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DETERMINATION OF IODINE CONTENT OF MILK FROM DIFFERENT ANIMALS AND IN CERTAIN DAIRY PRODUCTS

Abo El Enien, Karima and Magda Abd El Aziz
Dairy Chemistry Department, Animal Production Res. Institute, Agric. Res. Center, Ministry of Agric, Egypt .

ABSTRACT

Dietary iodine is essential for thyroid hormone production. Ensuring that the population receives adequate amount of iodine demands. Careful monitoring of the iodine content in food, milk and dairy products are good sources of dietary iodine. There are no recent data available about iodine content in Egyptian milk and dairy products .So the present study was conducted to measure the iodine content in whole raw buffalo milk from different locations in Egypt during the summer and winter seasons as well as measuring iodine content in cow goat and camel milk, beside processed milk and some dairy products collected from the supermarket during the winter season. The iodine concentration of all samples were measured by ammo. persulfate with catalytic spectrophotometric method . The results showed that the average iodine content of whole raw buffalo milk in the summer season was significantly lower than that during the winter season. There were no significant differences in the milk samples with regard to geographical sampling location. The average content of iodine in buffalo was 42.46 ± 1.38 µg /100 ml which is closed to camel milk, however it was not significantly higher, comparing with cow milk. The average iodine value in goat milk 16.22 ± 3.2 µg/ 100 ml was highly significant lower than the average amount of iodine in buffalo, cow and camel milk.

While the average of iodine levels in the processed milk were in range 28.40 – 39. 86 µg/100 ml and depends on the additives. With regard to rayeb milk the average level of iodine was 28.29 ± 2.08 µg/100 ml. The median iodine concentration in UF white soft cheese was significantly higher (69.43±1.73 µg/100 ml) than that in kariesh cheese (57.43 ±2.13µg/100 ml). It was found that recovery of iodine in whey of kareish cheese and permeate of UF white soft cheese were 59 % and 55%, respectively. of original milk. Moreover, the results revealed that the average iodine content in skim milk, cream, butter and butter milk were 35.56 ± 1.56, 24.61 ± 1.60, 24.77 ± 2.10, 13.04±1.98 µg/ 100 ml, respectively.

Keywords: Iodine, buffalo, cow, goat, camel, milk, some dairy products, catalytic spectrophotometric determination, season variation.

INTRODUCTION

Iodine is an essential element for human health. Adequate iodine levels are essential for the production of thyroid hormones and proper immune system function (Stone, 1988 ; Hetzel & Clugston , 1999).The main source of iodine is generally food items such as milk and dairy products (Pearce *et al.,* 2004). Deficiency of iodine can lead to hypothyroidism, enlargement of the thyroid gland and mental retardation in children (Philip and Lawrence (2001) .The role of iodide in breast cancer is an area of active research (Stoddard *et al*., 2008). Researchers have found correlation between iodine deficiency, iodine-deficient goitre and gastric cancer

(Behrouzian, R& Aghdami, N.,2004; Abnet *et al*., 2006 and Josefssson & Ekblad, E. , 2009). In addition over consumption of iodine can be toxic and just as damaging as a deficiency. The recommended daily allowances of iodine 150 µg /day for adult men and women. For pregnant women the amount rises to 220 µg /day. Breastfeeding women need at least 290 µg /day and an upper limit of the daily iodine intake at 1.1 mg, for adults (Food and Nutrition Board Institute of Medicine 2001). Therefore, the public should be aware of the need for adequate dietary iodine intake. Ensuring that a population receives adequate amount of iodine demands careful monitoring of the iodine content in food. Among major dietary items, milk is an important source of dietary of iodine and othere dairy products such as cheese, yogurt and ice cream (Food Sources of Dietary Iodine , 2010), therefore upon there exists an increasing interest in the determination of total iodine in various species of milk and dairy products.

