

Standardization and development of process for *Sheerqurma* and its shelf-life

Study

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Abstract: The aim of investigation was to utilize dry nuts in milk to make a *Sheerqurma* by standardizing khoa and sugar levels in it. The *Sheerqurma* was prepared by standardized processing parameters and finalized according to sensory and physicochemical analysis. Based on sensory and physicochemical analysis, the product containing 5% khoa and 15% sugar was found to secure the highest sensory score. It was revealed that there was gradual increase in acidity, specific gravity, density, T.S.S, total solid as percent of khoa or sugar increased where pH and moisture decreased. The product was evaluated for its shelf life stability in LDPE, HDPE pouch, PET and Glass bottle in refrigerator at 4°C. According to sensory analysis and microbial counts, *Sheerqurma* was found to remain stable till 5th day in glass bottle. Where in LDPE and HDPE pouch Total Plate Count and Coliform was observed on 3rd day and in PET bottle on 5th day. While yeast and mould was observed on 5th day after an incubation of 3 days.

Key words: *Sheerqurma*, khoa, sugar, sensory parameter, microbial count, shelf life.

Introduction

The dairy industry is the largest industries in India. India ranks first in milk production; accounting for 18.5 percent of the world production, with an average production of 143.3 million tons per annum in 2014-15; of this about 50 to 55 percent of the total milk production is converted into traditional milk products (Patel and Bhadania, 2014). Maharashtra is the sixth largest milk producing state in the country (Kaware and Yadav, 2014).

Sheer-Qurma literally ‘Milk with dates’ in Urdu. In Sanskrit *Sheerqurma* has a same meaning as *Sheer* is persian for milk and *Qurma* is persian for dates. This dish is made from dried dates and milk. Conventionally it is prepared by partial dehydration of whole milk in a pan over direct fire together with sugar and usually dryfruits and vermicilli. Therefore there is a need to simplify and standardize the processes of preparing traditional dairy products, which would not only reduce preparation time but also, would be convenient to use Kadam *et al.* (2011).

Traditionally *Sheerqurma* is a sweet delicacy drink having many varieties with distinct characteristics attributed to the specific area in both the developed and developing countries. There is an increasing consumer demand for high quality convenient ready-to-drink food products which has led to an increase in the commercial production of ready-to-drink products. Mohammedali Shihab *et al.* (2013).

In any product development process, sensory attributes play an important role in deciding the acceptability of the product Gotarne *et al.* (2015). Dried fruits are widely used in confectionaries, bakery products, sweet and dairy industries. Industrial food manufacturing units widely make use of dried fruits in soups, sauces, marinades, puddings, food formulas for children and infants, etc. Singh Neha *et al.* (2013). In almost all countries Nuts are consumed as snacks, deserts, part of meal and are eaten whole fresh or roasted (Kannan and Sasikumar, 2014).

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Materials and Methods

Materials

The raw material such as almond, cashewnut, *charoli* (Buchanian Lanzan), dates, pistachios, milk, khoa, sugar, vanaspati ghee and cardamom, packaging materials viz. Low density polyethylene (LDPE) pouch, High density polyethylene (HDPE) pouch, Polyethylene Terephthalate (PET) bottle and Glass bottle were purchased from local market of Aurangabad.

Standardization of recipe formulation

The formulation of *Sheerqurma* was done in laboratory by using variation in proportion of khoa and other ingredients remaining constant. A standard recipe has been formulated according to Thari kanchi Payasam as reported by Mohammedali Shihab *et al.* (2013). Further the selected sample was assessed for the sugar variation. Formulation for different levels of khoa and sugar is presented in Table 1.

Methods of analysis

The physicochemical characteristics of *Sheerqurma* during standardization of khoa as well as sugar were examined to finalize the recipe formulation. The pH and acidity was calculated by standard method given in FSSAI Manual of Milk and Milk Products (2012). Specific gravity, Density and T.S.S. were determined according to the method described in AOAC (2005). Moisture content and Total solid were estimated by the method as given in AOAC (2005).

Sensory evaluation of prepared *Sheerqurma*

Sheerqurma were evaluated for sensory characteristics like appearance, color, flavor, taste, consistency and overall acceptability by 10 semi-trained panel members comprised of academic staff members of the Department of Agricultural Engineering, Maharashtra Institute of Technology. Judgments were made through rating products on a 9 point Hedonic Scale with corresponding descriptive terms ranging from 9 'like extremely' to 1 'dislike extremely' Gotarne *et al.* (2015).

