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EVALUATION OF PHYSICOCHEMICAL CHARACTERISTICS AND DETECTION OF MOST TYPE ADULTERANT OF UHT MILK SOLDS IN THE MARKETS OF ERBIL CITY

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ABSTRACT

Developing countries are considered to be more susceptible to food adulteration, including milk to a large extent, as this is a global concern of the risks associated with it. Due to the lack of monitoring, adulterous milk can pose serious health risks leading to fatal diseases.

In this study, the samples were collected from several supermarkets and minimarkets in Erbil city, the capital of the Kurdistan region of Iraq. 100 cans of UHT whole cow milk from four available market brands, for each brand 25 samples, this research reviews some of the common physicochemical properties and adulterous substances in milk and different methods for detecting these adulterous substances in terms of quality and quantity.

The results of the research showed that there were highly significant differences for most of the studied physiochemical characteristics except for the percentage of fat and protein. The results showed high contrast for most of the studied characteristics, whether the contrast was negative or positive. As for the results of adulteration, all studied samples were completely free of detergents. While the results of the research showed that all samples were adulterated by adding glucose and skim milk. The COB and alcohol test results (0%,0%,0%, and 4%) were positive for the four brands (1,2,3,4), respectively. As for the percentage of adulterate for the four brands (1,2,3,4) the Formalin was (16%,16%,12%, and 12%), respectively, while the percentage of peroxide was (12%,36%,32%, and 28%), respectively, and all brand samples are completely free of sodium carbonate, except for brand 2, as the rates of this type of adulteration amounted to 16%.

***KEYWORD*s:** UHT milk, Physico-chemical property, Adulterant, pH, Clot on Boiling (COB), Alcohol test

1- INTRODUCTION

Milk is a very well-balanced food, include fat 3.7%, protein 4.9%, carbohydrates 4.9%, minerals and vitamins 0.7% and other miscellaneous, water based in component, to make complete balance neutrinos. (Adıgüzel and Biotransformation, 2020). A significant difficulty for the dairy industry is the lack of compliance with food safety requirements, which has a detrimental impact on the health and nutritional status of customers(Amenu *et al.*, 2019).

In ultra-high temperature (UHT) processing, milk is heated for a brief period of time (1 to 10 seconds) at temperatures between 135 to 150 °C before being promptly cooled to below 32 °C (Ranvir *et al.*, 2021), aseptic processing kills all milk microorganisms and enzymes, extending the milk is shelf life and improving its sensory perception for 6 to 9 months at room temperature (Arafat *et al.*, 2015).

Milk is defined as the normal mammary secretion obtained from complete milking of healthy milch animals without either addition thereto or extraction Accordant by the Prevention of Food Adulteration (PFA)(Aishwarya and Duza, 2017).

In attendance, probable two types of fraudulent, in milk: (i) adulteration by switch ingredient, which happens when there is whole or fractional elimination of a few elements; and (ii) by adding new ingredient, as soon as elements are added in consecutively for cover the bad stander milk production. When there is no customer knowledge, all of these actions are regarded as adulterations (Moore *et al.*, 2012). Water is common fraudulent added to milk to

increase quantity. These are usually followed by density replenishers example starch and sucrose Starch, a cheap polysaccharide, is the thickening and gelling agent most widely used in food preparation (Afzal *et al.*, 2011), while sodium hydroxide and sodium bicarbonate (CO_2)are used to avoid the decomposition of milk via neutralizing the natural acidity, while spoilage of milk produced by acidity of bacteria and addition for control of pH, taste and texture(Malame *et al.*, 2014). CO_2 is single law able acceptable preservative , overrating milk with CO_2 might decrease bone mineral density (BMD) (McGartland *et al.*, 2003). Preserving extensively added like hydrogen peroxide (Conceição *et al.*, 2019), that it probably inhibits microbial multiplication besides milk spoilage. Particularly in poorer countries, it was regarded as great and harmless preservative (Singh and Gandhi, 2015).