There are variations of iodine in milk which are related to whether and feeding. According to Castro *et al*., (2010) iodine concentration of cow milk in Canada was 304 ± 8.4 µg/kg, with concentrations ranging from 54 to 1,902 µg /kg influenced by feeding and milking practices . Also the study of Schöne *et al*.,(2009) showed that the iodine content of milk and serum reflected the iodine dosages in feed significantly and the total amount of iodine in milk per day was 30-40% of ingested supplemental iodine. Also, pervious study reported by Hemken, (1980) showed that iodine level in milk may vary over time, between 1965 and 1980, the iodine content of milk increased by 300 to 500 percent due largely to changes in cattle feeds.

On the other hand, the amount of iodine may vary according to seasonal variations and the way in which the manufacturer prepares the milk). (Brzóska *et al* 2009)

Recent studies showed that organic milk was lower (42·1 %) iodine content than non-organic milk (Rasmussen *et al*., 2000, Bath *et al*. , 2011).

There are no recent data available about iodine content in Egyptian milk and dairy products. It's difficult to determine just how much iodine you're getting from these foods. Therefore the present study aimed to measure the iodine content in Egyptian milk from buffalo, caw, goat and camel , processed milk and some of dairy products. Also, iodine content in buffalo milk from different of locally regions during winter and summer seasons will be measured.

MATERIALS AND METHODS

A systematic study was carried out for detecting the iodine content in Egyptian raw milk samples of different animals (buffalo, cow, goat and camel) and in some dairy products .

For studying the effect of seasons variation and geographic origin, raw buffalo milk samples were collected from different Egyptian governorates (Monofia , Dakahlia , Al- Shrkia , Kafr El-Sheikh , Giza) during winter and summer seasons . Cow and goat milk samples were obtained

from the herd of ministry of agriculture (Sakha – Kafr EL-Shikh). Camel milk samples were obtained from Marsa Matroh station.

Pasteurized milk samples (buffalo and cow milk were heated at 75 ºC for 15 sec. and then cooled to 4 ºC) . UHT cow milk (chocolate milk, banana milk) 1.5 % fat and Rayeb milk made from cow pasteurized milk were collected from super market Kariesh cheese being made from buffalo skim milk samples were obtained from Dairy Processing Unit belongs to Animal Production Research Institute Cream , butter and butter milk samples made from cow whole pasteurized milk were obtained from Dairy Processing Unit belongs to Animal Production Research Institute.

Potassium iodate to be used as standard and ceric ammonium sulfate were purchased from Sigma Chemical Co. Ammonium per sulfate, arsenic trioxide, concentrated sulfuric acid (98%) were obtained from Prolabo. Deionized water was used for preparing reagents and dilution procedure

Total iodine concentration in milk samples was measured by ammonium per sulfate with catalytic spectrophotometric method according to Pino *et al.* (1996) method modified to determine iodine in milk and some dairy products by Abd El Aziz, magda and Abo El Enien, Karima (2012) . All samples were extracted with ammonium per sulfate at 95 ºC for 30 min. After extraction, the reaction of As^{3+}-Ce^{4+} was performed at 32 ºC, and the transmission was measured spectrophotometrically at 420 nm.

Statistical analyses were performed according to Bailey (1995) . The data are represented as means ± SD where the number of samples analysis were 20 for buffalo milk during seasons variation and 5 – 10 for other samples (Cow , goat **,** Camel milk and different products**)** during winter season**.**

RESULTS AND DISCUSSION

The average iodine contents of whole raw buffalo milk from different regions in Egypt through winter and summer were represented in Fig.(1). Average values of milk iodine concentration in summer season were 30.51-33.15 µg/100 ml for all milk samples from different regions, while the content during the winter season (average values 41.73 – 44.75 µg/100 ml). Milk iodine concentration in the summer season was lower than winter about 26 %, with a standard deviation of 0.5 %.The average iodine content in milk was significantly higher ($p < 0..05$) in winter than summer. These results were agreed with those obtained by , Dahl *et al.,* (2003) who determined the iodine concentration in Norwegian-produced milk and found that low-fat milk from the summer season had significantly lower median iodine concentration, compared with low-fat milk from the winter season .Also, Pearce *et al*., (2004) found mean iodine content of cows' milk was significantly higher in the winter (116 ± 23.1 µg/250 ml) than in the summer (91.3 ± 16.6 µg/250 ml, $P = 0.0004$). Moreover, Brzóska *et al*., (2009) reported that milk iodine concentration in the summer season was lower by an average of 25.2% than the winter season .

