Chemical Characteristic of Yoghurt Produced by Small Scale levels and House Hold in Middle of Sudan

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DOI: https://doi.org/10.56293/IJASR.2024.6009

IJASR 2024
VOLUME 7
ISSUE 4 JULY – AUGUST **ISSN: 2581-7876**

Abstract: The quality of fermented dairy product is a delicate subject, it large depends on pre-and post-process handling. Yoghurt is usually produced by small scale and house hold levels The aim of this study was to evaluate the current situation of Yoghurt produced by small-scale levels and house hold in middle of Sudan. and determine chemical analysis of collected raw milk and yogurt samples from different sits in Khartoum and Gezira State in two seasons winter and summer. (32) sample were collected divided in to equal number (16). Yoghurt samples were collected during winter and summer season from different sites (two sites small scale and tow house hold levels, the study included five produced Yoghurt samples and one industrial samples, this study was conducted in the laboratory of Faculty of Agriculture, University of Khartoum. Sudan in the period from December. 2018 to June 2019. The results of the chemical composition analysis of collected Yogurt samples from different sites (*Bahari, Omdurman, Khartoum and Eastern Nile*) during winter and summer season presented no significantly different between moisture, total solids, fat, protein, and lactose in Khartoum and Gezira State during winter and summer season for chemical analysis. We concluded that Yoghurt samples collected from different areas has high nutritive value, it contains of good amount of protein, fat, lactose, moisture and there is no significant difference in chemical characteristic of yoghurt collecting from different sites in two states for both seasons.

Keywords: Yogurt, fermentation, Milk. Small scale, House hold.

Introduction

The livestock population in Sudan was estimated to be about (29,618,000) cows, (39,296,000) sheep (30,649,000) goats and (40,715,000) camels the total is (104,278,000) head according to (Federal Ministry for Animal Resources Fishery and Range-2012). Milk is the most complete food, rich in protein, carbohydrates, minerals, vitamin and calcium ions. The total milk production in the Sudan in (2014) estimated 4,361,000 tones, where the target production of milk for consumption is (4,426,000.731) tones. the available production of milk for consumption is (2,705,000.68) tones, so the deficit is (1,721,000.051) tones according to Ministry for Animal Resources Fishery and Range (2014). Human have evolved in close contact with nature, and the first food that nature provided for man was milk. The quality of milk is paramount therefore, it must be properly stored and transported in optimal conditions (McKinley, 2005). The vital product consists of four physical phases: Firstly, a gas phase, which essentially comprises Co_2 at milking time. Secondly, a fatty phase composed of cells, fat (2-5) µm of diameter which contain lipids and fat-soluble elements, the fatty globules are surrounded by phospholipids and proteins membrane. Thirdly, a colloid phase comprising casein micelles associated with phosphate and citrate of calcium and magnesium. And finally, an aqueous phase consisting of the soluble proteins, Lactose and minerals. There is an inverse relationship between the content of lactose and minerals, in order to keep the milk in relation with the isotonic blood plasma. (Miller, 2000). Milk is a major source of dietary energy, proteins and fats, contributing on average (134) kcal of energy/capitaper day, (8 g) of protein per day and 7.3 g of fat per day (Abdel Monei*m et al.,* 2011). Although fermented milk products such as yoghurts were originally developed simply as a means of preserving the nutrients in milk, it was soon discovered that, by fermenting with different microorganisms, an opportunity existed to develop a wide range of products with different flavors, textures, consistencies and more

recently, health attributes. (McKinley, 2005). Yoghurt is consumed in most parts of the world. (Sofu and Ekinci, 2007**).** Yoghurt is very popular fermented milk produced by lactic acid fermentation of milk by addition of a starter culture containing *Streptococcus salivarius sp*, *thermophilus and lactobacillus delbrueckii spp* (McKinley2005). There has been phenomenal increase in the production of fermented milks in developed countries and most of this increase is attributed to the healthy image associated with yoghurt (Karagul-Yuceer *et al.,* 2004; Valli and Traill, 2005). the World Health Organization has supported the use of yoghurt in nutritional, recovery WHO (2000). The health promoting properties of live lactic acid bacteria in yoghurt including protection against gastrointestinal upsets, enhanced digestion of lactose. (Marona and Pedrigon, 2004).

Materials and methods

Study design

This study was an observational, analytical, control laboratory-based study design. Conducted in December 2018 to June-2019 in two States Khartoum and Gezira State in Winter and Summer Season.

Study area

The study was carried out in tow States Gezira and Khartoum. Gezira State. The town is located at the western bank of the Blue Nile.

