

Comparison of traditional Doogh (yogurt drinking) and Kashk characteristics (Two traditional Iranian dairy products)

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ABSTRACT

The aim of the present study was to investigate the physicochemical characteristics of two traditional fermented Iranian dairy product that called "Doogh" and "Kashk". 4 samples of Doogh were taken from the different village including Arange, Shahryar, Lavasan and Taleh and 4 samples of Kashk were taken from the different region including Shahryar, Lavasan, Sohanak and Zanjan. In the Kashk samples, the mean values of pH, acidity, fat, protein and salt content were 4.01, 0.32%, 2.99%, 12.41%, 1.20 and for Doogh samples, the mean values were 3.35, 0.81%, 2.56%, 2.57% and 0.72 % respectively.

Key words: Fermented Iranian dairy product, Kashk, Doogh

INTRODUCTION

Middle East is the origin of different and traditionally fermented dairy products. A number of studies on food fermentation demonstrated the importance of these products due to the ability of them to inactivation or decomposition of anti-nutritive component, toxins, as well as improvement of digestibility of nutrient [1]. During fermentation reaction in milk, commonly LAB metabolize lactose to lactic acid and consequently pH reduction and higher titratable acidity (TA) were occur, therefore the pathogens organisms will not grow in fermented dairy products [2].

There is a significant relationship between the consumption of fermented dairy products and the health of people.

The different climate (in the same time) in Iran makes the production of a wide range of dairy fermented products [3]. According to codex standard Doogh (yogurt drinking) is a traditional dairy Iranian drink based on fermented different milk. This product consumption in the country, and so exported to another countries such as Armenia, Azerbaijan, Afghanistan, Balkans, Iraq, and to lesser extent, central Asia and some part of the Middle East. 'Doogh' has been derived from a Persian word 'dooshidan' that means 'milking'. Traditionally, Doogh referred to a drinking product that produced from the dilution of yogurt after a strong agitation step in special water proof sacs made from goat sheep skin or goatskin, called 'Mashk' [4]. Today's, Doogh is characterized by specific chemical, physical, microbiological physicochemical and sensory properties as outlined in Iran [5]. Doogh, as an Iranian popular dairy drink, with an increasing annual consumption of 13 million tons, is known as the traditional National Drink in the Iran [5]. The popularity of this product arises from its especial organoleptic properties along with some health benefits on human health. The production amount of Doogh reached 14,400,000 tons, in 2009 and about 1%

of which has been the total export amount of the product. In Iran, the consumption of this product has shown the greatest rate of growth among all dairy products in recent years. The increased rate of production during 2008-2009 was 68%, total consumption, total export and total annual production in 2009 was 1250000, 150000 and 1400000 ton respectively [4]. Some different surveys shows that Doogh is potentially acceptable in European people and a day by day increasing demand is being observed for its consumption and export [6].

Another popular and traditional fermented Iranian dairy product is Kashk. Kashk is mentioned in the 10th-century in Shahnameh (a Persian book of poetry). In fact this word must have come from Khushk (Persian word that meaning drying) which indicates that this product is prepared through drying process. Today's, kashk is a whitish thick liquid like as whey or similar to sour cream, used in traditional Iranian /Persian cuisine, like Kashk O Bademjan, Ash Reshteh, Kale Joush. It is available as a dried or liquid form. Dried product which needs to be soaked before it can be used in cooking. Traditionally Kashk was produced from the leftovers of cheese-making. The procedure is, removing butter from milk; the remainder can be used as the base for Kashk. The water is dried from this whitish liquid and what remains is Kashk which can be more dried, also spices are added in it. The shape of the product is conic or cubic balls and sold in sacks in bazaars in Iran. It is the main protein source of nomad people in Iran [7].

In addition to industrial manufacturing of Dough and Kashk both of these products are produced traditionally and according to high production of this product, studied about its properties are interested. Therefore the aim of this study was compare of the physicochemical characteristics properties of some traditional Iranian Doogh and Kashk.

MATERIALS AND METHODS

Material

Four samples of traditional Kashk were obtained from 4 different villages in Iran including Shahryar, Lavasan, Sohanak and Zanjan. Also four samples of traditional Doogh were obtained from four different village include Arange, Shahryar, Lavasan and Taleh. Sampling of each product was done according to International standard No. 326 [5].

Methods

Ph and titratable acidity was measured according to the method of international standard number 2852 [5]. Moisture, protein and ash were measured according to the method of international standard number 637, 639 and 1755 respectively [5]. Salt content was measured according to the method of international standard number 694 and 1809 for doogh and kashk respectively [5]. Calcium and phosphors were measured according to AOAC, (1990) [8].

Data Analysis

Data collected from the aforementioned study samples were analyzed based on 0.05% coefficient of error by a software program. The data analysis was performed using MINITAB statistical software, release 14.2 (MINITAB Inc., state college, PA and USA). At first such software program proved samples normal conditions and then the significant difference among data was precisely studied via Anova – one-way test.