On the other hand, the data revealed no significant differences in the milk samples with regard to geographical sampling location. As reported in previous study of Larsen *et al.,* (1999) the a temporal difference showed a general increase in iodine concentration in milk from all regions during the winter months over the summer months.

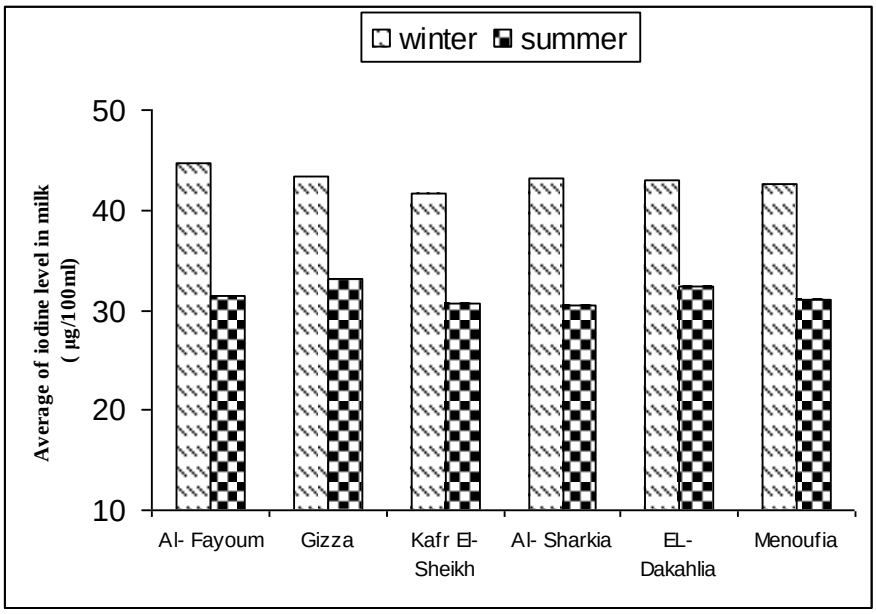

Fig (1): Iodine level in raw buffalo milk from different Egyptian governorates during summer and winter

Iodine levels of raw milk from buffalo, cow, camel and goat were shown in Table (1) The average content of iodine in buffalo was 42.46 ± 1.38, ranging from 40.58- 44.27 µg /100ml which was closed to camel milk (mean 41.51 ± 0.71 range 38.12 – 42.33), and no significant difference, compared with iodine in cow milk. While the results showed that the average value for iodine in goat milk was 16.22 ±3.2 µg /100 ml ranged from 11.54 – 21.10 µg /100 ml, which was highly significant ($p < 0.001$) lower than the average amount of iodine in buffalo , cow and camel milk. On the other hand, previous study by Underwood, (1977) reported that iodine content in goat milk and cow milk were significantly higher human milk, that may be important for human nutrition since iodine is necessary for thyroid hormone which is closely related to the metabolic rate of physiological body functions

Table (1): Iodine content in milk from different species of animals

Type of milk	Concentration of iodine (µg/100 ml)		
	Range	Average	± SD
Buffalo	40.58 – 44. 27	42.46	1.38
Cow	35.33 - 39.38	37.43	1.41
Camel	0.71	41.51	38.12 – 42.33
Goat	11.54 – 21.10	16.22	3.2