Storage studies for shelf-life

The finalized *Sheerqurma* was packed in LDPE pouch, HDPE pouch, PET bottle and Glass bottle and stored at 4°C in refrigerator. The product quality was evaluated at interval of alternate days. During storage sensory parameters viz appearance and color, flavor and taste, consistency and overall-acceptability were evaluated by 9 point Hedonic scale (Prajeesha and Jayaraj Rao, 2015). While, Total plate count was determined according to Mustafa *et al.* (2013), Coliform count and Yeast & Mould count determined according Petrus *et al.* (2010) and Palthur *et al.* (2014).

Statistical analysis

The obtained data in the present investigation was statistically analyzed. The analysis of variance of the data obtained was done by using ANOVA (Analysis of Variance) for different treatments as per the method given by Dalim *et al.* (2012). The significance between treatments $P < 0.05$ level, S.E. and C.D. at 5% level were mentioned whenever required.

Result and Discussion

Standardization of processing parameters

All the dry nuts such as almond, cashewnut, pistachio, *charoli* and dates were soaked for 30 minute at 27°C in hot water for easy removal of peel of almond, charoli and pistachio. The soaked nuts were cut into required size by stainless steel knife then all the dry-nuts was allow to dry for removal of excess moisture in hot air oven at 80°C for 3 hour. The chopped nuts were fried in ghee then cardamom was added at the final stage.

Then the Khoa was mixed in the milk to make a homogeneous mixture then taken in the pan, sugar was added and the mixture was heated at 75°C for 20 second, for destruction of microbial load and to enhance the shelf life of *Sheerqurma*. Then allowed to cool up to 30°C then filled into LDPE pouch, HDPE pouch, PET bottle and glass bottles then stored at refrigeration temperature at 4°C.

Sensory evaluation of *Sheerqurma* to standardize a level of Khoa

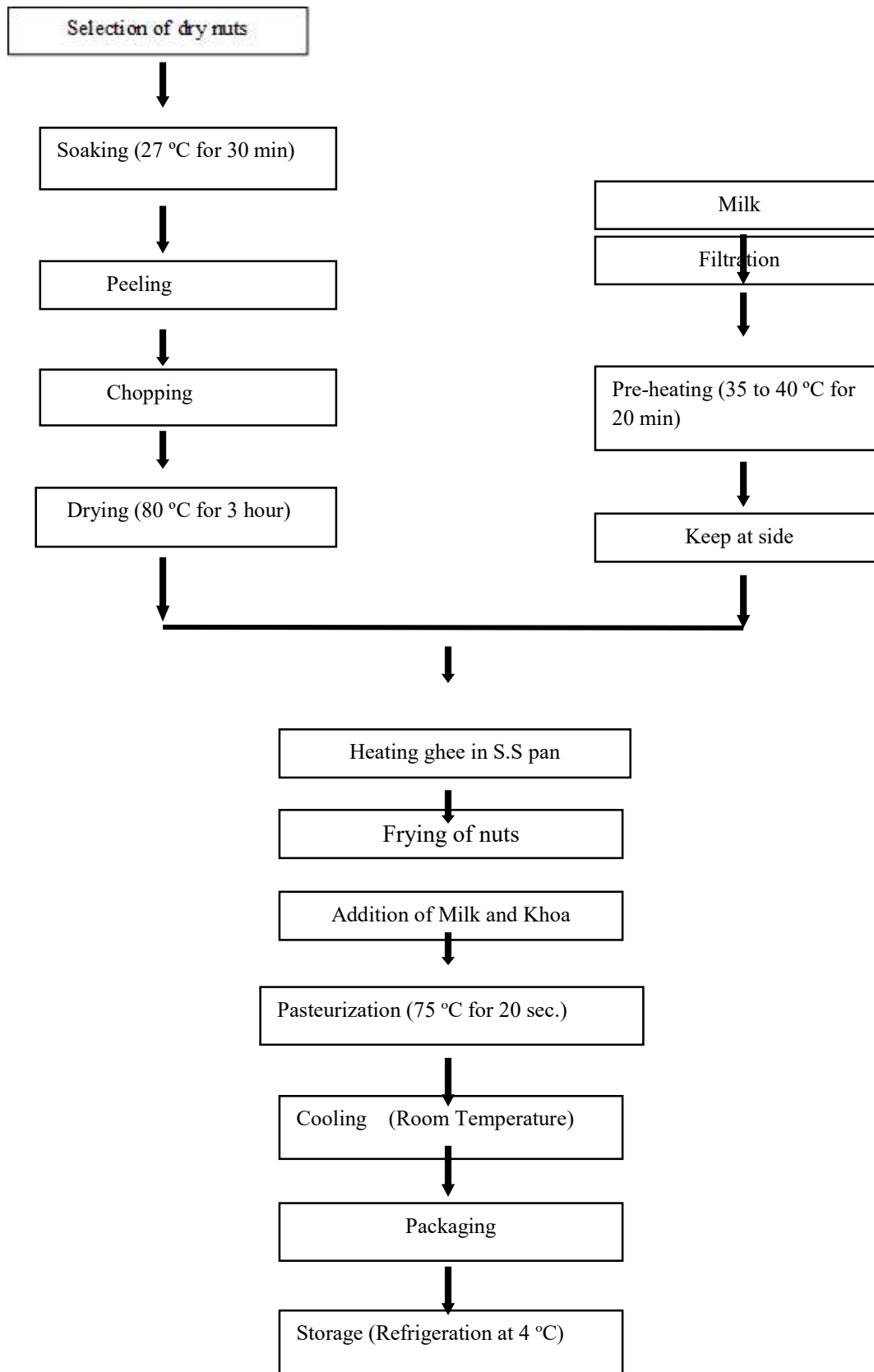
The *Sheerqurma* prepared by formulation of khoa at different percent were subjected to sensory evaluation. Scores recorded for different sensory parameters are presented in Table 2 and figure 1. Data from the table revealed that the score obtained among the four treatment as T_0 , T_1 , T_2 and T_3 contained 0%, 5%, 10% and 15% Khoa, the treatment T_1 having highest score in all parameter as appearance – 7.9, color – 7.8, flavor – 7.9, taste – 7.6, 7.8 for consistency as well as for overall acceptability.

