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ANY PARTICULAR TIME AND TEMPERATURE RANGES IN BREASTFEEDING IN VITAMIN A, E AND B-CAROTENE LEVELS DETERMINATION

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ABSTRACT

Human milk is widely accepted as optimal for human infants nutrition. Human milk, which contains compound benefical to infants is often expressed and stored before use. Changes in its antioxidant activity with storage have not been studied.

Breastfeeding and human milk are widely accepted as optimal for human infants nutrition. Nowadays lifestyle often makes it difficult to maintain or even initiate human lactation. This stuation is mostly related to the workload of women away from home. Human breast milk storage for differed use is on possibility.

At the determined time period vitamin A, E and β-carotene values show differences at +4 °C and -20°C at the same time for each group. Seen that vitamin A, E and β-carotene contents of milk examples hold at –20 °C is more preservative than the milk hold at +4 °C. β-carotene values determined at +4 °C for I, II and III groups accordingly 8.61, 5.92 and 4.32 µg/dl but for IV, V and VI groups at -20 °C this values found accordingly 8.21, 7.42 and 5.33 µg/dl. β-carotene values of control group is 9.65 µg/dl but our investigations show that this amount has been more preserved in V and VI groups than II and III groups. Also vitamin E value at the same groups and at the +4 °C accordingly are, 51.34, 46.65 and 42.85 µg/dl, at the –20 °C accordingly 50.88, 47.64 and 44.73 µg/dl. Vitamin E values again at the same groups accordingly at the +4 °C 26.12, 22.56 and 1 accordingly 8.20 µg/dl and at the –20 °C 25.98, 23.34 and 20.37 µg/dl. Storage of human milk is safe at 4 ^{o}C for 4 hours, whereas at -20 ^{o}C it is saf e for 7 days.

Key Words: Human milk, vitamin A, E , β-karoten.

Introduction

The nutrient content of breast milk is important for the growth and development of infants, particularly those infants who are exclusively breast-fed. Adequate growth and development of breast fed infants depend on the quantity and quality of breast milk (1). Breast

milk is considered an ideal nutrient for both term and perterm infants up to 6 months of age, in proving host defenses, digestion and absorbtion of nutrients, gastrointestinal function, and neurodevelopment(2,3).

Some of the nutrients in milk have antioxidant activity and these incluade vitamin A, vitamine E and ß-caroten. These antioxidants are benifical because they neutralize reductive oxygen metabolites and free radicals, thereby preventing these oxidizing agents from reacting with otherwise stabile constituents in the body to cause cellular damage (4-6).

Breastfeeding benefits the infant in all societiesbut especially in developing countries, were sanitary conditations might not be adequate (7-10)

Economic constrains force large numbers of women to return to work while still breastfeeding thir infants. The abeylity to express milk for later feeding, when away from the infant, might strangly influance mothers decision to continue breastfeeding even after they have returned to work(4,7,8,11).

The extent of vitamin losses during the processing and staring of foods depents on the sensetivity of these vitamins to temperature, oxygen, light, pH, time or combinations of these factors. Tocopherols are resitant to the action of alkalies and acids but are sensetive to oxidation heat, and light(4,12).

Vitamine A and E are fat-soluble nutrients that exert various important roles especially during the early stages of life. Vitamine E is required to protect the newborn against oxidative stres and vitamin A is fundamental for growth and development. Both nutrients are also essential to ensure a good functioning of the immune system of the young(13). β-caroten may act as a cancer protector via its conversion to retinoids and also through its antioxident properties, which prevent singlet oxygen formation (14)

Severeal recent studies support the wiew that short-term storage of milk is saf efor several hours at moderate temperature (19 ^{o}C to 22 ^{o}C) or in the refrigerator(10-12). Refrigerator strorage (4 ^{o}C) has even been reported to decrease bacterial growth in collostrumor nature (15,16).

Material ve Metot

Collection of breast milk

Samples of human milk were collected from both breasts by means of a Chicco manual breast pump following the manufacturer's instruction, from thirty health mother who breastfed exclusively, were studied during early (fifth days) or late (forteenth days) lactation. Brest milk was collected into sterile opaque bottles during the first expression in the

morningA fresh vitamin of milk was used each time at 1-mo intervals for analysis of the samples.

Bottles of milk (samples I, II, III, IV, V and VI) were stored at +4 to -20 ^{o}C. One milliliters of breast milk in one ml o deionized water were mixed with TCA %15 solution. The breast milk was immediately removed from the protein.