Table (2) showed the average value of iodine in processed milk (pasteurized milk, UHT milk, chocolate and banana milk) and rayeb milk .For the pasteurization process buffalo and cow milk in the iodine level was 37.31 ± 1.1 and 34.66 ± 1.21 µg/ 100 ml, respectively. Whereas the mean iodine content found in the buffalo and cow milk prior to heating processing were 42.46 ±38 ml and 37.43 ± 1.41 µg / 100 ml respectively as shown in Table (1). This indicated that the effect of heating in pasteurization process on iodine concentration was significant ($p < 0.05$). These results in line with Norouzian, (2011), who reported that the reduction of iodine concentration by high-temperature short-time pasteurization process was not negligible . Moreover, the data showed that effect of UHT process on iodine concentration was highly significant ($p < 0.01$)

However, it was found that the average concentration of iodine in UHT milk was 28.40 ± 1.22 increased to 37.57 ± 1.24 and. 39.86 ± 1.64 in UHT chocolate milk and banana milk, respectively. The results showed the addition of chocolate and banana to milk elevated the iodine level 32.29 % and 40.35 %, respectively. Whereas for the rayeb milk the level of iodine was 28.29 ± 2.08 coincide with UHT milk.

Table (2): Iodine content in some processed milk and rayeb milk

Samples	Concentration of iodine (µ g /100ml)		
	Range	Average	± SD
Pasteurized buffalo milk	35.86 – 39.22	37.31	1.1
Pasteurized cow milk	33.25 – 36.80	34.66	1.21
UHT cow milk	26.56 -30.22	28.40	1.22
UHT cow chocolate milk	35.57 -39.20	37.57	1.24
UHT cow banana milk	37.70 – 42.60	39.86	1.64
Rayeb milk	25.12 – 31.10	28.29	2.08

The data in Table (3) showed the iodine levels in cheese and its whey . The results indicated that iodine content in cheese and its whey was affected by the method of processing. The average content of iodine in UF soft cheese and permeate were 69.98 ±1.73 and 27.29 ± 1.34 (µg/100 g), respectively. These results were higher than kariesh cheese and its whey. This might be due to higher dry matter of UF soft cheese than kariesh cheese. It was found that recovery of iodine in whey and permeate were 59 % and 55% of original milk, respectively, while 36 and 47 % of iodine were retention in kariesh cheese and UF white soft cheese, respectively, as shown in Fig. (2) This indicated that iodine is considered as solid soluble in whey and permeate. These results are in line with the study of Sanchez and Szpunar (1999), which reported that the whey obtained after centrifugation of fresh milk or reconstituted milk powders contained more than 95% of the

iodine initially present in milk, with the exception of the infant formulas in which only 15–50% of the total iodine was found in the milk whey.

Table (3): Iodine content in cheese and its whey

Samples	Content of iodine (µg/100 g)		
	Range	Average	± SD
UF soft cheese	67.20 – 72.15	69.98	1.73
Permeate	25.45 – 30.01	27.29	1.34
Kariesh cheese	54.63 – 60.52	57.43	2.13
Kariesh cheese whey	19.85 – 24. 72	22.29	1.58

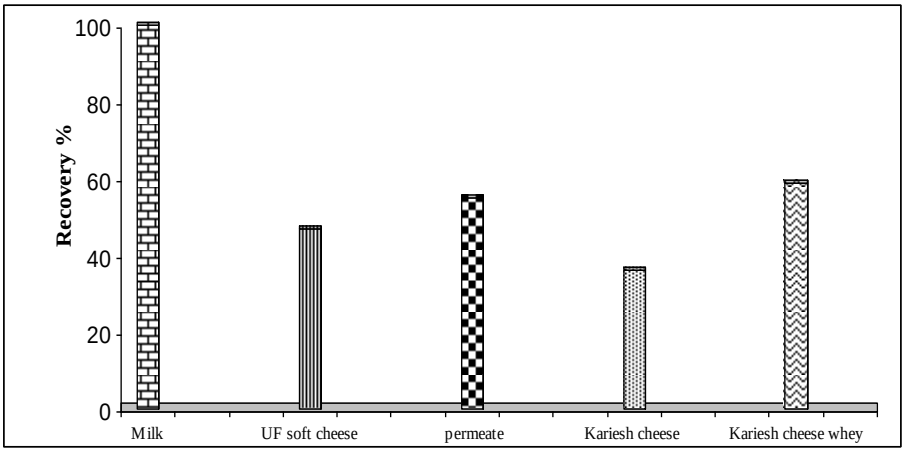

Fig. (2): Distribution of iodine percentage between cheese and its whey compared with whole milk

