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Research Article

Evaluation of Chemical Properties and Detection of Adulteration in Cheeses Sold in Babylon Province.

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Abstract

The Study was conducted at the laboratories of the Department of Animal Production Techniques, Al-Musaib Technical College, laboratories of Department of Animal Production Techniques , Food analysis lab in Technical Inistitute . During the period of August 2017 to May 2018.48 samples of cattle cheeses from different origin were collected from four different regions of Babylon province (Hilla ,Mahawil ,Musiab ,Alexandria); these samples were divided into four groups according to types of these cheeses and each group was sub-divided into (12) pattern according to the mark . they were group (A) contain (12) marks of imported semi soft cheeses (president, dalal, happycow, vonk, kibi, teama, la vache qui rit, puck, abu alwalad, nadec, sabah, al captin), group (B)contain (12) marks of imported slice cheeses (hamoda, mersin, kraft, alrawabi, casar, american, heritage, danube, almarai, pride, president, nadec,), group (C) contain (12) marks of imported spreadable cheeses,(almarai, anchor, sabah, puck, smile, luna, baf, bukah, damraran, memas, momtaz, kalleh), group (D)contain (12) patterns of locally produced white soft cheeses. Each pattern of each group was submitted to the chemical , in addition to conducting examination for the detection of some preservatives and commercial adulteration . The results of the study showed significant differences ($P<0.05$) between the patterns of each group in the chemical properties, the study showed that there was a significant difference ($P<0.05$) between the pattern of group (A) in the percentage of total solid substances , moisture, fat , protein, percentage of fat\total solid substances,and dry matter but there were no significant differences ($P<0.05$) between the patterns of this group in the pH and percentage of acidity, the patterns of group (B) also reported a significant difference in the percentage of total solid substances, moisture, fat, fat\total solid substances, protein, and dry matter, and there were no significant differences in the pH and percentage of acidity in this group, whereas there were a significant difference ($P<0.05$) between the patterns of group (C)in the percentage of total solid substances , moisture, fat, fat\total solid substances, protein, dry matter, and the value of pH , but no significant differences in the percentage of acidity, the patterns of group (D) are reported a significant difference ($P<0.05$) in the percentages of total solid substances, moisture, fat\total solid substances, protein, dry matter, but they did not report asignificant difference in the percentages of both fat and acidity and value of pH.., The results also showed that there were some samples contain preservatives as(benzoic acid , boric acid , formaldehyde, hydrogen peroxide) the samples which contain these materials were about (%8.3-%25) of total samples of each three group, while the samples of group (D) was clear of preservatives exept it was contain a starch that used as a commercial fraud in the (%8.3)samples of total studied samples of this group.

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Introduction

The importance of cheese in human nutrition is due to its high protein content (16-28%), fat (30%) and a rich source of calcium salts (100-600 mg), and vitamin A (0.2%), [1]. Several researchers say that the chemical composition of soft cheese varies from one region to another and from time to time, and the reason for this is due to the different methods of manufacturing , the quality of the raw milk used in its manufacture, and other factors such as transportation, storage and handling this is confirmed by [2],while [3] showed that there are different chemical and structural properties of processed cheese that affect the functional properties of that cooked cheese, others, such as total calcium content, casein content, pH, as well as content of emulsifying salts, lactose content, whey protein content, as well as types and quantities of additives for the production of cheese with special physiochemical and functional properties[4].Fat percentage indicates that many cheese producers remove part of milk fat before manufacturing cheese, and this is what [5] showed in the results they obtained . For acidity, its percentage was 0.34% on average.it ranged between 0.4% -0.28%. It was also found that the rate of acidity production in cheese is not uniform due to its dependence on the microbes present in it which are heterogeneous and which consist of different types. Chemicals are added to food, and these additives include (stabilizers, acidifiers, emulsifiers, colorants, thickeners, diluents, auxiliaries in manufacturing processes and preservatives), and these materials in turn are divided into flavorings and materials that protect food from microbial spoilage and work to enhance the functional properties of the food or improve duration of preservation and appearance)[6]. The levels at which these chemicals are harmful to human health are generally several times greater than their natural use [6] In any case, poor health control and training may lead to exceeding the specified levels for these substances and result in harm, or even a toxic effect on public health, and substances with a toxic effect are those substances that cause health damage to humans in the short or long term . Health damage here is not limited to the well-known symptoms of poisoning such as vomiting, diarrhea and high temperature, which often appear shortly after eating the poisoned food, but also includes health damage that may appear after several years, including damage to the kidneys and liver and impaired digestive system functions. The most important form of commercial adulteration of milk and its products and the most harmful to the health of the consumer is the use of materials to prevent the occurrence of change or decomposition in its composition due to microbes or any other type of food spoilage until it is transferred to consumers or to manufacturing plants, However, it has negative effects on the public health of the consumer, because it is responsible for many diseases and among these substances (formalin, , borax salts, benzoic acid, salicylic acid and hydrogen peroxide) [7]. These substances should not be used for several reasons, the first of which is that these substances disrupt the digestive process in a person, as they affect the intestinal microflora, as well as cause cirrhosis of the liver, for example, formalin is a highly toxic and carcinogenic substance that also leads to ulceration of the digestive system, chronic kidney failure and hepatitis. And other dangerous diseases. [8]. Other materials are also used in commercial adulteration of cheese or milk products, such as the use of starch or some bonding materials in milk diluted with water with the intention of raising its density and showing it with a more creamy appearance ,So this research aimed to study the chemical composition of the studied types of soft and cooked imported and local cheeses and detection of some prohibited preservatives added to cheeses such as (benzoic acid, borax, formalin, hydrogen peroxide) as well as detection the presence of starch, which is added for the purpose of commercial fraud.