Sample Size and collection

Thirty-eight samples which consist of (16) sample collected from Khartoum State (*Bhari,* Omdurman, Khartoum and Eastern Nile location) during Winter and Summer seasons same number of samples collected from Gezira State*, Al Hasahisa* localities (*Tayba, Arbagi, Elsadaga and AL hasahisa.* Each sample was collected in clean dry and sterilized plastic containers. All collected samples were placed in an isolated box containing ice crystals to suppress microbial growth during transportation to laboratory. The samples were kept at (4^{o}C).

Chemical analysis methods of samples

The various chemical parameters included, moisture, total solids, protein, fat, ash, lactose, salt, total, titratable acidity, pH, minerals, volatile fatty acids, acetaldehyde were determined in collected yoghurt samples according to AOAC (1990).

Statistics analysis

The data were coded, entered, and analyzed using the Statistical Package for Social Science (SPSS), data are presented in form of Means±SD so *P Value* < 0.05 statically significant.

Results and discussion

The results of the chemical composition of collected yoghurt samples from different sites in Khartoum State (Bahari, Omdurman, Khartoum and Eastern Nile) during winter and summer season. The results of chemical composition of yoghurt presented same results for all areas Table (1,2) collected from Bahari, Omdurman, Khartoum and Eastern Nile for (moisture, total solid, fat, protein and lactose. All these results in agreement with study done by Mushera (2010) and pytri *et al*., (2016) and also in agreement with Sudanese standards which is stated that the minim fat content should by 3%. The results showed the chemical Composition of collected Yogurt Samples that collected from four different sites in Gezira Sate (*Tiaba, EL Gorashi, Arbbagi, ELsadaga and ELhasahisa* sites).in two seasons winter and summer presented same results as in Khartoum State Table (3,4). The moisture content in line with that reported by Musheria (2010) and the total solidly content value agreement with results reported by Musheria (2010) which was (12.00±0.13) Table (2). Also, Fat, proteins and lactose. Also were in agreement with Musheria (2010) Table (3,4).

Table (1) Chemical analysis of yoghurt samples in winter season in Khartoum State

Sample	Bahri	Omdurman	Khartoum	Eastern Nile
Moisture	87.90 ± 0.10 [a]	86.40 ± 0.10 [c]	87.37 ± 0.15 [b]	86.33 ± 0.15 [c]
Total solids	13.13 ± 0.15 [a]	12.83 ± 0.15 [a]	12.40 ± 0.10 [b]	12.40 ± 0.10 [b]
Fat	3.64 ± 0.04 [a]	3.44 ± 0.04 [c]	3.52 ± 0.03 [b]	3.41 ± 0.02 [c]
Protein	3.74 ± 0.14 [b]	3.72 ± 0.08 [b]	3.69 b ± 0.04	3.68 ± 0.03 [b]
Lactose	2.45 ± 0.04 [b]	2.70 ± 0.10 [ab]	2.60 ± 0.10 [b]	2.97 ± 0.15 [a]

* Means in the same column followed by the same letter(s) are not significantly (P ≤ 0.05) different accordingly to Duncan's Multiple Rang Test (DMRT).
CV = coefficient of Varian

Table (2) Chemical analysis of yoghurt samples in summer season in Khartoum State

Sample	Bahri	Omdurman	Khartoum	Eastern Nile
Moisture	86.00 ± 0.20 [a]	84.17 ± 0.15 [c]	86.23 ± 0.21 [a]	85.20 ± 0.10 [b]
Total solids	12.43 ± 0.15 [c]	15.33 ± 0.15 [a]	12.70 ± 0.10 [ab]	13.13 ± 0.15 [b]
Fat	3.45 ± 0.05 [c]	3.62 ± 0.03 [b]	3.78 ± 0.02 [a]	3.62 [b] ± 0.03 [a]
Protein	3.30 ± 0.10 [b]	3.77 ± 0.04 [a]	4.00 ± 0.10 [a]	3.79 ± 0.01 [a]
Lactose	2.90 ± 0.56 [ab]	2.17 ± 0.15 [b]	2.03 ± 0.06 [b]	3.23 ± 0.15 [a]

* Means in the same column followed by the same letter(s) are not significantly (P ≤ 0.05) different accordingly to Duncan's Multiple Rang Test (DMRT).
CV = coefficient of Variance

Table (3) Chemical analysis of collected yoghurt samples in winter season in Gezira State