With regard of iodine level in skim milk , cream , butter and butter milk and comparing with whole milk , the data in Table (4) reveled that the average contents of iodine were 35.56 ± 1.52, 24.61± 1.60, 24.77 ± 2.16, 13.04 ± 1.98 µg/ 100 ml for skim milk , cream , butter and butter milk, respectively. In addition the results showed that the distribution of iodine in skim milk and cream were approximately 93 % and 8 % respectively as shown in Fig.(3) . While recovery of iodine in butter and butter milk were about 5% and 2 % of whole milk, respectively. This indicated that 5% of iodine bond with fat and 95% found in soluble constituent of milk. These results also are in agreement with the result of Sanchez and Szpunar (1999). Moreover the fractionation analysis of iodine in bovine milk by preconcentration neutron activation analysis which was performed by Olive *et al.,* (2008) showed that iodine concentrations in homogenized milk (3.25 % milk fat) 0.48 ± 0.02 µg mL^{-1} of total iodine, 0.020 ± 0.003 µg mL^{-1} of lipid-bound iodine, 0.039 ± 0.002, 0.019 ± 0.002 and 0.021 ± 0.004 µg mL^{-1} of protein-bound iodine depending on the protein separation method and 0.45 ± 0.02 µg mL^{-1} of inorganic species.

Table (4): Iodine content in skim milk, cream, butter and butter milk

Items	Content of iodine (µg/100 ml)*		
	Range	Average	± SD
Skim milk	33.44 – 37.10	35.56	1.52
Cream	22.22 – 27.34	24.61	1.60
Butter	22.01 – 28.00	24.77	2.16
Butter milk	11.22- 15.16	13.04	1.98

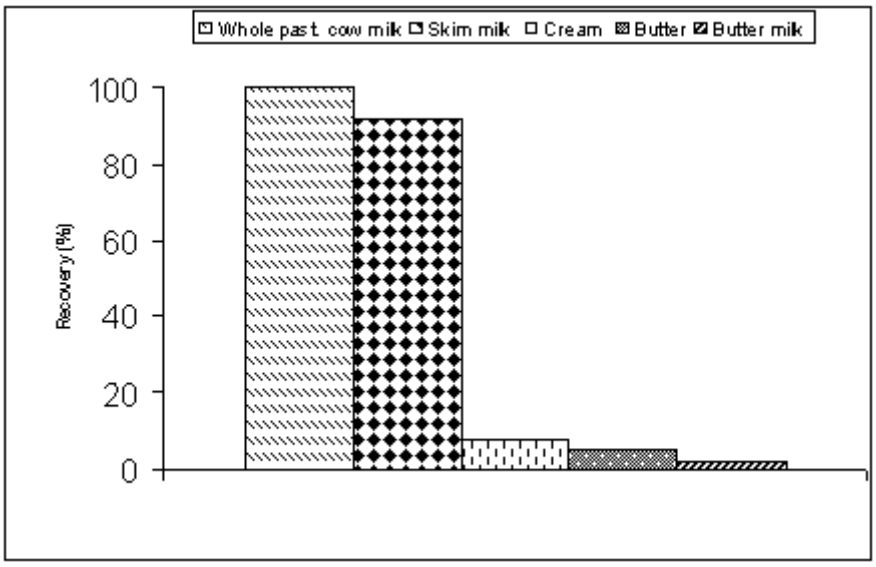

Fig (3): Distribution of iodine content in butter and butter milk compared with whole milk

CONCLUSION

Milk and dairy products are important sources of iodine intake in Egypt. Rayeb milk and processed milk contain between 28 and 39 µg of iodine / 100 ml and thus contributes significantly to the daily requirement of the average human. With a recommended iodine intake of 150 µg/day for adults, a daily intake of 200 ml milk meet the requirement with 37 – 52 %, while 50gm of white soft cheese and kariesh cheese contributed by 23 % and 19 % respectively. These results decreased in summer by about 26%.