Another preservative in raw milk to increase shelf life is Formalin 40% solution of formaldehyde, which is purposely and illegally used because it has antiseptic nature. While in humans is very poisonous even in slight quantities. Glucose and cane sugar (sucrose) used to cover the adding of excessive amount of water within milk also it is expected that cane sugar might added to diluted raw milk to achieve better taste. Also, it is added to milk for porous to an elevation of the lactometer reading and thus the specific gravity of the milk (Afzal *et al.*, 2011).

The aim of this research is to know the suitability of the product for human consumption from a health point of view and to know the care that the product receives during preparation and manufacture to evaluate the quality of the market and detection most adulteration that forms risk for consumer health in some brands of market milk and inform the authorities concerned with health control in case of obtaining unsatisfactory results according to the standard specifications.

2- MATERIALS AND METHODS

2-1-Collection of samples:

In this study,100 samples were collected for four commercial brands (brand 1, brand 2, brand 3, brand 4) of UHT milk where randomly selected from different markets and mini-markets in the city of Erbil, the capital of Kurdistan, Iraq, at the rate of 25 samples for each brand, and transported at the same time and same conditions and after are stored in an ice packed cool box and transported to laboratory for analysis (Algamesh *et al.*, 2007).

2-2-Evaluation of the physicochemical properties of UHT Milk

2-2-1-Lactoscan ((Lactoscan MCC, Milkotronic Ltd Bulgaria)).: Checked the ratio o\f all the fat %, solid nonfat%, lactose, milk density, conductivity, protein%, added water to milk %, freezing point, and salt by Lactoscan Instrument.

2-2-2- pH of milk.

The pH is estimated according to the method used in (AOAC, 2012).

2-2-3-Clot on boiling test.

This examination is carried out according to the method used in (Tessema, 2009).

2-2-4-Alcohol test.

This examination is carried out according to the method used in (Tessema, 2009).

2-3-Detect the adulteration in UHT milk

2-3-1-Formaldehyde (Formalin).

The formalin detection is estimated according to the Hehner test method (Sharma *et al.*, 2012).

2-3-2- Sodium carbonate and sodium bicarbonate.

The presence of Sodium carbonate and sodium bicarbonate in UHT milk was detected by the method described by(Foley *et al.*, 1974).

2-3-3-Hydrogen peroxide.

Determination of H_2O_2 in UHT milk according to the procedure of (Kamthania *et al.*, 2014).

2-3-4-Starch.

Starch is detected by the method used by (Azad and Ahmed, 2016).

2-3-5-Glucose.

Glucose is detected by the method used by (Sharma and Barui, 2011).

2-3-6-Detergent.

Detergent is detected by the method used by (Singh et al., 2012).

2-3-6-Skim milk powder.

Skim milk powder content in UHT milk samples was measured according to method(Awan *et al.*, 2014) .

2-4-Statistical Analysis.

The collected data were submitted to SPSS software (SPSS, 2019) and different procedures were applied (Descriptive statistics, Frequencies and Correlation coefficients).

3-RESULT AND DISCUSSION

3-1- Detection physiochemical test of UHT milk.

As it is shown in Table 1, that all studied physiochemical parameters are highly differed

significantly ($p<0.01$) except both fat % and protein %, where they are insignificant ($p>0.05$). However, for solid nonfat%, lactose% and salt%, both brands 1 and 4 exceeded significantly ($p<0.01$) the rest two studied brands 2 and 3 in their percentages/values; while the vice versa is true for freezing point% both brands 2 and 3 surpassed significantly the brands 1 and 2 with negative values. For Specific gravity, the brand 4 recorded significantly ($p<0.01$) the highest value (1.03438) compared to the other three studied brands; regarding pH, the brand 3 recorded significantly ($p<0.01$) the highest value (6.4720) compared to the others brand, but all bands have lower pH. Moreover, water addition doesn't record any means for the four studied brands. As conclusion, brand 4 has most percentages/values of the studied physiochemical parameters.