Materials and Methods

- Chemical tests

The Lactoflash milk chemical properties measuring device was used to estimate the chemical properties of the cheese. The percentage of each (protein, fat, non-fat solids)

was measured as well as the percentage of moisture according to what was mentioned by (9) with a weight of 2 grams of the sample and dried in the electric oven at a temperature of 105 ºc until a constant weight is reached which represents the weight of the dry matter, which was subtracted from the total weight to estimate of the moisture content, as well as measuring of pH of the studied samples by the method of regression and estimating the pH using a pH .(meter [10].

Detection of preservatives and commercial fraud: -

- detection of benzoic acid

5 gm of each sample of cheese were taken and extracted with 50-100 ml of ethyl ether after mixing it with distilled water and transferring it to the liquid state and filtering, then washing the ethyl ether layer with water and evaporating the bulk of the ethyl ether by placing it in a ceramic vessel in a water bath The remaining part of it was left to evaporate automatically, in case oft benzoic acid was present in large quantities in the sample it would turn into bright crystals and give a distinctive smell during heating, after that the residue from the evaporation process is dissolved in hot water and a few drops of ammonium hydroxide are added to it and it is evaporated and dissolved in a few drops of hot water and filter it if necessary, then add a few drops of the neutral solution ferric chloride (0.5% w / v), where a precipitate of ferric chloride with a salmon color indicates the presence of benzoic acid in the samples [11] .

detection of formaline

5 g of a cheese sample was mixed with 5 ml of distilled water in a graduated tube, and one drop of a 10% ferric chloride (FeCL3) solution was added to 10 ml of concentrated sulfuric acid (0.85) in another test tube, and the last mixture was poured quietly and slowly from one The sides of the test tube that containing the mixture of the sample and water, taking into account not to mix them together, in case of a purple or blue ring is formed between the two mixtures, this indicates the presence of formalin in the samples, while the formation of the brown ring between the two mixtures indicates the absence of formalin [11].

detection of boric acid

5 ml of the cheese sample was applied after converting it to a liquid state into a test tube, adding 2-3 drops of 1% phenonphthalein indicator to the form with continuous shaking and correcting it with adding NaOH 0.1N solution drop by drop until the color of the form changedto the pink color, then an equal amount of glycerol water solution (1: 1or50%) was added to the sample, and if the pink color disappeared this indicates the presence of borax in the samples [12].

detection of Hydrogen Peroxide(H_2O_2)

About 2 gm of the cheese sample was placed in a test tube after mixing it with distilled water and turning it into a liquid state. Approximately 5 drops of Para phenyldiamine 12% (w / v) solution were added. The appearance of the blue color immediately under these circumstances indicates the presence of hydrogen peroxide in the model [13].

detection of starch

3 gm of the sample was placed in a test tube after mixing it with distilled water and turning it into a liquid state, then it was heated on the flame until it boiled and cooled to room temperature, then one drop of Iodine solution was added 1%, and the blue color appeared in the sample indicates the presence of starch which disappears during boiling and then reappears at cooling [13].