REFERENCES

Abd El Aziz, Magda and Karima Abo El Enien (2012). Comparative study between Spectrophotometric and HPLC methods used for iodine extraction in milk and some dairy products. J. of Food and Dairy Sciences, Volume 3 No. (4), 247-258.

.Abnet ,C.C.; Fan, J.H.; Kamangar, F.; Sun ,X.D.; Taylor, P.R.; Ren, J.S.; Mark ,S.D; Zhao, P.; Fraumeni, J.F. Jr.; Qiao, Yl. and Dawsey , S.M. (2006). "Self-reported goiter is associated with a significantly increased risk of gastric

noncardia adenocarcinoma in a large population-based Chinese cohort", International Journal of Cancer 119 (6): 1508–1510.

Bailey,N.T.J. (1995). Statistical Methods in Biology. 3rd Ed. Cambridge Univ. Press, Cambridge.

Bath , SC. Button, S. Rayman, MP. (2011). Iodine concentration of organic and conventional milk: implications for iodine intake. Br J. Nutr. ,l 5:1-6.

Behrouzian, R. and Aghdami, N. (2004) . "Urinary iodine/creatinine ratio in patients with stomach cancer in Urmia, Islamic Republic of Iran". East Mediterr Health J. 10 (6): 921–924. PMID 16335780.

Brzóska, F.; Szybiński , Z. and Sliwiński, B. (2009) . Iodine concentration in Polish milk-variations due to season and region. Endokrynol Pol.60(6):449-54.

Castro, B. S.I.; Berthiaume, R.; Laffey, P.; Fouquet, A.; Beraldin, F.; Robichaud, A. and Lacasse, P.(2010) . Iodine concentration in milk sampled from Canadian farms J. Food Prot. ; 73(9):1658-63.

Dahl, L.; Opsahl ,J.A.; Meltzer, H.M. and Julshamn, K.(2003) . Iodine concentration in Norwegian milk and dairy products. Br J Nutr. 90 (3):679 - 85.

Food and Nutrition Board Institute of Medicine (2001) Dietary reference intakes. United States Institute of Medicine recommendations for iodine intake Washington, DC: National Academy Press

Food Sources of Dietary Iodine (2010) By Louise Lyon http://www.livestrong.com/article/287302-food-sources-of-dietary-iodine/#ixzz1uzdEzaaw

Hemken, R.W. (1980). Milk and meat iodine content: relation to human health. J Am Vet Med Assoc 176:1119–1121.

Hetzel ,B.S. and Clugston, G.A. (1999) :. Iodine. In: Shils M, Olson JA, Shike M, Ross AC, eds. Modern Nutrition in Health and Disease. 9th ed. Baltimore: Williams & Wilkins; 253-264.

Josefssson, M.; Ekblad, E. (2009) . "Sodium Iodide Symporter (NIS) in Gastric Mucosa: Gastric Iodide Secretion". In Preedy, Victor R.; Burrow, Gerard N.; Watson, Ronald. *Comprehensive Handbook of Iodine: Nutritional, Biochemical, Pathological and Therapeutic Aspects*.

Larsen , E.H. *;* Knuthsen, P. and Hansen , M. (1999). Seasonal and regional variations of iodine in Danish dairy products determined by inductively coupled plasma mass spectrometry . *J. Anal. At. Spectrom.*, 14, 41-44.

Norouzian, M.A. (2011) . Iodine in raw and pasteurized milk of dairy cows fed different amounts of potassium iodide. Biol. Trace Elem. Res.;139(2):160-7.