In the present study that in the Table (1) shows, the mean value of the fat in all four brands from 1, 2, 3 and 4 consecutively was (3.5024, 3.6268, 3.3612, 3.3856). In the present study the highest amount of fat was found in brand 2 that was (3.62668) followed by brand 1 which was (3.5024) and after that brand 4 that was (3.3856) last one brand 3 was (3.3612). There was an insignificant difference ($p<0.05$) among the fat contents of collected UHT milk samples. In present research the result of fat in brand 1 was in agreement with (Fayed *et al.*, 2022) and (Elzhraa *et al.*, 2021),while brand 2 was in agreement with (Fayed *et al.*, 2022) ; (Su *et al.*, 2022) ; (Kumbár and Nedomová, 2015) and (Scandurra *et al.*, 2022).The result of brand 3 and 4 in agreement with (Müller *et al.*, 2022) and narrowly in agreement with to (Alswedi, 2018) and (Ibrahim and Technology, 2018),. However, our result of brand 1 and 2 contains a little fatter comparing to Iraq standards that the normal fat range in UHT whole milk must be in range 3.25%.

In the study, the result of mean solid nonfat was (9.2356, 9.0452, 9.0024, 9.3340). However, the present finding is disagreement with the result of (M el-kholy et al., 2018; Ahmed et al., 2019; Hamdan, 2019; Elzhraa et al., 2021) because their results have less value compere to ours finding. In the other hand the present result is in agreement with (El-Leboudy et al., 2017). While the result of (dos Santos et al., 2022); (Ibrahim and Technology, 2018); (Fayed et al., 2022) ;(Arafat et al., 2015) and (Kunda et al., 2015) were broadly in agreement to present research that slightly lower than our present result.

The result of analysis UHT milk for ration of salt content for four brands respectively was (0.7572, 0.7396, 0.7348, 0.7660) that shown in table (1). The result of UHT whole milk in salt was Significant at ($p<0.01$), these results are in agreement with (Dursun *et al.*, 2017) and (Mudalal *et al.*, 2019) while slightly lower than the result of (Fayed *et al.*, 2022).But the result was in disagreement with (Scandurra *et al.*, 2022).

The mean of protein content in stated UHT milk were (3.3876, 5.6060, 3.3296, 3.4212) for four brands respectively, and the obtained results were insignificant at ($p>0.05$). The results of brand 1,3 and 4 were in agreement narrowly with result of (Kumbár and Nedomová, 2015); (El-Leboudy *et al.*, 2017); (Hamad *et al.*, 2017); (Alswedi, 2018); (Ibrahim and Technology, 2018); (Ahmed *et al.*, 2019); (Karmaker *et al.*, 2020) and Scandurra *et al.*, 2022), while brand 2 was in agreement with (Elzhraa *et al.*, 2021). Generally, our results were in disagreement with (Dursun *et al.*, 2017); (Li *et al.*, 2021) and (Fayed *et al.*, 2022) results. In case we compared the brand 2 result for protein which was slightly higher than Iraq standard for protein content.

The mean of lactose content in studied UHT milk were (5.0872, 4.8588, 4.9356, 5.1092),the result of present study in brand 2 and 3 that narrowly in agreement with (Dursun *et al.*, 2017); (Alswedi, 2018); (Mudalal *et al.*, 2019) ; (Karmaker *et al.*, 2020) ; (Su *et al.*, 2022) and (Scandurra *et al.*, 2022) .But the result also show that brand 1and 4 broadly in agreement with (Su *et al.*, 2022)and (Scandurra *et al.*, 2022),while the result of brand 4 in our research symmetrically to result of(Manzi *et al.*, 2013).

It was found in our research that the mean of freezing point was (-0.59532, -0.57448, -0.57488, -0.58748), that shown in table (1). According to our result of (Navratilova *et al.*, 2006); (Kunda *et al.*, 2015); (Bouisfi *et al.*, 2018); (Hamdan, 2019) and (dos Santos *et al.*, 2022) that narrowly in agreement of all ours brand in present study .In the other hand the results were disagreement with (Elzhraa *et al.*, 2021).The Iraq standard for freezing point are range from (-0.550 to-0.525) we compare to our present result we found normal stander range .