RESULTS AND DISCUSSION

Table 1 and 2 shows the physicochemical properties of traditional Doogh and Kashk samples taken from different region. Moisture contents of the Kashk samples were found between 73.91% to 78.41%. High content of moisture and fat in the samples resulted with a soft texture and vice versa. From the customer's perspective, Kashk with low moisture and high fat content makes better sense and mouth feel. Fat is among one of the important component of milk and milk product and contribute taste, flavor, quality, and nutritional value in the final product. Fat percent was obtained between 2.46% to 3.35%, which was an effective factor on softness of the samples. Between the experimental samples the highest and lowest moisture were belonged to Zanjan (78.41%), Shahryar (73.91 %) and the highest and lowest of fat content related to Zanjan (3.35%) and Sohanak (2.46%) respectively. Statistical analysis has shown significant difference between moisture of Shahryar and fat of Zanjan with others Kashk samples. Moisture and fat content of these entire samples were accepted when compared them with international standard. The moisture content of all experimental Doogh samples statistically were similar and varied from 93.15 % and 95.20. Fat content of Doogh samples has shown sharp difference and this difference statistically was significant. The highest level of fat content was belongs to Doogh of Arange (3.50%). The lowest fat content (1.63

%) refers to Lavasan Doogh and showed significant difference with other samples. Actually Lavasan Doogh is diet product and recommended for people with overweight.

Usually most part in total solid of Kashk is composed of nitrogenous substance that refers to proteins. These proteins component are important and valuable in terms of biological value especially when they derived from animal sources. Average protein contents of Kashk samples were about 12%. This value is near the protein contents of some cheeses. So, it can be said that Kashk is a suitable source of animal protein, carrying an important role in diet of its consumers. There isn't any statistically difference between protein content of Shahryar and Sohanak and both of them has higher protein content than Lavasan and Zanzan and this difference was statistically significant.

Protein content of Doogh samples were low and its average were about 2.60%. Protein content in all the samples was rather similar but Arange Doogh has shown the highest level (2.89%).

Salt is an ingredient contributing taste, consistency and Safety. In Kashk and Doogh production process salt should be added to product. So Kashk with this salty characterization becomes important in usage area such as cooking. People add Kashk on food (such as Ash Reshteh) like sauce. In this case cookers add lower salt in food. Salt content of Shahryar (1.47%) and Sohanak (1.52%) have statistically similar and higher than Lavasan (0.89%) and Zanzan (0.95%).

Statistical study performed to determine significant difference between Taleh Doogh with others. Taleh Doogh showed highest salt percent (1.13%) however it was in acceptable limit. According to international standard of Iran maximum percent of salt for Doogh and Kashk was 1 and 2 % respectively and so all of samples include Doogh and Kashk were acceptable.

During fermentation by lactic acid bacteria, lactose in milk metabolized and converts to lactic acid and for this reason acidity increased it means decrease of Ph. Acidity of Kashk sample was varied from 0.23% (Lavasani) to 0.48% (Shahryar) and which has effect on the flavor and taste of the food. In Doogh samples the highest acidity refers to Arange (1.02%) and in compare to another sample this difference was significant. The Ph of All samples was lower than 4.6. In this case, it can be said that Kashk is an acidic product when pH values were considered (The product having Ph values between 3.7 and 4.6 derived in acidic product). Also, low Ph may contribute for safety of the food stuff.

Ash content refers to total mineral in food. Ash content of the entire experimental samples (Kashk and Doogh) statistically was similar, but ash content of Kashk was higher than Doogh. According to International standard ash content should be below 2.5% and therefore the ash content of all Kashk samples were according to International standard.

Table 1: physicochemical properties of traditional kashk¹

Properties	Shahryar	Lavasani	Sohanak	Zanzan	Acceptable limit [*]
pH	3.85±0.00 ^b	4.11±0.01 ^a	4.03±0.00 ^a	4.08±0.02 ^a	4.2 max
acidity	0.48±0.03 ^a	0.23±0.03 ^b	0.26±0.07 ^b	0.31±0.05 ^b	1.3 – 2 (%)
Fat	3.14±0.62 ^b	3.01±0.41 ^b	2.46±0.16 ^c	3.35±0.51 ^a	1 (%) min
Moisture	73.91±3.01 ^b	77.83±2.94 ^a	76.49±1.59 ^a	78.41±1.47 ^a	82 (%) max
Protein	13.83±0.48 ^a	11.61±1.47 ^b	13.60±2.01 ^a	10.63±1.54 ^b	8 (%) min
Salt	1.47 ± 0.02 ^a	0.89±0.05 ^b	1.52±0.06 ^a	0.95±0.021 ^b	2 (%) max
Carbohydrate	13.74 ± 1.10 ^a	12.98 ± 2.18 ^{ab}	14.09±1.65 ^a	11.48±2.59 ^b	-
Ash	1.33±1.69 ^a	1.10±0.98 ^a	1.59±1.20 ^a	1.06±1.93 ^a	2.5 (%) max
phosphorus	0.22±0.01 ^a	0.31±0.06 ^a	0.26±0.04 ^a	0.18±0.04 ^a	-
Calcium	0.24±0.03 ^a	0.25±0.05 ^a	0.19±0.01 ^a	0.21±0.02 ^a	-

¹ The values reported are mean ± SD

*: International standard [5]

Different letters in each column are indicate statistical difference at 5% level.