Analytical methods

A relatively rapid procedure is described for the spectrophotometric determination of vitamin A and, β-carotene in breast milk based on a modification of the original (17,18) . The mean of two determinations was used and the vitamin A concentration was expressed throughout in equivalents of retinol(µg/dl)

The concentration of vitamin E in brest milk was measured by spectrofotometric as described by Kiermer and Freisfekd(19).

Results

Tablo1. Vitamin A, E and β-carotene Content in Brest Milk Before and After Frozen Storage (+4 and -20) for up to Different Time Period

Milk sample Control (n=30)	Time	Storage Temperature (°C)	Vitamin A (µg/dl)	Vitamin E (µg/dl)	β-caroten (µg/dl)
Before freezing			28.58	54.86	9.65
I	4 hours	+4	26.12	51.34	8.61
II	8 hours	+4	22.56	46.65	5.92
III	12 hours	+4	18.20	42.85	4.32
IV	7 days	-20	25.98	50.88	8.21
V	15 days	-20	23.34	47.64	7.42
VI	30 days	-20	20.47	44.73	5.33

At the determined time period vitamin A, E and β-carotene values show differences at +4 °C and -20°C at the same time for each group. Seen that vitamin A, E and β-carotene contents of milk examples hold at –20 °C is more preservative than the milk hold at +4 °C β-carotene values determined at +4 °C for I, II and III groups accordingly 8.61, 5.92 and 4.32 µg/dl but for IV, V and VI groups at -20 °C this values found accordingly 8.21, 7.42 and 5.33 µg/dl. β-carotene values of control group is 9.65 µg/dl but our investigations show that this

amount has been more preserved in V and VI groups than II and III groups. Also vitamin E value at the same groups and at the +4 °C accordingly are, 51.34, 46.65 and 42.85 µg/dl, at the –20 °C accordingly 50.88, 47.64 and 44.73 µg/dl. Vitamin E values again at the same groups accordingly at the +4 °C 26.12, 22.56 and 1 accordingly 8.20 µg/dl and at the –20 °C 25.98, 23.34 and 20.37 µg/dl

Discussion

Breast milk from healthy and well-noutrished women is the preferred method of feeding for health infants for the first 6 months of life.In the last two decades, special attention has been paid to the compositional and physiological aspects of the vitamin fraction in human milk, which has recently been reviewedand is summarised here(17-23).

Vitamin E is a widely distributed fat-soluble vitamin composed of several tocopherol and tocotrienols, the most biologically active of which is tocofepherol. The terms vitamin E and tocopherol are commonly used interchangealy, as they are in this paper. The precise role that vitamin E plays in human metabolism is stil in dispute, but there is general consessus that it is important for erytrocyte stability(7,23).

The content of many nutrients in breast milk are dependent on nutritional status of the lactating women. This is particularly tru for fat and water-soluble vitamins, some of which have antioxidant properties. Breastfeeding benefits the infant in all societies (7,11) but especially in developing countries, were sanitary conditations might not be adequate (1,2,6) Economic constrains force large numbers of women to return to work while still breastfeeding thir infants. Women who breastfeed have to store expressed milk while at work for later feeding to their infants; however, stroge conditions are often not optimal.

Carotenoids provide a major source of vitamine A in breast milk in developing and may contribute to the immuno-protective effect of breast milk. Because the average daily dietary intake of vitamin A (retinol plus β-carotene) by unsupplemented lactating women in these countries[660 retnol equivalents (RE)/d] is less than half that of women in developed countries (1540 RE/d) and less than the recommended safe amount for lactating women (850 RE/d (1,2,24) these studies are of particular importance in developing countries where performed vitamin A is not consistently available in the mother's diet.

The extent of vitamin losses during the processing and staring of foods depents on the sensetivity of these vitamins to temperature, oxygen, light, pH, time or combinations of these factors(11, 25,26).

In all cases (sample I to VI), results indicated a significant decrease in vitamin A, vitamin E and, β-carotene content with increased storage time at any temperature. However, the stability of vitamins (vitamin A, vitamin E and β-carotene) were the same for all of the milks and temperatures.

Finally we also carried out a study for the effect of temperature and short-term stroge on the vitamin A, E and, β-carotene of breast milk at +4 and -20 ^{o}C. The results are in table 1. Loss of vitamins occurred more rapidly (after 12 hours and + ^{o}C) when vitamins stroge were higher (7 days and -20 ^{o}C), but longer periods under these conditions did not lead to subsequent losses, suggesting that equilibrium had been achived. We have found no information about the effect of frozen stroage on A, vitamin E and β-carotene content during stroge of breast milk. Our results indicate that this vitamin is quite sensetive to breast milk during stroge. Storage of human milk is safe at 4 ^{o}C for 4 hours, whereas at -20 ^{o}C it is saf e for 7 days.

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