The result analysis of specific gravity in UHT milk for brands 1, 2, 3, and 4 consecutively was (1.03311, 1.03208, 1.03303, 1.03438). The result of all brand was in agreement exactly to (Taw et al., 2014); (Kovalevska and Chala, 2017) and (Karmaker et al., 2020) but the result was narrowly in agreement with (Arafat et al., 2015) and (Awal et al., 2016).

The result of the mean water addition content was (0,0,0,0) for all brands, and the result of brands 1 and 3 was in agreement with (Mudalal et al., 2019) and (Debnath et al., 2014), while disagreement with brands 2 and 4 same researchers (Awal et al., 2016) ;(Adam, 2009); (Mansour et al., 2012); (Kunda et al., 2015) and (M el-kholy et al., 2018).

Table (1): Physiochemical measurements of UHT milk for the four studied brands

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum	Sig. (p)
Fat	Brand 1	25	3.5024 a	0.09735	0.01947	3.38	3.75	
	Brand 2	25	3.6268 a	0.21738	0.04348	3.40	4.45	0.173
	Brand 3	25	3.3612 a	0.59897	0.11979	2.16	4.07	NS
	Brand 4	25	3.3856 a	0.67859	0.13572	1.58	3.71	
Solid nonfat	Brand 1	25	9.2356 a	0.25838	0.05168	8.71	10.23	
	Brand 2	25	9.0452 b	0.27263	0.05453	8.64	9.80	0.000
	Brand 3	25	9.0024 b	0.31141	0.06228	8.48	9.39	**
	Brand 4	25	9.3340 a	0.30561	0.06112	8.97	9.99	
Lactose	Brand 1	25	5.0872 a	0.15057	0.03011	4.76	5.66	
	Brand 2	25	4.8588 b	0.20721	0.04144	4.00	5.05	0.000
	Brand 3	25	4.9356 b	0.19079	0.03816	4.48	5.16	**
	Brand 4	25	5.1092 a	0.13883	0.02777	4.92	5.25	
Specific gravity	Brand 1	25	1.03311 b	0.0009630	0.0001926	1.0310	1.0368	
	Brand 2	25	1.03208 c	0.0005854	0.0001171	1.0310	1.0328	0.000
	Brand 3	25	1.03303 b	0.0018154	0.0003631	1.0304	1.0350	**
	Brand 4	25	1.03438 a	.0017087	.0003417	1.0320	1.0358	
Protein	Brand 1	25	3.3876 a	0.10009	.02002	3.20	3.78	0.126
	Brand 2	25	5.6060 a	7.95947	1.59189	3.18	32.41	NS
	Brand 3	25	3.3296 a	0.10757	0.02151	3.11	3.45	
	Brand 4	25	3.4212 a	0.08253	0.01651	3.29	3.50	
pH	Brand 1	25	6.4520 b	0.02693	0.00539	6.40	6.50	
	Brand 2	25	6.4300 c	0.02500	0.00500	6.40	6.45	0.000
	Brand 3	25	6.4720 a	0.02533	0.00507	6.45	6.50	**
	Brand 4	25	6.4220 c	0.03559	0.00712	6.40	6.50	
Water addition	Brand 1	25	0.00	0.000	0.000	0	0	
	Brand 2	25	0.00	0.000	0.000	0	0	—
	Brand 3	25	0.00	0.000	0.000	0	0	
	Brand 4	25	0.00	0.000	0.000	0	0	
Salt	Brand 1	25	0.7572 a	0.02701	0.00540	0.70	0.85	
	Brand 2	25	0.7396 b	0.01485	0.00297	0.70	0.76	0.000
	Brand 3	25	0.7348 b	0.01982	0.00396	0.70	0.77	**
	Brand 4	25	0.7660 a	0.01848	0.00370	0.74	0.79	
Freezing point	Brand 1	25	-0.59532 b	0.020128	0.004026	-0.676	-0.557	0.000
	Brand 2	25	-0.57448 a	0.011601	0.002320	-0.593	-0.551	**
	Brand 3	25	-0.57488 a	0.018386	0.003677	-0.602	-0.539	
	Brand 4	25	-0.58748 b	0.010532	0.002106	-0.605	-0.570	

