 [b]	4.61 [a]
SEM	0.11	0.13	0.35	0.33	0.42	0.02

Effect of soymilk addition on yogurt pH during storage
Table -3- shows the results of yogurt samples pH during cold storage at 42±2 ºC for 14 days.

Table-3-pH values of yogurt samples during storage time.

Treatments	Storage time (pH)		
	1 Day	7 Days	14 Days
T1	4.71 [a]	4.18 [a]	3.95 [a]
T2	4.69 [a]	4.15 [a]	3.85 [ab]
T3	4.68 [a]	4.11 [a]	3.81 [ab]
T4	4.67 [a]	4.08 [a]	3.77 [ab]
T5	4.65 [a]	4.05 [a]	3.73 [ab]
T6	4.61 [a]	4.03 [a]	3.60 [b]
+SEM	0.18	0.09	0.28

T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25. a, b means within columns with different superscripts differ significantly at (P≤ 0.05). The same superscripts among the treatments mean insignificant.

T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25.[a, b] means within columns with different superscripts differ significantly at (P≤ 0.05). The same superscripts among the treatments mean insignificant.

It was observed that the pH values for all samples thrown down continuously throughout the storage period in a similar way, yogurt samples treated with soymilk were characterized by slightly lower pH values as compared to the control sample. It is noted that the lowest pH (3.6) was detected in the sample T6 during storage for 14 days when 25% cow milk was substituted by soymilk which was significantly different compared to control. The pH reduction could be possibly explained due to soymilk being a suitable medium for the growth of some types of lactic acid bacteria during cold storage by consuming residual sugars in Soymilk, which in turn decreases pH as a result of its metabolic activity (Božanić *et al.*, 2011). These results were agreed with Osman and Razig,2010 and Niamah, *et al*.,2017, they found that the pH values for processed fermented products using soymilk decreased, and the total acidity percentage increased during the cold storage period.

Effect of soymilk addition on yogurt syneresis during storage

It is shown from figure (1) that whey separated for all samples was decreased during cold storage periods, the significantly lowest amount revealed in the samples of yogurt in which cow milk was replaced with greater amounts of soymilk, the maximum and minimum decreasing of (3.65 and 4.3 ml/25gm) obtained after 14 days of storage with replacement of cow milk by %25 soymilk and control respectively.

The results of the present study differ from results obtained by Osman and Razig (2010), where they found that the use of soymilk in yogurt production led to an increase in the amount of separated whey during cold storage. The obtained results may be due to the increase of total solids with an increment of soymilk concentration as shown in table (1) and can be described due to the increase of yogurt gel ability to entrap more water as a result of denaturation of soymilk proteins and produced complexes with their components and with denatured cow milk proteins during heat treatment of milk blends through yogurt processing which changes the gel stability to adequate matrix characterized by small pore size and less permeability of yogurt gel with the addition of soymilk (Malaki Nik, *et al.*2008).

Effect of soymilk addition on yogurt hardness during storage

The hardness of yogurt is one of the most important quality criteria, The maintenance of a uniform texture and hardness among different units, processing dates and shelf life is a prime goal in yogurt production (Chanasattru *et al*. 2002 and Abdulqadr, *et al*. 2015).

Figure-2- showed that the hardness characteristic was significantly superior for all soymilk added yogurt samples during all storage periods compared to the control sample, except with 10% soymilk concentration during storage of 7 days. The higher gel strength (19 gm cm^{-2}) for T5 compare to T1 control

samples with (6.9 gm cm^{-2}) was recorded during 14 days of cold storage. It revealed that the protein aggregation (protein matrix) is clear in soymilk treated samples appeared to be more compact with regular distribution of protein network and it enhanced during cold storage. The obtained results are due to increasing of total solids with an increment of soymilk concentration as the shown table (4) and this might be attributed to the formation of some bonds between soy and cow milk proteins influencing the protein network. Different results were obtained by Park *et al.*2007, when they used a mixture of skim milk and soymilk in yogurt production. They found that increase in the proportion of soymilk led to a decrease in the gel strength of the product.