It could be revealed that increasing a percent of Khoa beyond 5% slightly decreased the sensory score. Thus, the treatment containing the 5% khoa concentration was found superior with good overall acceptability and hence used for the further study for sugar assessment.

Physicochemical parameter of *Sheerqurma* during standardization of Khoa

During the formulation of recipe for *sheerqurma* a percent of khoa was standardized among four treatments and then selected for further studies. According to Table 3 *Sheerqurma* formulated by treatment T_0 , T_1 , T_2 and T_3 contained 0%, 5%, 10% and 15% Khoa having pH as 6.32, 6.21, 6.17 and 6.05 while acidity recorded as 0.10, 0.15, 0.22 and 0.22 percent. Among the four treatments,

Flow sheet for the preparation of standardized *Sheerqurma*



the formulation of treatment T₁ obtained same pH as of Thari kanchi payassam. The results are closely related with the results recorded by Mohammedali Shihab *et al.* (2013).

The specific gravity of *Sheerqurma* of T₀, T₁, T₂ and T₃ were 1.20, 1.21, 1.24, and 1.25. whereas density (g/cm³) was recorded as 1.18, 1.19, 1.22 and 1.24 then T.S.S recorded as 39.74°, 44.68 °, 45.75 ° and 49.60 °Brix, whereas percent moisture was recorded as 71.23, 68.69, 65.83 and 62.46 then Total Solid recorded as 28.77, 31.31, 34.17 and 37.54 respectively.

It was observed that as the percent of khoa increased then acidity, specific gravity, density, TSS, total solid also increased whereas pH and moisture decreased. The similar result was recorded by (Asif Mahmood and Sumaira Usman, 2010).

Sensory evaluation of *Sheerqurma* to standardize the level of sugar

The *Sheerqurma* prepared by formulation of sugar at different percent were subjected to sensory evaluation. Scores recorded

Table 1: Formulations of *Sheerqurma*

Ingredient	Control	Concentration of Khoa				Concentration of Sugar	
	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆
Milk	65	60	55	50	77.51	72.51	67.51
Khoa	00	05	10	15	05	05	05
Sugar	27.50	27.50	27.50	27.50	10	15	20
V. Ghee	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Almond	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Cashew	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Charoli	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Dates	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Pistachio	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Cardamom	0.01	0.01	0.01	0.01	0.01	0.01	0.01

All quantities are expressed in percent

Table 2: Effect of different levels of Khoa on sensory parameters of *Sheerqurma*

Sample	Appearance	Color	Flavor	Taste	Consistency	Overall acceptability
T ₀	7.6	7.4	7.3	7.2	7.0	7.3
T ₁	7.9	7.8	7.9	7.6	7.8	7.8
T ₂	7.7	7.7	7.8	7.7	7.5	7.7
T ₃	7.6	7.5	7.4	7.3	7.7	7.5
S.E (±)	0.244	0.300	0.305	0.305	0.300	0.285
C.D @ 5%	0.500	0.612	0.623	0.623	0.612	0.583