*Means with common letters are didn't differed significantly; NS= non-significant; *= Significant at (p<0.05); **= Significant at (p<0.01).*

It could be observed from Table 2, that most associations are highly significant (p<0.01). Fat % is correlated negatively with solid nonfat, lactose and specific gravity (-0.315, -0.282 and -0.334, respectively); while solid nonfat is correlated positively with lactose and specific gravity (0.754 and 0 .767, respectively) and negatively with pH and freezing point (-0.359 and -0.757, respectively). Lactose has positive significant (p<0.01) correlation coefficients with both specific gravity and salt (0.729 and 0.636, respectively), but has negative one with freezing point (-0.723), and this last physiochemical parameter (freezing point) is associated significantly (p<0.01) and negatively with specific gravity (-0.623), while specific gravity is correlated positively with salt (0.66), that associated significantly with most studied characters. However, such positive and negative significant correlation coefficients have some indicators on the freshness of the studied material.

Table(2): Correlation coefficients between the studied physiochemical parameters (characteristics)

Correlations										
		Fat	Solid nonfat	Lactose	Specific gravity	Protein	pH	Water addition	Salt	Freezing point
Fat	Pearson Correlation	1	-0.315**	-0.282**	-0.334**	0.101	-0.003	.b	-0.163	0.113
	Sig. (2-tailed)		0.001	0.005	0.001	0.319	0.980	.	0.104	0.263
	N	100	100	100	100	100	100	100	100	100
Solid nonfat	Pearson Correlation	-0.315**	1	0.754**	0.767**	-0.021	-0.359**	.b	0.698**	-0.757**
	Sig. (2-tailed)	0.001		0.000	0.000	0.837	0.000	.	0.000	0.000
	N	100	100	100	100	100	100	100	100	100
Lactose	Pearson Correlation	-0.282**	0.754**	1	0.729**	-0.002	-0.150	.b	0.636**	-0.723**
	Sig. (2-tailed)	0.005	0.000		0.000	0.981	0.136	.	0.000	0.000
	N	100	100	100	100	100	100	100	100	100
Specific gravity	Pearson Correlation	-0.334**	0.767**	0.729**	1	-0.066	-0.176	.b	0.660**	-0.623**
	Sig. (2-tailed)	0.001	0.000	0.000		0.513	0.079	.	0.000	0.000
	N	100	100	100	100	100	100	100	100	100
Protein	Pearson Correlation	0.101	- 0.021	-0.002	-0.066	1	0.019	.b	0.020	-0.017
	Sig. (2-tailed)	0.319	0.837	0.981	0.513		0.849	.	0.840	0.868
	N	100	100	100	100	100	100	100	100	100
pH	Pearson Correlation	-0.003	-0.359**	-0.150	-0.176	0.019	1	.b	-0.380**	0.178
	Sig. (2-tailed)	0.980	0.000	0.136	0.079	0.849		.	0.000	0.076
	N	100	100	100	100	100	100	100	100	100
Water addition	Pearson Correlation	.b	.b	.b	.b	.b	.b	.b	.b	.b
	Sig. (2-tailed)	.	.	.	.	.	.		.	.
	N	100	100	100	100	100	100	100	100	100
Salt	Pearson Correlation	-0.163	0.698**	0.636**	0.660**	0.020	-0.380**	.b	1	-0.652**
	Sig. (2-tailed)	0.104	0.000	0.000	0.000	0.840	0.000	.		0.000
	N	100	100	100	100	100	100	100	100	100
Freezing point	Pearson Correlation	0.113	-0.757**	-0.723**	-0.623**	-0.017	0.178	.b	-0.652**	1
	Sig. (2-tailed)	0.263	0.000	0.000	0.000	0.868	0.076	.	0.000	
	N	100	100	100	100	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

b. Cannot be computed because at least one of the variables is constant.