Statistical Analysis

[14] was used in data analysis to study the effect of different parameters on the studied traits according to a complete random design (CRD). The significant differences between the averages were compared with the Duncan (1995) polynomial test.

Mathematical model:

$Yij = \mu + Ti + eij$

As:

Yij: the view value j of transaction i.

μ: the general average of the studied trait.
Ti: effect of treatment i (type of cheese).
eij: the normally distributed random error with a mean equal to zero and a variance of σ2e.

Results and discussion

The results in Table (1) show that there are significant differences (p <0.05) in the chemical composition percentages among the group (A) samples in the percentage of total solid substances, moisture, fat, fat / total solid substances, protein, and the percentage of dry matter, as sample (12) recorded the highest percentage of total solid substances it reached (59.50%), while sample (6) recorded the lowest percentage of total solid substances, as its value was (50.00%). While the percentage of moisture recorded its highest value in sample (6) as it reached (50.00%) while sample (12) recorded the lowest percentage of moisture its reached (40.50%). The percentage of fat was the highest in sample (9) among the group (A) samples, it reached (30.02%) and the lowest percentage of fat in this group was recorded by sample (6) which was (23.02%), while the percentage of fat / total solid substances had its highest value among the samples of this group in sample (12) reached (48.23%) while the lowest value for it among the samples of this group was in sample (3) as it was (40.11%) and the percentage of protein had its highest value among the group (A) samples in sample (10) it was (25.68%) while the lowest percentage of protein was recorded by sample (9) as it reached (20.15%) . Sample (4) had the highest percentage of dry matter among the samples of this group amounting to (3.11%) while the percentage of dry matter had the lowest value in sample (7) it reached (2.13%), while there was no significant difference at (p <0.05) between the studied samples of group (A) in the pH value and the percentage of acidity. The difference in the chemical composition ratios between the studied models may be due mainly to the non-conformity of most of these models to a unified standard specification or the failure of companies and factories producing this type of cheeses to follow a unified standard specification when producing these cheeses, and this difference in the chemical composition percentages maybe due to the different manufacturing method and conditions, as well as the different content, quality of the raw materials used to manufacture this type of cheese as well as the different techniques used in manufacturing. These results are consistent with what was found by [15] and [16].

The results in Table (2) showed that there are significant differences (P <0.05) between the group (B) models, as there were significant differences between the (12) studied samples in the percentages of total solid substances, moisture, fat, and fat / total solid substances, protein, and dry matter,as the highest percentage of total solid substances was recorded in sample(3),as its percentage reached (56.00%), while the lowest percentage was in sample (8) and reached (44.93%), while the highest percentage of moisture was was recorded in sample (8) as it reached (55.07%) and the lowest percentage of moisture among the samples of group (B) was recorded in sample (3) as it reached (44.00%). Fat percentage recorded its highest value in sample (11) it was (29.80%) while this percentage was the lowest in sample(8)as it was(21.42%).

With regard of the perentage of fat / total solid substances the highest percentage was in sample (11) as it reached (47.86%) while the lowest percentage was in sample (5) as it reached (37.00%). The percentage of protein reached the highest among the samples of this group in sample (4) as it reached (24.77%) while this percentage was the lowest in sample (7) as it was (17.55%) and the percentage of dry matter in sample (3) reached a value of (3.47%) while its percentage in sample (8) amounted to (2.07%). There was no significant diffenences (P <0.05) among the samples of this group in the pH values and acidity percentage.

These results agree with what [17] , [18], found, while not agreeing with what are found by [19].

Table (1) The percentages of the chemical composition of group A samples of imported semi soft cheeses.