Each value represents the average of ten panelists

Where, T₀ – control without Khoa T₁ - 5% Khoa T₂ - 10 % Khoa T₃ - 15% Khoa

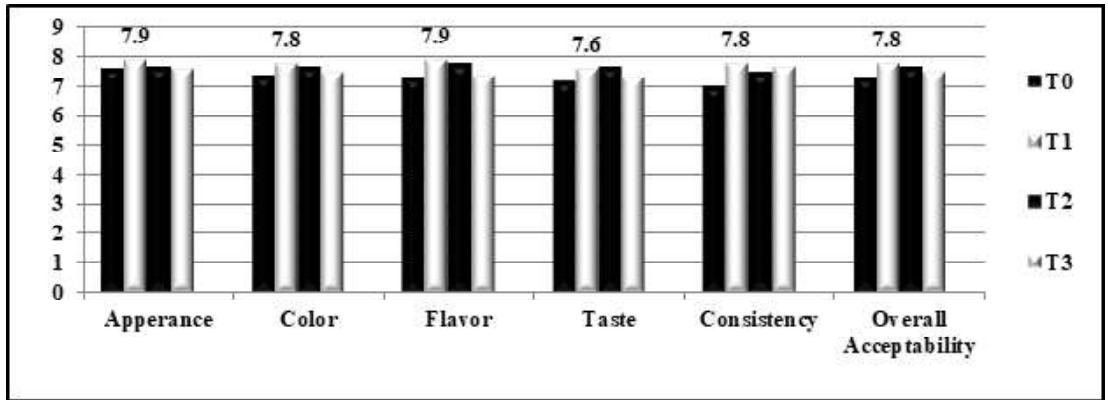
Table 3: Physicochemical parameters of *Sheerqurma* as influenced by khoa levels

Sample	Physicochemical parameter						
	pH	Acidity(%)	Specific gravity	Density(g/cm ³)	T.S.S° Brix	Total Solid (%)	Moisture(%)
T ₀	6.32	0.10	1.20	1.18	39.74	28.77	71.23
T ₁	6.21	0.15	1.21	1.19	44.68	31.31	68.69
T ₂	6.17	0.22	1.24	1.22	45.75	34.17	65.83
T ₃	6.05	0.22	1.25	1.24	49.60	37.54	62.46
S.E (±)	0.135	0.040	0.030	0.010	0.055	2.150	2.150
C.D @ 5%	0.428	0.091	0.071	0.024	0.128	4.958	4.958

Each value represents the average of three determinations

Where, T₀ - control without Khoa T₁ - 5% Khoa T₂ - 10 % Khoa T₃ - 15% Khoa

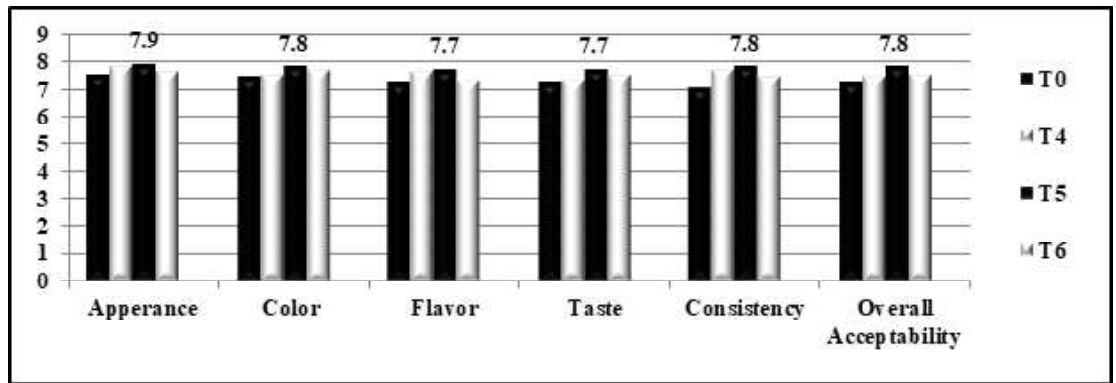
Figure 1: Sensory evaluation of *Sheerqurma* during standardization of khoa