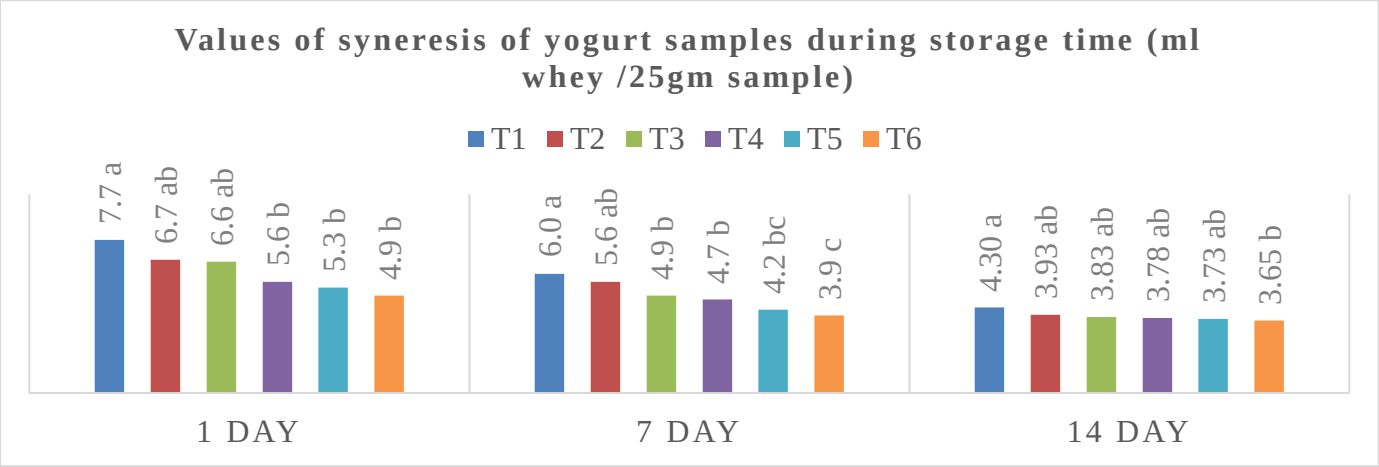

Figure-1-values of syneresis of yogurt samples during storage time.

T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25.a, b, means within columns with different superscripts differ significantly at (P≤ 0.05). The same superscripts among the treatments mean insignificant.

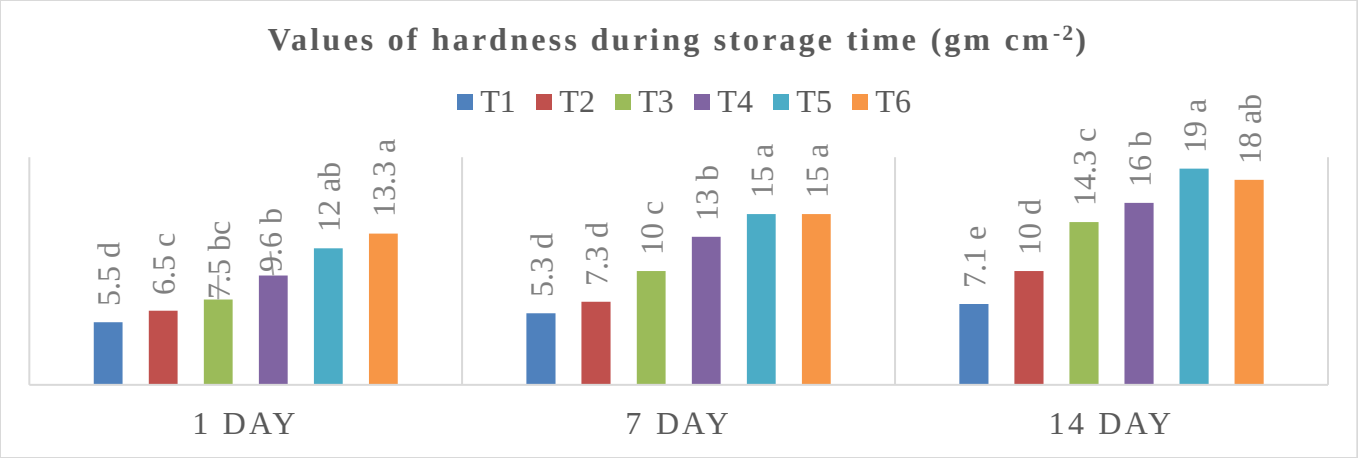

Figure-2-Values of hardness during storage time
T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25. $^{a, b, c, d, e}$ means within columns with different superscripts differ significantly at (P≤ 0.01) & (P≤ 0.05). The same superscripts among the treatments mean insignificant.

Sensory evaluation of yogurt during storage

Regarding the sensory evaluation, T6 showed the high total scores of sensory attributes and significantly differed from T1, T2, and T3 (Table 4), similar results were recorded by Park et al. (2007) who illustrated that the increasing of soymilk ratio which mixed with skim milk for yogurt processing enhanced the sensory qualities of the final product compared to control sample.

A result in table (4), showed significant variation for appearance scores among control and different samples treated by soymilk replacement. Replacement of cow milk by soymilk has positive effects on appearance, the mean scores for appearance increased with increasing the percentage of soymilk, these samples are characterized by smooth and dry surfaces. On the first day of storage, the minimal value (9.5) of appearance was obtained for T1 and the maximum score (19.3) was obtained upon T6 when soymilk was added in the percentage of 25%.

Table-4-Sensory properties of yogurt during storage time.