A semi soft cattle cheeses	TSS %	Moisture %	Fat %	Fat\TSS %	Protien%	Dry matter %	pH	Acidity %
1-	55.40	44.60	25.70	45.30	23.25	2.87	5.87	0.24
2-	58.13	41.87	26.12	42.20	25.05	3.00	5.02	0.22
3-	54.00	46.00	24.56	40.11	22.16	2.97	5.88	0.25
4-	53.00	45.33	27.32	45.99	20.76	3.11	4.90	0.30
5-	50.89	47.11	23.50	42.00	23.00	2.90	5.20	0.23
6-	50.00	50.00	23.02	46.22	21.10	2.99	5.00	0.22
7-	57.12	42.88	30.00	45.01	22.45	2.13	4.99	0.27
8-	52.03	47.27	26.12	47.05	21.00	2.99	5.16	0.24
9-	56.23	43.77	30.02	48.17	20.15	3.04	5.72	0.23
10-	57.44	42.56	28.00	42.07	25.68	2.70	5.60	0.22
11-	55.69	44.31	28.00	48.16	21.00	2.55	4.72	0.29
12-	59.50	40.50	28.70	48.23	24.30	2.30	5.96	0.28
LSD value	3.95 *	5.06 *	5.19 *	4.89 *	3.55 *	0.62 *	1.47 NS	0.084 NS

*(P<0.05).
Each number in the table represents an average of three replications.

Table (2) The percentages of the chemical composition of group B samples of imported slice cheeses.

B slice cattle cheeses	TSS %	Moisture %	Fat %	Fat\TSS %	Protien%	Dry matter %	pH	Acidity%
1-	50.13	49.87	24.70	40.33	19.85	2.78	5.87	0.24
2-	53.44	46.56	26.62	43.26	22.15	3.12	5.02	0.22
3-	56.00	44.00	28.18	45.31	20.26	3.47	5.88	0.20
4-	52.00	48.00	22.35	47.00	24.77	2.51	4.90	0.27
5-	51.89	48.11	22.58	37.00	23.03	3.00	5.20	0.23
6-	53.12	46.88.	27.14	43.12	20.79	2.77	5.17	0.30
7-	51.72	48.28	28.54	45.21	17.55	2.83	5.00	0.27
8-	44.93	55.07	21.42	46.15	18.78	2.07	4.36	0.31
9-	50.53	49.47	26.00	46.47	20.75	3.14	5.13	0.26
10-	51.14	48.86	27.06	42.67	20.38	2.18	5.87	0.21
11-	55.19	44.81	29.80	47.86	21.18	3.25	4.92	0.32
12-	49.59	50.40	23.17	44.32	22.30	2.20	5.55	0.25
LSD value	6.73 *	5.92 *	5.04 *	5.97 *	3.88 *	0.677 *	1.18 NS	0.098 NS

*(P<0.05).
Each number in the table represents an average of three replications.

The results in Table (3) showed that there are significant differences (P <0.05) between the group (C) samples, as there were significant differences between the (12) studied samples in the percentages of total solid substances, moisture, fat, and fat / Total solid substances, protein, dry matter, and the pH value, as the highest percentage of total solids was recorded by sample (11) as its percentage reached (64.15%) while the lowest percentage for it was in sample (1) and reached (56.76%) while it was higher percentage of miosture was recorded in sample (1) as it reached (43.24%) and the lowest percentage of miosture among the samples of group (C) was recorded in sample (11) as it reached (35.01%), and the percentage of fat recorded its highest value among the samples of this group in sample (12) was (29.17%) while this percentage was the lowest in sample(5) among the group (C) samples as it was (23.58%) while the fat / total solid substances percentage had its highest value in the sample (3) as it reached (51.11%) while the lowest percentage was in sample (9) as it reached (46.77%). As for the percentage of protein, it reached the highest among the samples of this group in sample (5) as it reached (28.13%) while this percentage was the lowest among the samples of this group in sample (6) as it was (22.39%) and the dry matter percentage in sample (3) reached a value of (3.27%) the highest value among the group samples (C) While its percentage in sample (12) was the lowest among the samples of this group it reached (2.40%), and the pH value in sample (2) reached (6.02). In sample (7) its value reached (5.00) as the lowest value among the samples of this group. Whereas, no significant differences (P <0.05) were recorded between the samples of this group in the percentage of acidity .