Each bar-column represents the average of ten panelists

Where, T₀ - control T₁ - 5% Khoa T₂ - 10 % Khoa T₃ - 15% Khoa

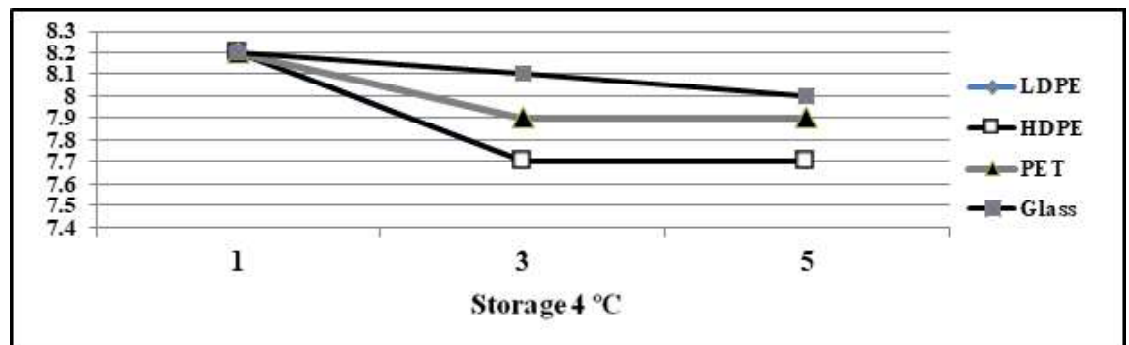
Figure 2: Sensory evaluation of *Sheerqurma* during standardization of sugar



Each bar-column represents the average of ten panelists

Where, T₀ - control T₄ -10% Sugar T₅ -15% Sugar T₆ -20% Sugar

Figure 3: Effect of packaging material on Appearance and Colour during storage



for different sensory parameters are presented in Table 4 and figure 2. Data from table revealed that among the scores obtained for the four treatments as (T₀, T₄, T₅ and T₆) containing 27.5%, 10%, 15% and 20% sugar, the treatment T₅ had highest score in all parameters as appearance – 7.9, color – 7.8, flavor – 7.7, taste – 7.7, 7.8 for consistency and overall acceptability. It could be judged that up to 15 percent was most acceptable to taste as more or less than 15 percent slightly decrease the sensory score.

Thus, the treatment containing the 15 percent sugar was found superior with good overall acceptability and hence a recipe has been standardised by formulation of 5 percent khoa and 15 percent sugar.