3-2- Detect the adulteration in UHT milk.

In the present study, the result for COB test for brands 1, 2, and 4 was negative while in brand 3 4% was positive. However, our result was in an agreement in brands 1,2 and 4 but in disagreement with brand 3 with (Awal *et al.*, 2016) and (Hamad *et al.*, 2017). The present result for alcohol test for brand (1,2,4) was negative but in brand (3) was (4%) percentage in average of (25) sample of UHT milk. In contrast our result in agreement with (Awal *et al.*, 2016; Hamad *et al.*, 2017; Jamal *et al.*, 2018) ,while brand (3) in agreement with (Gashaw and Gebrehiwot, 2018).

The result in the present research for Formaldehyde for all four brands consecutively was 6 (24%),10 (40%),16 (36%),12 (40%) the 25 samples for each brand that was positive, as these results agree with (Moosavy et al., 2019), but disagree with researchers (Soomro et al., 2014); (Karima et al., 2015); (M EL-kholy et al., 2018); (Abdel Ghaffar et al., 2019); (Wafy, 2019) and (Karmaker *et al.*, 2020).

In the present study the result for sodium bicarbonate found was negative for brands 1, 3, and 4 but in brand 2 positive was 4 (16%). The present finding in the brand 1, 3, and 4 are in agreement with those (Debnath et al., 2014); (Soomro et al., 2014); (Awal et al., 2016), and (Abdel Ghaffar et al., 2019). On the hand brand 2 is in agreement with (Moosavy et al., 2019).

The result of detection starch in this study for all the brands 1, 2, 3, and 4 respectively was (16%, 16%, 12%, and 12%), these results are in agreement with (Moore et al., 2012); (Barham et al., 2015); (de Souza Gondim et al., 2016) and (Memon et al., 2018), while in disagreement with (Adam, 2009); (Awal et al., 2016); (M El-kholy et al., 2018) and (Moosavy et al., 2019).

Hydrogen peroxide was detected in UHT milk for brands 1,2,3 and 4, the result was 3 (12%), 9 (36%), 8(32%), and 7 (28) respectively. The result of all brands was in agreement with (Karima et al., 2015) and (Mahmoudi et al., 2015). While disagreement with many researchers such as (Debnath et al., 2014); (Amin, 2016); (M El-kholy et al., 2018); (Moosavy et al., 2019); (Wafy, 2019); (Karmaker et al., 2020) and (Asged and El Zubeir, 2021).

Glucose results in the present study of all four brands were positive in 100 samples of UHT milk. The results were achieved in agreement with (Awan and Naseer, 2014); (Pandey et al., 2019), and (Chugh and Kaur, 2022). Besides that, in agreement with (Singh et al., 2015)

The result of the detergent test in the present study was negative in all four brands in all 100 samples. our result was in a garment with (Faraz et al., 2013; Awan and Naseer, 2014; M El-kholy et al., 2018; Malpani et al., 2018). However our result disagreement with (Swathi et al., 2015) and (Pandey et al., 2019).