These results are similar to those found by [20] and [21], while they are inconsistent with that found by [22] , [23]

Table (3) The percentages of the chemical composition of group C samples of imported spreadable cheeses

C spreadable cattle cheeses	TSS %	Moisture %	Fat %	Fat\TSS %	Protien %	Dry matter %	pH	Acidity %
1-	56.76	43.24	25.73	48.93	24.15	2.68	5.80	0.24
2-	61.33	38.67	26.43	49.66	27.17	3.00	6.02	0.22
3-	58.94	41.05	24.12	51.11	27.46	3.27	5.90	0.20
4-	58.98	41.01	26.15	47.89	25.97	2.94	5.13	0.27
5-	57.11	42.89	23.58	47.50	28.13	3.00	5.66	0.23
6-	56.88	41.12	27.14	51.02	22.39	2.89	5.02	0.30
7-	58.72	41.28	25.44	47.11	27.55	2.85	5.00	0.25
8-	60.07	39.90	27.82	46.85	26.18	2.47	5.36	0.25
9-	59.47	40.53	26.00	46.77	27.75	3.00	6.00	0.23
10-	58.86	41.14	24.76	47.97	25.98	2.79	5.77	0.22
11-	64.15	35.01	27.80	50.16	27.28	3.05	5.92	0.24
12-	60.41	39.50	29.17	50.12	24.60	2.40	5.75	0.23
LSD value	5.83 *	4.09 *	4.36 *	3.49 *	3.07 *	0.607 *	0.944 *	0114 NS

*(P<0.05).

Each number in the table represents an average of three replications.

The results in Table (4) showed that there were significant differences (p <0.05) in the chemical composition perentages among the samples of group D with regard to the percentage of total solids, moisture, and the perentage of fat / total solid substanes, protein.Sample (9) recorded the highest percentage of total solid substances, as its percentage reached (41.19%), while sample (8) recorded the lowest percentage of total solids as its value was (35.99%). While the percentage of moisture recorded its highest value in sample (8), as it reached (64.01%), while sample (9) recorded the lowest percentage of moisture, its value was (58.81%) and with regard to the percentage of fat, it did not record a clear significant difference between the percentage of fat among the samples of group (D), as the percentage of fat ranged between (18.21% - 17.00%), while the percentage of fat / total solids had the highest value among the samples of this group in samle (2) and it reached (45.00%). While it reached its lowest value among the samples of this group in sample (6) as it was (40.00%) and the percentage of protein had the highest value recorded among the samples of group (D) in sample (6) and it was (17.00%) while the lowest percentage was in sample(8) recorded for protein as it reached (13.55%) and sample(7) had the highest value for dry matter percentage among the samples of this group amounting to (3.14%), while the lowest value for dry matter percentage was recorded in sample (5) it was (2.00%) . While there was no significant difference (p <0.05) between the samples studied for group (D) in the fat percentage and percentage of acidity, as well as no significant difference in the pH values between the samples of this group.

Table (4) The percentages of the chemical composition of group E samples of locally produced white soft cheeses.

D local white soft cattle cheeses	TSS %	Moisture %	Fat %	Fat\TSS %	Protien %	Dry matter %	pH	Acidity %
1-	37.00	63.00	17.00	43.44	14.23	3.04	6.69	0.18
2-	40.85	59.14	18.21	45.00	16.08	3.00	6.32	0.19
3-	38.24	61.75	17.67	43.23	15.00	2.87	6.45	0.18
4-	37.20	62.78	18.16	43.18	14.44	2.99	6.55	0.18
5-	36.00	64.00	17.50	40.51	15.00	2.00	6.09	0.20
6-	39.99	60.00	17.22	40.00	17.00	3.00	6.11	0.21
7-	39.92	60.08	18.00	43.25	16.32	3.14	6.22	0.20
8-	35.99	64.01	17.15	44.60	13.55	2.97	6.66	0.18
9-	41.19	58.81	18.00	43.33	14.70	3.12	6.21	0.19
10-	40.15	59.84	17.00	41.27	15.23	2.17	6.13	0.19
11-	36.11	63.89	17.83	43.26	14.00	2.67	6.24	0.17
12-	36.44	63.55	17.97	42.92	14.00	2.11	6.54	0.20
LSD value	4.07 *	4.13 *	1.78 NS	3.96 *	2.69 *	0.783 *	0.691 NS	0.087 NS

*(P<0.05).

Each number in the table represents an average of three replications.

Preservatives and commercial adulteration of cheeses: -

Table (4) obtained from conducting tests to detect the presence of preservatives and commercial adulteration substances for cheeses shows the presence of benzoic acid in 25% of the group (A) tested cheese samples, as well as the presence of borax in 25% of the cheese samples of this group as well, While the presence of formalin, hydrogen peroxide, and starch was not proven in the samples of this group, and for the group (B) samples, the presence of two substances benzoic acid and hydrogen peroxide were shown in 8.3% of the total tested samples for each substance, while the percentage of samples that contained formalin, up to 16.6% of the total tested samples.