Physicochemical parameters of *Sheerqurma* during standardization of Sugar

Figure 4: Effect of packaging material on Flavor and Taste during storage

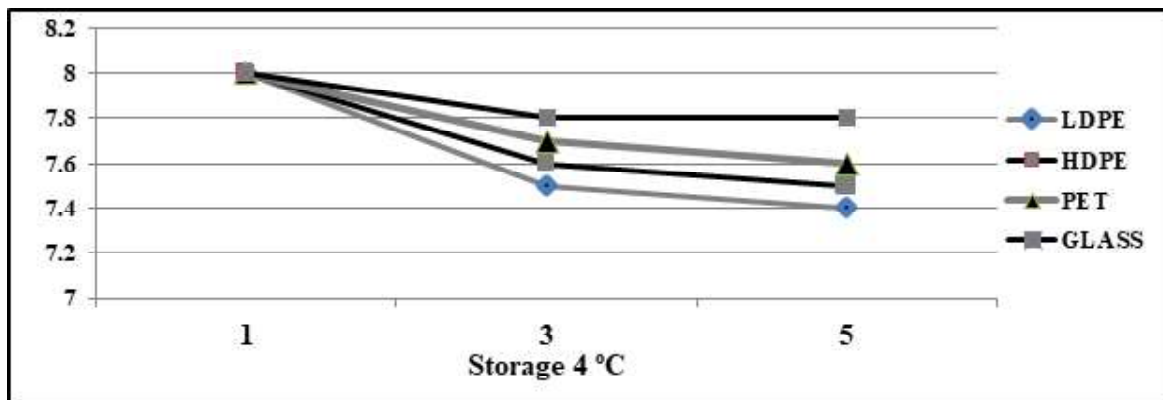


Figure 5: Effect of Packaging material on Consistency during storage

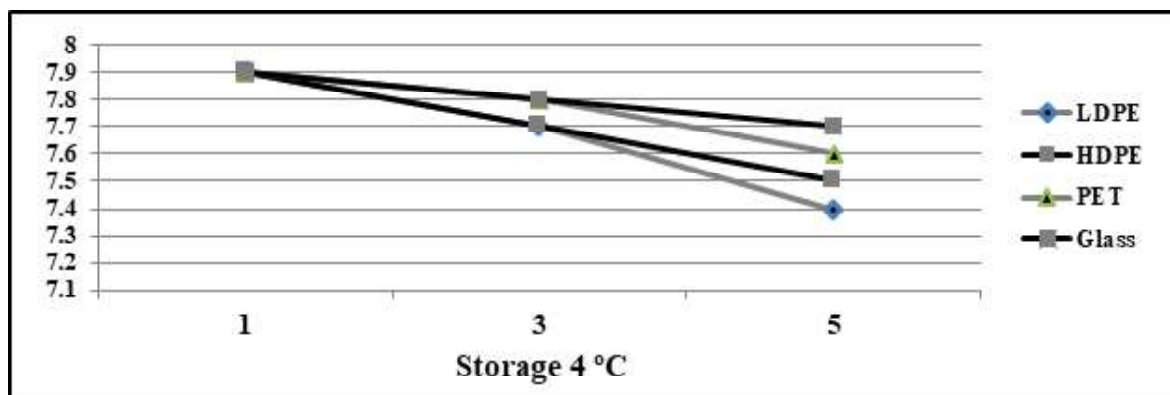
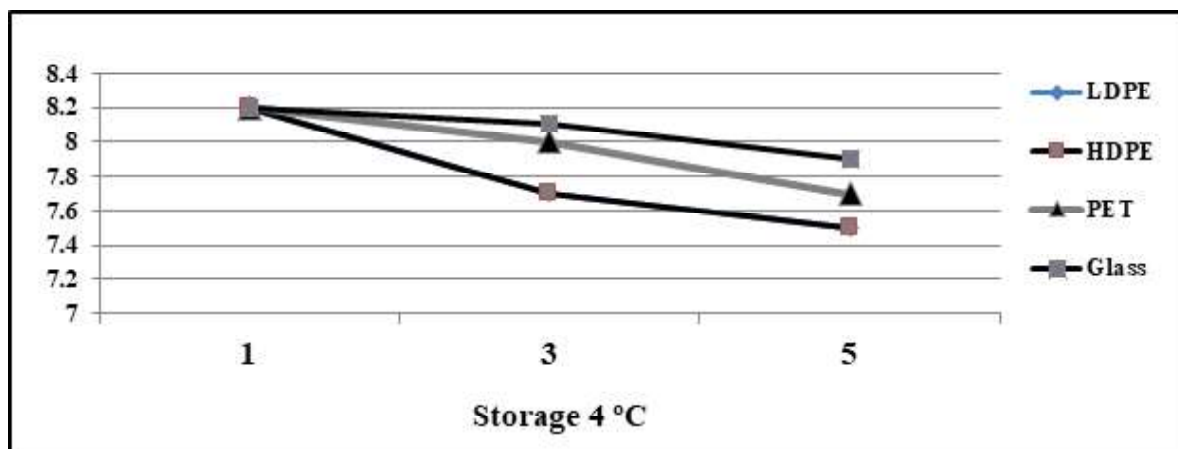


Figure 6: Effect of Packaging material on Overall acceptability during storage



During the formulation of recipe for *Sheerqurma* percent of sugar was standardized and then selected for further studies. According to Table 5 pH of *Sheerqurma* for as T₀, T₄, T₅ and T₆ containing 0%, 10%, 15% and 20% Sugar were 6.32, 6.39, 6.38 and 6.37 while acidity recorded as 0.11, 0.17, 0.18 and 0.20 percent. The results are closely related with the results recorded by Mohammedali Shihab *et al.* (2013).

The specific gravity of *Sheerqurma* for T₀, T₄, T₅ and T₆ were 1.20, 1.10, 1.13, and 1.17. whereas density (g/cm³) recorded as

1.18, 1.11, 1.12 and 1.14 and T.S.S recorded as 39.65°, 24.17°, 30.33 ° and 35.00 °Brix, whereas percent moisture was recorded as 71.13, 68.20, 66.83 and 64.78 then Total Solid recorded as 28.87, 31.80, 33.17 and 35.22 respectively.

It was observed as the percent of sugar increased then acidity, specific gravity, density, TSS, total solid also increased whereas pH and moisture decreased. The result was recorded by (Asif Mahmood and Sumaira Usman, 2010).