Sample	Tyba	Arbagi	ELsadaga	Hassahisa
Moisture	88.30 ± 0.3 [a]	88.27 ± 0.3 [a]	88.27 ± 0.3 [a]	88.50 ± 0.1[a]
Total solids	11.97 ± 0.3 [a]	11.67 ± 0.2 [a]	12.03 ± 0.3 [a]	12.20 ± 0.2 [a]
Fat	3.57 ± 0.1 [a]	3.50 ± 0.1 [a]	3.60 ± 0.2 [a]	3.50 ± 0.1 [a]
Protein	3.23 ± 0.3 [a]	3.43 ± 0.4 [a]	3.33 ± 0.1 [a]	3.37 ± 0.2[a]
Lactose	3.53 ± 0.1 [a]	3.53 ± 0.2 [a]	3.40 ± 0.1 [a]	3.60 ± 0.1 [a]

* Means in the same column followed by the same letter(s) are not significantly (P ≤ 0.05) different accordingly to Duncan's Multiple Rang Test (DMRT).
CV = coefficient of Variance.

Table (4) Chemical analysis of yoghurt samples in summer season in Gezira State

Sample	Tyba	Arbagi	ELsadaga	Hassahisa
Moisture	88.6 ± 0.4 [a]	87.4 ± 0.2 [b]	88.1 ± 0.1 [ab]	87.6 ± 0.2 [b]
Total solids	12.9 ± 0.4 [ab]	12.2 ± 0.2 [b]	13.4 ± 0.1 [a]	12.5 ± 0.2 [b]
Fat	3.8 ± 0.2 [a]	3.4 ± 0.2 [b]	3.4 ± 0.1 [b]	3.5 ± 0.1 [ab]
Protein	3.7 ± 0.3 [a]	3.6 ± 0.2 [a]	3.7 ± 0.2 [a]	3.6 ± 0.2 [a]
Lactose	3.7 ± 0.3 [a]	3.6 ± 0.2 [a]	3.5 ± 0.2 [a]	3.6 ± 0.2 [a]

* Means in the same column followed by the same letter(s) are not significantly ($P \leq 0.05$) different accordingly to Duncan's Multiple Rang Test (DMRT).
CV = coefficient of Variance.

Conclusion

The study concluded that Yoghurt samples collected from different areas has high nutritive value, it contains of good amount of protein, fat, lactose, moisture and there is no significant difference in chemical characteristic of yoghurt collecting from different sites in two states for both seasons.

References

1. Abdel Moneim E.S., Rania M.A., and Zakaria A.S. (2011) Effects of Storage on Quality of Yoghurt Prepared from Cows' and Goat's Milk and Pure Strains of Lactic Acid Bacteria. University of Gezira, P.O. Box 20Wad-Medani, Sudan.
2. El-Zubeir, Abdall, M.W., Omni, E, L (2005). Chemical composition of fermented milk in Sudan, Food control (16) 633-637.
3. Karagul-Yuceer, J.C., Wilson and C.H.,White, (2004). Formulation and processing of yogurt. j. Dairy Sci, 84: 543-550.
4. Maocaro, Ernesto. (2004) Teaching and Learning a Second Language: A Guide to Recent Research and its Applications. Continuum International Publishing Group, p 208.
5. Marona, D and G. Perdigon, (2004). Yogurt feeding inhibits promotion and progression of cancer. Med. Sci. Monit, 10:96-104.
6. Mckinley, M.C, (2005). The nutrition and health benefits of yogurt. Int. J. Dairy Technol, (58):1-12.
7. Miller, G.D., Jarvis, J.K., and MaBean L.D. (2000). Handbook of Dairy Foods and Nutrition, Boca Raton. Fla: CRC Press.
8. Ministry of Animal Resources and Fishery, (2014). M.R.F. Animal Rang.
9. Mushiera M. Abdel Rahman (2010). Quality Evaluation of Yoghurt Supplemented with Carrot Juice. Department of Food Science and Technology, Faculty of Engineering and Technology, University of Gezira, Wad Medani, Sudan.
10. Pariente Beltran, Beatriz (2006). Rethinking translation in second language class room teaching, discourse and tax analysis through translation to advanced students University of Massachusetts (12):87-111.
11. Sofu, A. and F.Y., Ekinic, (2007). Estimation of storage time of yogurt with artificial neural network modelling. J. Dairy Sci, 90: 3118-3125.
12. Sudanese Standards, (2017). Yogurt. Sudanese Standards and Metrology Organization (SSMO) No. 291.
13. Valli, C, and W.B., Traill, (2005) Culture and food: A model of Yogurt consumption in the Edu. Food Qual, Neil. C.W. C Feudtner, M.M. Garrison and D.A Christakis, (2002) Lactobacillus therapy for acute infectious diarrhoea in children: A meta-analysis. Paediatrics, (109): 678-684.