Olive, K. I. ; Acharya, R. and Chatt, A. (2008). Fractionation analysis of iodine in bovine milk by preconcentration neutron activation analysis. Talanta , Volume 77, Issue 2, Pages 827–832

Pearce ,E. N. ; Pino, S.; He, X.; Bazrafshan, H. R. ; Lee, S. L. and Braverman, L. E. (2004). Sources of Dietary Iodine: Bread, Cows' Milk, and Infant Formula in the Boston Area. The Journal of Clinical Endocrinology & Metabolism Vol. 89, No. 7 3421-3424.

Philip, F. and Lawrence, F. A. (2001) . "Endemic Goiter". Endocrinology & metabolism. McGraw-Hill Professional.

Pino, S. ; Fang, S.L. and Braverman,L.E. (1996). Ammonium persulfate: a safe alternative oxidizing reagent for measuring urinary iodine. Clinical Chemistry, Vol. 42, 239-243.

Rasmussen, L.B.; Larsen, E.H. and Ovesen, L.(2000). Iodine content in drinking water and other beverages in Denmark. Eur J Clin Nutr. 54 (1) : 57 - 60.

Sanchez , L. F. and Szpunar, J. (1999). Speciation analysis for iodine in milk by size-exclusion chromatography with inductively coupled plasma mass spectrometric detection (SEC-ICP MS). *J. Anal. At. Spectrom.*, 14, 1697-1702

Schöne, F. G .;Leiterer, M.; Lebzien, P.; Bemmann, D.; Spolders, M. and Flachowsky G.(2009). Iodine concentration of milk in a dose-response study with dairy cows and implications for consumer iodine intake. J Trace Elem Med Biol.; 23(2):84-92.

Stoddard, II, F. R.; Brooks, A. D.; Eskin, B. A.; Johannes, G. J. (2008). "Estrogen Effect of Iodine". *Iodine Alters Gene Expression in the MCF7 Breast Cancer Cell Line: Evidence for an Anti-International Journal of Medical Science* 5 (4): 189.

Stone , O. J. (1988) .The role of the primitive sea in the natural selection of iodides as a regulating factor in inflammation. Med . Hypotheses. 25:125-129

Underwood, E.J.(1977). Trace Elements in Human and Animal Nutrition. 4th ed. p. 173. Academic Press, New York.

تقدير محتوى اليود في لبن الحيوانات المختلفة وفى بعض منتجات الألبان

كريمة أبو العينين و ماجدة عبد العزيز
قسم بحوث كيمياء الألبان- معهد بحوث الإنتاج الحيواني

يلعب اليود دورا أساسيا في صحة الإنسان و يعتبر عنصرا هاما وضروريا لإنتاج هرمون الغدة الدرقية. و يشكل نقص اليود السبب الرئيسي لتلف المخ وانخفاض القدرة الفكرية .و للتأكد من حصول الإنسان على كمية كافية من اليود يتطلب مزيد من الاهتمام لتقدير و رصد دقيق لمحتوى اليود في الطعام وخصوصا في الألبان و منتجاتها التي تعتبر مصدر رئيسي لليود الغدائى .

لا توجد بيانات حديثه متوفرة عن محتوى اليود في الألبان المصرية ومنتجاتها ولذلك من الصعب تحديد كمية اليود التي نحصل عليها من هذه الأطعمة. ولذا تهدف هذه الدراسة إلى: تقدير محتوى اليود في اللبن وبعض منتجات الألبان المصرية من خلال إجراء دراسة منهجية لتقدير محتوى اليود في اللبن الجاموسى خلال فصليى الشتاء والصيف في خمس محافظات مختلفة .

وكذلك تقدير اليود في عينات اللبن الخام من الحيوانات المختلفة (الجاموس والبقر والماعز والإبل) و في بعض منتجات الألبان مثل الجبن الأبيض و القريش ،القشدة ،الزبد و منتجاتها الثانوية (اللبن الفرز- الشرش - اللبن الخض) وكذلك الألبان المصنعة(اللبن : المبستر -المعقم - المعقم المضاف إليه(شيكولاتة - موز) واللبن الرايب) خلال فصل الشتاء.