Figure 7: Effect of packaging material on Total plate Count during storage

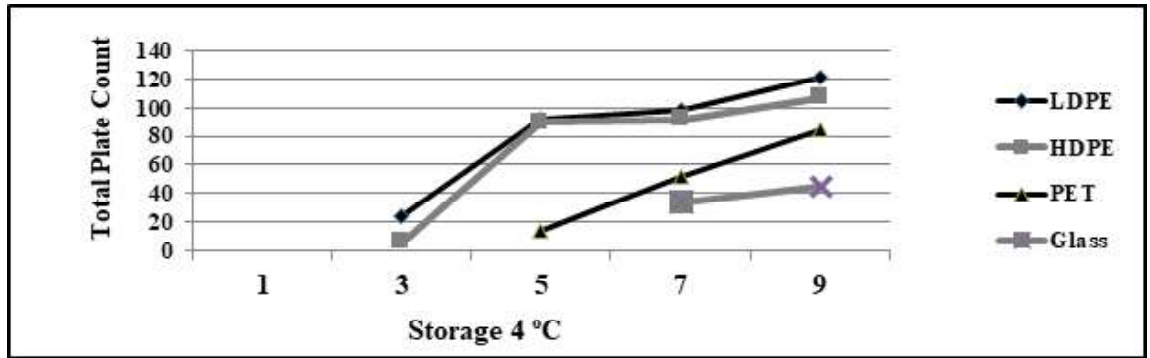


Figure 8: Effect of packaging material on Coliform Count during storage

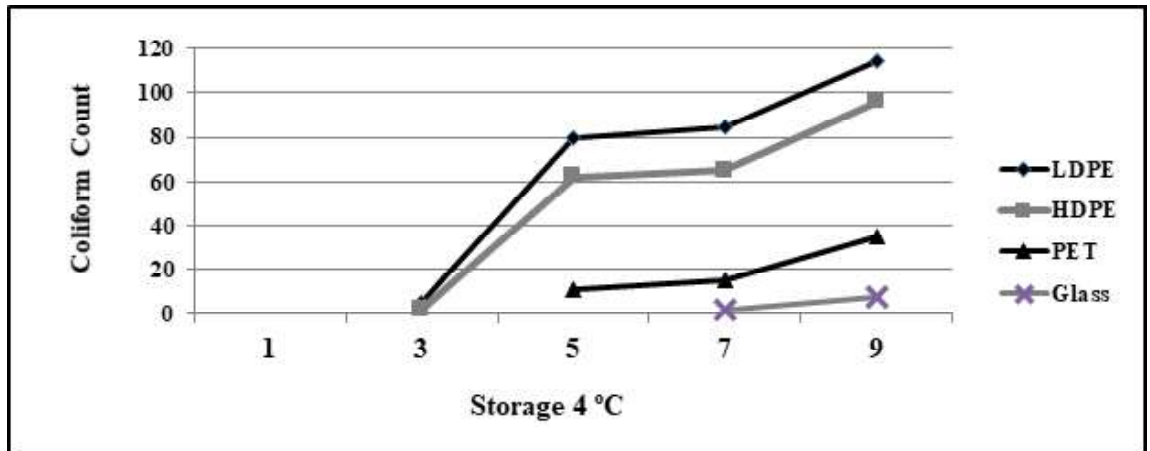
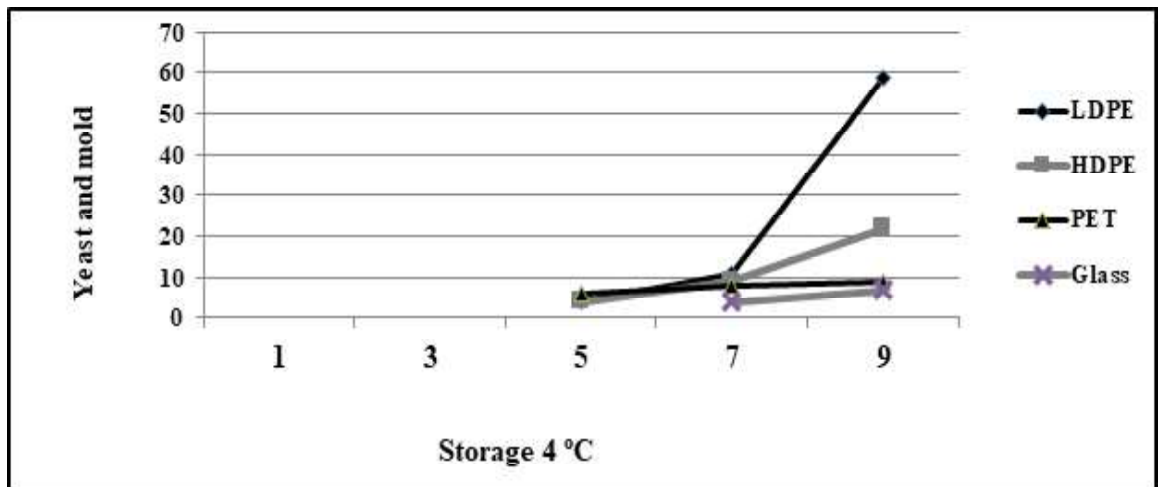


Figure 9: Effect of packaging material on Yeast and Mold Count during storage



Storage stability of *Sheerqurma* by LDPE and HDPE pouch, PET and Glass bottle

The shelf life of *Sheerqurma* was evaluated by using four types of packaging material: Low Density Polyethylene, High Density Polyethylene, Polyethylene Terephthalate and Glass bottle in refrigeration condition of 4°C at interval of alternate day by sensory evaluation on 9 point Hedonic scale. The results presented in Figure 3, 4, 5 and 6 represent a changes in sensory

score on storage as influenced by packaging material. The sensory score of appearance and color was 8.2 ± 0.83 on 1st day then slightly decreased as on 5th day was 7.7 ± 0.82 of LDPE and HDPE pouch, 7.9 ± 0.52 of PET, 8.0 ± 0.75 of Glass bottle. Where flavor and taste having initial score on first day as 8.0 ± 0.76 then decreased till 5th day as 7.4 ± 0.83 of LDPE, 7.5 ± 0.79 of HDPE, 7.6 ± 0.20 of PET and 7.8 ± 0.53 of Glass bottle.