In the present study, skim milk was detected for all four brands 1,2,3, and 4 respectively, and this is in agreement with (M El-kholy et al., 2018); (Memon et al., 2018), and (Gheisari et al., 2018), while this is in disagreement with (Debnath et al., 2014); (Soomro et al., 2014); (Awal et al., 2016); (Moosavy et al., 2019)and Karmaker et al., 2020)

Table(3): Frequency and percentages (proportions) of both Negative and positive four brands of all studied parameters of UHT milk

Brand		Parameters																	
		COB		At		F		SC&SB		S		G		SM		HP		D	
		+ Ve	- Ve	+ Ve	- Ve	+ Ve	-Ve	+ Ve	- Ve	+ Ve	- Ve	+ Ve	- Ve	+ Ve	- Ve	+ Ve	- Ve	+ Ve	- Ve
Brand 1	N	0	25	0	25	6	19	0	25	4	21	25	0	25	0	3	22	0	25
	%	0	100	0	100	24	76	0	100	16	84	100	0	100	0	12	88	0	100
Brand 2	N	0	25	0	25	10	15	4	21	4	21	25	0	25	0	9	16	0	25
	%	0	100	0	100	40	60	16	84	16	84	100	0	100	0	36	64	0	100
Brand 3	N	1	24	1	24	16	9	0	25	3	22	25	0	25	0	8	17	0	25
	%	4	96	4	96	36	64	0	100	12	88	100	0	100	0	32	68	0	100
Brand 4	N	0	25	0	25	12	13	0	25	3	22	25	0	25	0	7	18	0	25
	%	0	100	0	100	48	52	0	100	12	88	100	0	100	0	28	72	0	100

COB (Clot on boiling); AT (Alcohol test); F (Formaldehyde); SC&SB (Sodium carbonate & sodium bicarbonate); S (Starch); G (Glucose); SM (Skim milk); HP (Hydrogen peroxide); D (Detergents).

4- CONCLUSIONS

The standard criteria for sterilized UHT milk for the four brands were not followed correctly, Significant differences were observed for most of the studied physiochemical characteristics, as all samples contained percentages of glucose and sorted milk, and this is sufficient evidence that these types of milk are not fresh. Also, all these brands were adulterated with formalin at high rates, and this is completely contrary to the standard specifications, but all the brands were free of sodium carbonate, except for brand (2). And most of the results of the COB and alcohol test for brands were negative except for brand (4). Detergents and water addition were not found in all brands, As well as the relationship of variance was highly significant for most of the traits studied. Years ago, UHT milk was not as preferred as fresh milk, but the demand for daily sterilized milk is gradually increasing significantly. In Erbil Governorate in particular and in Kurdistan in general. Therefore, it must be the legal authority familiar with and fully aware of UHT standards. Consumers must be well aware of the common adulterants and hygienic quality of UHT milk. Also, producers of milk and dairy products should realize the importance of regular inspection of their products to ensure that they meet the minimum quality standards. They should be aware of the necessary required sanitary measures during handling, milking, processing, transportation, and storage.