Treatments	Storage period(days)	Appearance 20	Texture 15	Body 15	Flavor 35	Acidity 15	Total %	Average %
T1	1	9.5 ^{d}	7.5 ^{d}	7.5 ^{e}	28.5 ^{ab}	14.0 ^{a}	67.0 ^{e}	70.37 ^{d}
	7	10.5 ^{c}	10.1 ^{bc}	11.0 ^{cd}	31.0 ^{a}	13.6 ^{ab}	76.2 ^{c}	
	14	10.3 ^{c}	7.8 ^{c}	8.8 ^{de}	28.0 ^{ab}	13.0 ^{b}	67.9 ^{de}	
T2	1	13.2 ^{bc}	9.0 ^{a}	9.5 ^{d}	27.8 ^{b}	14.3 ^{a}	73.8 ^{cd}	74.40 ^{c}
	7	12.6 ^{bc}	11.0 ^{bc}	11.8 ^{c}	25.3 ^{bc}	13.3 ^{ab}	74.0 ^{cd}	
	14	14.0 ^{b}	8.8 ^{c}	12.0 ^{c}	27.8 ^{ab}	12.8 ^{b}	75.4 ^{cd}	
T3	1	13.8 ^{b}	10.8 ^{bc}	10.8 ^{cd}	22.5 ^{c}	12.8 ^{b}	70.7 ^{d}	74.63 ^{c}
	7	13.3 ^{bc}	11.0 ^{bc}	12.6 ^{bc}	30.6 ^{a}	13.3 ^{ab}	80.8 ^{b}	
	14	13.6 ^{b}	10.2 ^{b}	11.2 ^{cd}	26.2 ^{bc}	11.7 ^{c}	72.4 ^{cd}	
T4	1	17.0 ^{ab}	12.3 ^{b}	13.5 ^{b}	25.8 ^{bc}	13.5 ^{ab}	82.1 ^{a}	82.83 ^{ab}
	7	14.6 ^{b}	12.8 ^{b}	13.3 ^{b}	30.8 ^{a}	13.6 ^{ab}	85.1 ^{ab}	
	14	16.0 ^{b}	12.7 ^{b}	12.3 ^{bc}	28.3 ^{ab}	12.0 ^{bc}	81.3 ^{b}	
T5	1	19.0 ^{a}	14.0 ^{ab}	14.5 ^{ab}	20.8 ^{d}	13.0 ^{b}	81.3 ^{b}	

	7	17.6 ^{ab}	14.3 ^{ab}	14.8 ^{ab}	21.2 ^{cd}	12.8 ^{b}	80.7 ^{b}	81.53 ^{b}
	14	16.8 ^{b}	14.0 ^{ab}	13.2 ^{a}	27.0 ^{b}	11.6 ^{c}	82.6 ^{b}	
T6	1	19.3 ^{a}	14.5 ^{a}	14.7 ^{ab}	19.6 ^{d}	12.3 ^{bc}	83.3 ^{b}	
	7	17.5 ^{ab}	14.8 ^{a}	15.0 ^{a}	28.8 ^{ab}	13.3 ^{ab}	89.4 ^{a}	83.43 ^{a}
	14	17.3 ^{ab}	13.8 ^{ab}	13.8 ^{ab}	21.0 ^{cd}	11.2 ^{c}	77.6 ^{c}	
SEM		3.08	3.12	3.35	3.11	1.83	6.13	5.03

T1(control)100:0, T2 95:5, T3 90:10, T4 85:15, T5 80:20 and T6 75:25.$^{a, b, c, d, e}$ means within columns with different superscripts differ significantly at (P≤ 0.01) & (P≤ 0.05). The same superscripts among the treatments mean insignificant.

The texture and body properties for all samples treated with soymilk were more sensorily acceptable than control samples during storage, high scores were obtained by the increment of the soymilk concentration table (4). Maximum values (14.8 and 15) and minimum values (7.5 and 7.5) were recorded for texture and body of T6 and T1 respectively. These results ensure the results gained for syneresis and

hardness properties of yogurt produced with increasing the level of soya bean milk. On the contrary, concerning the properties of flavor T1 exhibited a significantly higher (31) score for flavor compared to yogurt replaced by soymilk whereas the lowest value(19.6) was recorded in T6, as Sowonola , *et al* ,2005 , Al-Sharifi, 2013 and Shakeel, *et al.* (2015) stated that Soybean has a particular beany flavor due to the presence of some aldehyde compounds pentanal, n-hexanal and phytoestrogens (Božanić *et al.* 2011) which is not familiar by most consumers and to overcome this, the milk was sweetened with sugar and flavored with fruit flavors. Table (4) revealed that samples treated with soymilk gained nearby low scores for acidity compared to control (14), with minimum scores (11.2) observed for soya treated 25% sample, these results indicate that fermentation resulted by lactose was more preferable by panelists.

CONCLUSIONS:

Soymilk blends characterized by high total solid contents with higher PH value, the yogurt sample produced from soya bean and cow milk blends distinguished by a low volume of whey syneresis and higher values for hardness compared to control in regards to sensory evaluation, with increasing of soymilk concentration the yogurt samples gain higher scores for body and texture with lower scores for flavor and acidity.

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