Table 4: Effect of different levels of Sugar on sensory parameters of *Sheerqurma*

Sample	Appearance	Color	Flavor	Taste	Consistency	Overall acceptability
T ₀	7.5	7.4	7.2	7.2	7.0	7.2
T ₄	7.8	7.5	7.6	7.3	7.7	7.4
T ₅	7.9	7.8	7.7	7.7	7.8	7.8
T ₆	7.6	7.7	7.3	7.5	7.4	7.5
S.E(±)	0.252	0.311	0.306	0.329	0.280	0.297
C.D @ 5%	0.514	0.635	0.624	0.672	0.572	0.607

Each value represents the average of ten panelists

Where, T₀ – control T₄ –10% Sugar T₅ –15% Sugar T₆ –20% Sugar

Table 5: Physicochemical parameters of *Sheerqurma* as influenced by different sugar level

Sample	Physicochemical parameter						
	pH	Acidity(%)	Specific gravity	Density(g/cm ³)	T.S.S(° Brix)	Total Solid (%)	Moisture(%)
T ₀	6.32	0.11	1.20	1.18	39.65	28.87	71.13
T ₄	6.39	0.17	1.10	1.11	24.17	31.80	68.20
T ₅	6.38	0.18	1.13	1.12	30.33	33.17	66.83
T ₆	6.37	0.20	1.17	1.14	35.00	35.22	64.78
S.E(±)	0.013	0.017	0.002	0.005	0.420	0.715	0.715
C.D @ 5%	0.030	0.039	0.004	0.012	0.970	1.650	1.650

Each value represents the average of three determinations

Where, T₀ – control T₄ –10% Sugar T₅ –15% Sugar T₆ –20% Sugar

There was decrease in **consistency** of *Sheerqurma* as increase in Storage period as initially on 1st day a Consistency of *Sheerqurma* for all 4 packaging material was 7.9±0.74 but on 5th day slightly decreased as 7.4±0.82 of LDPE, 7.5±1.03 of HDPE, 7.6±1.03 of PET and 7.7±0.75 of Glass bottle. On 1st day Overall acceptance score was 8.2±0.79, while on 5th day Overall acceptability significantly decreased in all the packaging material as 7.5±0.82 for LDPE and HDPE, 7.7±0.45 for PET and 7.9±0.55 for Glass. It was observed that among four packaging material Glass bottle as compared to LDPE, HDPE pouch and PET bottle having a higher score in all 1st, 3rd and 5th day. These results were in accordance with the findings of (Prajeesha and Jayaraj, 2015).

Microbial quality of *Sheerqurma* during storage in different packaging material

The standardized *Sheerqurma* was packed in LDPE, HDPE pouch, PET and Glass bottle for examination of microbial quality as Total Plate Count, Coliform, Yeast and Mold during storage upto 9 days to evaluate the safety and keeping quality of *Sheerqurma*. The results recorded during the present investigation are presented in Figure 7, 8 and 9. As Total Plate Count, Coliform count, yeast and mold were not detected in the fresh sample then on the 3rd day LDPE, HDPE pouch showed the TPC and Coliform count while on 5th day in PET bottle microbial count was observed.

While in Glass bottle on 7th day all the three microbial counts were observed.

The microbial count increased with increase in storage period in all packaging material. The microbiological analysis showed that the product remained commercially stable till the 5th day in glass bottle during the entire period of storage at 4°C and confirmed the adequacy of processing as well as its consumption. The result found was more or less similar results reported by Petrus *et al.* (2010) and Palthur *et al.* (2014).

Conclusions

Thus in present of scientific data, it can be concluded as *Sheerqurma* can be prepared by using 0%, 5%, 10% and 15% khoa and 10%, 15% and 20% sugar. A good quality of *Sheerqurma* can be prepared with 5% khoa and 15% sugar on basis of sensory and physico-chemical analysis. According to packaging material based on sensory analysis a *Sheerqurma* can remained stable till 5th day in glass bottle while in LDPE, HDPE it gives off flavour which is unacceptable to consume. While based on microbial count *Sheerqurma* can remained stable till 5th day in glass bottle. Hence, the process of preparation of *Sheerqurma* was standardized for commercial exploitation.

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