وقد تم تقدير محتوى اليود في هذه العينات وذلك باستخلاص اليود بطريقة بيرسلفات الأمنيوم ثم قياسه بواسطة جهاز spectrophotometer عند ٤٢٠ نانومتر .

أظهرت النتائج أن :

١- متوسط محتوى اليود في اللبن الجاموس الخام كامل الدسم فى موسم الصيف أقل بشكل معنوي من متوسط تركيز اليود في فصل الشتاء و لم تكن هناك اختلافات كبيرة في عينات اللبن من مواقع جغرافية مختلفة .

٢- أعلى متوسط لمحتوى اليود كان في اللبن الجاموسى(٤٢,٤٦ ± ١,٣٨ ميكروجرام /١٠٠مل) يليه لبن الإبل (41.51 ± 0.71 ميكروجرام / ١٠٠ مل) ثم اللبن البقرى (37.43 ± 1.41 ميكروجرام /١٠٠ مل) وأخيرا لبن الماعز(١٦,٢٢ ± ٣,٢ ميكروجرام. /١٠٠ مل).

٣- متوسط محتوى اليود في الألبان المصنعة في نطاق ٢٨,٤٠- ٨٦. ٣٩ ميكروجرام / ١٠٠ مل تعتمد على المواد المضافة.وقد وجد أن إضافة الشيكولاته و الموز رفعت نسبة اليود حوالى٣٢,٢٩ – ٤٠,٣٥% علي التوالي . في حين أن اللبن الرايب كان مستوى اليود ٢٨,٢٩ ± ٢,٠٨ ميكروجرام/ ١٠٠مل

٤- تركيز اليود في الجبن الأبيض الناعم (UF) (٦٩,٤٣ ميكروجرام / ١٠٠ مل) أعلى بكثير من متوسط تركيز اليود في الجبن القريش (٥٧,٤ ميكروجرام / ١٠٠مل) .

وقد تبين أن استرجاع اليود في شرش الجبن القريش و راشح اللبن للجبن الأبيض الناعم (UF) كان بنسبة ٥٩٪ و ٥٥٪ على التوالي من اللبن الأصلي.

٥- متوسط محتوى اليود في اللبن الفرز , القشدة ,الزبد , ولبن الخض كانت ٣٥,٥٦، ٢٤,٧٧، ٢٤,٦١ ، ١٣,٠٤ ميكروجرام / ١٠٠ مل على التوالي . و قد وجد أن نسبة استرجاع اليود في هذه المنتجات هي ٩٣% , ٨ % , ٥ % و ٢ % من اللبن كامل الدسم الأصلي المستخدم في تصنيعها على التوالي.

الخلاصة :

اللبن ومنتجاته مصدر هام لتناول اليود في مصر حيث وجد أن اللبن الرايب و الألبان المصنعة تحتوي على ما بين ٢٨ - ٣٩ ميكروجرام من اليود / ١٠٠ مل، وهذا يساهم بشكل كبير في الاحتياجات اليومية للإنسان العادي . وتناول ٢٠٠ مل لبن/ يوميا يلبي المتطلبات بنسبة ٣٧ - ٥٢٪ من اليود الموصى به (١٥٠ ميكروجرام / يوم للبالغين)، في حين أن ٥٠ جرام من الجبن الطري والجبن الأبيض القريش تساهم بنسبة ٢٣٪ و ١٩٪ على التوالي . وتنخفض هذه القيم في فصل الصيف بنسبة ٢٦٪ تقريبا.

قام بتحكيم البحث

أ.د / طه عبد الحليم نصيب	**كلية الزراعة – جامعة المنصورة**
أ.د / منير محمود العبد	**كلية الزراعة – جامعة القاهرة**