Calcium and phosphorus is essential and valuable macronutrients in the human diet. Most of the phosphorus in the body is found in association with calcium like as teeth and bones where it is essential to structure. Calcium and phosphorus content in Kashk samples didn't show any significant difference, and its ranges were 0.19% to 0.25% for calcium and between 0.18% to 0.31% for phosphorus. Similar results are shown for Doogh, but calcium content of Lavasan Doogh has statistically lower as compare to another samples. There wasn't any similar study about

properties of traditional Doogh and Kashk. But few study was done about similar product for example Çakır et al in 2009 [7] have been reported that properties of traditional Turkey fermented product that called as “Keşk”, “Kesük”, “Kiş” or “Cockle” that is rather similar to Kashk. Some of measurement properties like as Ph and acidity was similar with this study but anthers properties were so different. Also Kirdar, in 2012 [9] was done a similar study about Kes. This variation could explain due to the composition and type of raw milk used for production, manufacture process, drying and storage condition or the lake of available and suitable standard production method.

Table 2: physicochemical properties of traditional Doogh¹

Properties	Shahryar	Lavasan	Arange	Taleh	Acceptable limit [*]
pH	3.44±0.01 ^a	3.61±0.00 ^a	3.12±0.02 ^a	3.25±0.00 ^a	4.5 max
acidity	0.73±0.10 ^b	0.61±0.03 ^b	1.02±0.08 ^a	0.91±0.03 ^a	-
Fat	3.12±0.50 ^a	1.63±0.43 ^c	3.50±0.02 ^a	2.01±0.41 ^b	-
Moisture	94.70±4.03 ^a	95.20±2.36 ^a	93.15±2.41 ^a	94.02±2.01 ^a	-
Protein	2.45±0.12 ^a	2.12±0.45 ^a	2.89±0.17 ^a	2.83±0.09 ^a	-
Salt	0.82±0.02 ^b	0.86±0.08 ^b	0.81±0.01 ^b	1.13±0.11 ^a	1 (%) max
Carbohydrate	4.67±0.18 ^a	3.87±0.14 ^b	3.71±0.02 ^b	4.73±0.13 ^a	-
ash	0.56±0.07 ^a	0.47±0.03 ^a	0.61±0.03 ^a	0.64±0.04 ^a	-
phosphorus	0.07±0.02 ^a	0.10±0.04 ^a	0.09±0.01 ^a	0.13±0.01 ^a	-
Calcium	0.12±0.03 ^a	0.06±0.03 ^b	0.09±0.01 ^{ab}	0.15±0.06 ^a	-

¹ The values reported are mean ± SD

*: International standard [5]

Different letters in each column are indicate statistical difference at 5% level.

CONCLUSION

All around the world, fermented traditional beverages and foods are important part of the human diet and have health-promoting benefits on human. Many of the fermented food consumed by different ethnic people have therapeutic values. The current study has reported the physicochemical properties of two traditional fermented Iranian dairy products including Doogh and Kashk. These products are good source of protein and mineral as compare to milk with ability to hold them longer. Due to changes in life-style and urbanization and the shifting from traditional food habits to industrial fast foods, the consumption of traditional foods is in decline. Production of traditional food stuff needs to be modernized, since it is still produced in primitive conditions and methods. More studied and propaganda about traditional food is necessary, maybe its influence on western diet and decreased the high consumption of coke and alcohol beverage.

REFERENCES

- [1] J.M. Mathara, U. Schillinger, P.M. Kutima, S. Mbugua, C. Guigas, C. Franz, W.H. Holzapfel, *Curr Microbiol.*, **2008**, 56, 315-321.
- [2] B. Aslim, Z.N. Yukesekdag, E. Sarikaya, Y. Beyatli, *LWT- Food Sci Technol.*, **2005** 38, 691-694.
- [3] M. Tajabadi Ebrahimi, A.C. Ouweh, M.A. Hejazi, P. Jafari, *Afr J Microbiol Res.*, **2011**, 5(1), 20-27.
- [4] Codex standard, Project Document for a Regional Standard for Doogh, **2011**.
- [5] Institute of Standards and Industrial Research of Iran (ISIRI), **2003**.
- [6] N. Khoshbakht Fahim, H.R. Beheshti, J. Feizy, S.S. Fakoor Janati, *Gorakhpur Industrial Development Authority.*, **2012**, 37(3), 127-132.
- [7] I. Çakır, H. Coşkun, I. Akoğlu, M. İşleyen, M. Kıralan, A. Bayrak, *J Food Agric Environ.*, **2009**, 17 (3&4), 116-119.
- [8] A.O.A.C., Official Methods of Analysis. 15th Edition. Association of official Analytical Chemists, Inc, Arlington.VA, **1990**.
- [9] S.S. Kirdar, *J Anim vet adv.*, **2012**, 11(3) ,330-334.