Samples of this group also contained starch at a rate of 25% of the total tested samples. While it was found that the samples of this group were clear of borax. the presence of formalin and hydrogen peroxide, was found in the samples of group (C) with rates up to 8.3% and 16.6% each, respectively of the total tested samples of this group,

While the group (D) samples were free of the presence of any of these preservatives, except for the presence of starch, which is considered a commercial adulteration, in which the percentage of samples containing 8.3% of the tested samples for this group was recorded. These results obtained in terms of the containment of cooked cheese samples on benzoic acid as a preservative are consistent with what [24] found, which indicated that all 19 samples of the studied cheese contain this substance at rates ranging between 1,735. - 25.771 mg / kg, while the addition of benzoic acid is not indicated on the product, and is also consistent with what [25] found. While other studies showed that the concentration of benzoic acid in Iranian dairy products was less than 30 mg / kg [26], while these results were inconsistent with what [27] founds of these samples containing starch .

Table(5) . The samples containing preservatives and commercial adulteration substances are calculated as a percentage of the total samples

Symbol of group	Hydrogene peroxide	Boric acid	Formalin	Benzioc acid	Starch
A	_	25%	_	25%	_
B	8.3%	_	16.6%	8.3%	25%
C	16.6%	_	8.3%	_	_
D	_	_	_	_	8.3%

Conclusions

The following points can be concluded from the research:

1- Some imported and local cooked cheeses contain preservatives, and no preservatives were mentioned in these cheeses in spite of proven the presence of these preservatives in some samples.

2- There is a clear discrepancy in the chemical composition of some samples of the same type of cheese.

Recommendations:-

1 - Confirming the importers' health certificates and checking them for the purpose of determining the extent of their conformity with the suitability for human consumption from espect of food additives.

2-The necessity of directing local producers through audio and visual media on the correct methods of manufacturing in order to maintain quality of locally produced cheese in accordance with the specifications in Iraq.
3-The locally produced cheeses are better than imported cheeses becouse they free from preservatives that may couse damage to the consumer health.

References

1- Kazem, Z.M.(2007).Evaluation of some types of local and imported dairy products(cheese). J. of kerbala uni,5(4)1-5.sited by arabic

2- Hayalogu , A . ; Guven , A . M . ; Fox , P. F. (2002) . Microbiological 1Biochemical And Technological Properties Of Turkish White Cheese 1Beyaz Peynir, Review.Int.Dairy.J.12:635-648.

3-Kapoor , R . and Metzger, L .E . (2008) . Processed Cheese Scientific And1Technological Aspects-Areview.Com.Rev.Food Sci.Food Safety.7:194-1214.

4-Pinto , S . ; Rathour , A . K . ; Prajapati , J . P. ; Jana , A . H . and 1Salanky , M . J . (2007) . Utilization Of Whey Protien Concentrate In Processed Cheese Spread.Natural Product Radiance 6(5):398-401.

5-Kariem. Y.; Abou- Ghorrah. S.; and Slik. S. (2007). Characteristics of Some Syrian Fresh White Cheeses (Baladi and Akkawi) Manufactured from Cow's Milk. Master Student Damascus University, for Agri.Scie.J.23 (2):299-315.sited by arabic

6-Fischer , W . J . ; Tritscher , A . M . ; Schilter , B . and Stedler , R . H . (2003) . Contaminants of Milk and Dairy products/ Contaminants Resulting From Agricultural And Dairy Practices. In Encyclopedia of Dairy Sciences,Vol.1,pp.516-532.London,Elsevier Scie.

7-Al-kotami, S.; Abou Ghorra, S.;and S. Yaziji.(2013).Studying some chemical and microbial properties in Syrian Akkawi cheese. Damascus University, for Agri.Scie.J.29 (3):97-114.sited by Arabic.

8-Jafar,AB.,M.(2000).preservaties and additives in food industries.college of agriculture university of ein shams.sited by Arabic.

9- Ling , E . R . (1956) . Atext Book Of Dairy Chemistry.Vol.2.Chapman And Hall LTD.London.

10-Kosikowski, F.V. (1982) . Cheese And Fermented Milk Foods.2nd .Ed.New York.U.S.A.