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پوختە

وڵاتانی تازەگەشەکردوو دووچاری فێڵکردن لە خۆراك دەبنەوە،بە شێوەیەکی بەرچاو بەرهەمی شیر دەگرێتەوە. مەترسییەکانی پەیوەست بەم بابەتە بووەتە جێگای نیگەرانی لە سەرتاسەری جیهان. بەهۆی نەبوونی چاودێری، بوونی شیری دەستکاریکراو لە مارکێتەکاندا دەکرێت ببێتە هۆی نەخۆشی مەترسیدار و کوژەر.لەم توێژینەوەیەدا نموونەی شیر لە چەند سوپەرمارکێتێك لە شاری هەولێری پایتەختی هەرێمی کوردستان کۆکرایەوە.100 دەبە(قوتوو) شیری پرچەوری لە جۆری شیلای دەستکردەبە پلەیەکی گەرمی بڵند لە چوار برِاند و بۆ هەر برِاندێك 25 نموونە کۆکرایەوە.ئەم توێژینەوەیە پێداچوونەوە دەکات لەسەر هەندێك اە تایبەتمەندییە فیزیۆکیمیاییەکانی شیر و ئەو مادده نارِاستەقینانەی کە لە شیردا هەن وە رِێگای جیاواز بۆ دەستنیشانکردنیان لە رِووی برِی و جۆری .ئەنجامی توێژینەوەکە جیاوازییەکی بەرچاو دەردەخات بۆ زۆربەی تایبەتمەندییە فیزیۆکیمیاییەکان جگە لە رِێژەی سەدی چەوری و پرۆتین.ئەنجامەکان هاوپێیی بەرچاو دەردەخەن بۆ زۆربەی تایبەتمەندییەکان جا ئەگەر هاوپێییکردنەکە پۆزەتیڤ بێت یان نێگەتیڤ .سەبارەت بە ئەنجامی ناپوختەیی شیرەکە ، هەموو نموونەکان بە تەواوی خاڵی بوون لە بەەنی ماددەی پاککەرەوە تێیاندا.لە کاتێکدا ئەنجامی توێژینەوەکە ئەوەی دەرخستبوو کە هەموو نموونەکان فێڵیان تێداکرابوو بە زیادکردنی گلوکۆز و شیری بێ چەوری. ئەنجامی پشکنینەکانی رِێژەی مەیاندن لە پلەی کوڵان و کحول (0% ،0% ،0% و4%) پۆزەتیڤ بوون بۆ هەر چوار برِاندی (1 ،2 ،3 و4) یەك لە دوای یەك .بەهەمان شێوە رِێژەی سەدی فێڵکردن بۆ هەرچوار برِاندی (1 ،2 ،3 و4) بە فۆرمالین (16% ،16% ،12% و12%) یەك لە دوای یەك لە کاتێکدا رِێژەی سەدی پیرۆکساید (12% ،36% ،32% و28%)یەك بە دوای یەك، وە هەموو نموونەی برِاندەکان بەتەواوی خاڵی بوون لە کاربۆناتی سۆدیۆم ،جگە لە برِاندی2، کەرِێژەی فێڵکردن تێییدا 16%بوو .

الخلاصة

تعتبر البلدان النامية أكثر عرضة لغش الطعام ، بما في ذلك الحليب إلى حد كبير ، حيث أن هذا مصدر قلق عالمي للمخاطر المرتبطة به. بسبب نقص المراقبة ، يمكن أن يشكل الحليب المغشوش مخاطر صحية خطيرة تؤدي إلى أمراض قاتلة.

في هذه الدراسة ، تم جمع العينات من العديد من الاسواق الكبيرة والصغيرة في مدينة أربيل ، عاصمة إقليم كردستان العراق. 100 عينة من حليب بقري كامل الدسم والمعالجة بالحرارة الفائقة UHT من أربع علامات تجارية متوفرة في الاسواق ، وبمعدل 25 عينة / علامة تجارية ، يستعرض هذا البحث بعض الخصائص الفيزيائية والكيميائية الشائعة والمواد المغشوشة في الحليب والطرق المختلفة للكشف عن هذه المواد من حيث الجودة والكمية.

أظهرت نتائج البحث وجود فروقات معنوية لمعظم الخصائص الفيزيوكيميائية المدروسة باستثناء نسبة الدهن والبروتين. وأظهرت النتائج تبايناً عالياً لمعظم الصفات المدروسة ، سواء كان التباين سلبياً أو إيجابياً. أما بالنسبة لنتائج الغش ، فقد كانت جميع العينات المدروسة خالية تمامًا من المنظفات. بينما أظهرت نتائج البحث أن جميع العينات مغشوشة بإضافة الكلوكوز وحليب الفرز. نتائج اختبار كل من التخثرعند الغليان والكحول كانت (0 %, 0 % , 0 % و 4 %) موجبة للعلامات التجارية الاربع (1 , 2 , 3 و 4) على التوالي. في حين نسبة الغش بالفورمالين للعلامات االتجارية (1 , 2 , 3 و 4) كانت (16% , 16% , 12% و 12%) على التوالي ، بينما النسبة المئوية للبيروكسيد كانت (12% %36, ,32% و28%) على التوالي ، جميع عينات العلامات التجارية خالية تماما من كاربونات الصوديوم باستثناء العلامة التجارية 2 اذ ان نسب هذا النوع من الغش بلغت 16%.