11- Association Of Official Analytical Chemists.AOAC . (1995) . Official 1Methods Of Analysis Of AoAc.International 16th ed.Whashigton,DC:AoAc.

12- Association Of Official Analytical Chemists AOAC . (2000) . Official Methods Of Analysis Of AoAc.International.17th.ed1Gaithersburg. MD:AoAc.International.

13- Association Of Official Analytical Chemists AOAC . (1995) . Official Method 11No.961.08,Phosphatase(reactivated and residual) In Milk.In AoAc 1Official Methods Of Analysis,16th edn.Dairy Products,Arlington VA:AoAc,p.36.

14- SAS .(2012) .Statistical Analysis System, User`s Guide.Statistical Version 19.1th ed.SAS .Inst.Inc. Cary.N.C. USA.

15- Hussein , F. S. E.; Elzubeir , I.M.; and Fadlelmoula, A.A.(2011) . Quality Evaluation Of Imported And Locally Produced Processed Cheese In Sudan . Jordan. J. of Biological scien.Vol.4,N.4,PP.231-236.

16- Bojanic, R .M .; Nilolic ,N.; and Rasovic, A.(2017) . Quality Of Urda Obtained After Production Of Montenegrin Semihard Cheese.Food Research 1(5):166-170.

17- Abdelrahim , S .; Abdalla , M.O.M.; El-Haj, N. H. M. and Elsiddig, H. M.O. (2011). Chamical and Microbiological Evaluation of Processed Cheese available in Khartoum Market,Sudan.American,J.F.& Nut.1(1):28-33.

18- Kwak , H . S . ; Choi , S . S . ; Ahn , J . and Lee , S .W . (2002) . Casein Hydrolysare Fractions Act As Emulsifiers

In Process Cheese.J.Food Sci.67(2):821-825.

19- Piska ,I. and Stetina ,J. (2004) .Influence Of Cheese Ripening And Of Cooling Of The Properties Of Processed Cheese. J.Food Eng.61:551-555.

20- Abdelraziq ,K.A.and Yousif ,A.M. (2010) . Utilization Of Groundnut Milk In Manufacturing Spread Cheese. Pak. J.Nutr.9(4):314-319.

21- Acharya, M. R. and Mistry, V. V. (2005) . Effect Of Vacuum-Condensed Or Ultra Filtered Milk On Pasteurized Process Cheese.J.Dairy Sci.88:3037-3043.

22- Shirashoji , N . ; Jaeggi , J . J . and Lucey , J . A . (2006) . Effect Of Trisodium Citrate Concentration And Cooking Time On The Physicochemical Properties Of Pasteurized Process Cheese .J. Dairy Sci.89:15-28.

23- Dimitreli ,G. and Thomareis ,A.S.(2007) . Texture Evaluation Of Block-Type 1Processed Cheese As afunction Of Chemical Composition And In Relation To Its Apparent Viscosity.J.Food Eng.79:1364-1373.

24- Mazdeh ,F.Z.;Sasanfar ,S.;Chalipour ,A.;Pirhadi ,E.;Yahyapour,G.; Mohammadin ,A.; Rostami ,A.; Amini , M.and Hajimahmoodi ,M.(2017) . Simultanous Determination Of Preservatives In Dairy Products ByHPLC and Chemometric Analysis . Intr.J. of Analytical Chemistry.Vol.2017,Article ID 3084359,8 Pages.

25- Fuselli , F.; Lamantia ,C.A.;Longo ,L.; Faberi ,A.;Marianella ,R.M. (2012) .Multi-Detection Of Preservatives In Cheese By Liqiud Chromatography-Tendem Mass Spectrometry .J.Chroma .B.Vol.906,1October 2012,pp.9-18.

26- Esfandiqri ,Z.; Badiey ,M.; Mahmoodian ,P.; Sarhamgpour ,R.; Yazdani ,E.;and Mirlohi ,M. (2013) . Simultaneus Determination Of Sodium Benzoate,Potassium Sorbate And Natamycin Content In Iranian Yoghurt Drink(Doogh) And The Associated Risk Of Their Intake Through Doogh Consumption.Iranian . J.Of Public Health.Vol.42,No.8,PP.915-920.

27- Fernanda ,D.G. (2016) . Chemical Composition In Parmesan Cheese Marketed In Paranavai-Parana .J.of Revista do Instituto de Laticinios Candido Tostes. 70(4):185-191.

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