



Evaluation of Fat and Vitamin E in Some Baby Biscuit

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Abstract

This study aims to evaluate by analysis the following on three different products of baby biscuit from three different firms: Vitamin E, moisture fat, refractive index, free fatty acid (FFA), peroxide value (PO), iodine number, totox and P-anasidine, melting point, rancimat value of the fat extracted from the biscuits sample at the beginning, and the end of 6-month at-room temperature in wood cupboard.

At the beginning, and at the end the results were respectively as follows: the content of vitamin E which was (3.79,2.88) in mg/100 g dry matter in the products from three different firms. Moisture percentages were (4.0, 5.25), FFA (0.19, 0.34), PO (0.28, 0.52), iodine number (51.83, 59.93), refractive index (390.33, 430.67), P-anasidine (22.22, 23.57), fat % was (16.34), melting point was 24.4. Rancimat value of the fat was 75.57, Saturated. F.A was 38.187 Unsaturated. F.A was 49.77, Trans SFA was 11.7, Totox (22.77, 24.61) were evaluated by calculation. It may be concluded that 24% of vitamin E were lost during the storage period.

Keywords: Vitamin E; Babe Biscuit; Storage Period; Antioxidants

Introduction

With the continuous advancements in the food industry in general and a child's nutrition care, the demand for ready to eat processed foods with better shelf life, satisfying taste, easiness of portability, and with high nutritional quality. We cannot deny that the increasing employment of women in the industry and the public sector arouses the need of special snacks and diet products to satisfy the requirements of these advancements [1]. Production of special baby biscuits was considered as an important advancement in the food industry because it has a high nutritive value [2].

Since Vitamin E (tocopherols and tocotrienols) is considered to be a potent antioxidant, it is essential for human nutrition because it has the ability to prevent oxidative damage to cell through inactivation of free radicals and reactive oxygen species [3]. Vitamin E serves as an important antioxidant role in cellular membranes by blocking the peroxidation of polyunsaturated fatty acid (PUFA). Consumption of foods rich in vitamin E may reduce the risk for epithelial cancers, heart disease and stork [4]. A daily intake of 3-15 mg of tocopherol is required on a normal diet. Amounts in excess of 15 mg are probably needed when large amounts of unsaturated fatty acid are included in the diet [5].

Materials and Methods

Determination of vitamin E by Emmerie-Engel reaction [6] and Calorimetric of α - tocopherol was done by spectronic 20 calorimeter. Products were collected from three different firms at the production days all samples were performed in triplicate, immediately milled and under N₂ gas packaged and stored in the dark 20°C.

The vitamin E content was analyzed after six months of storage at room temperature in wood cupboard; one separate bag was taken out of storage on each occasion.

Result and Discussion

The results showed the average and standard deviation of the moisture, Vitamin E, refractive index, (FFA), (PO), iodine number, totox and P-anasidine, melting point, rancimat value, Saturated. F.A, Unsaturated. F.A, Trans SFA was of the fat extracted from the biscuits sample at the beginning, and the end of 6 month-at room temperature in wood cupboard, in three factories (Table 1).

Most determination of the total tocopherol content of foods are based upon the Emmerie-Engel reaction, Which involves the reaction of the tocopherols in the extract with ferric chloride to yield ferrous chloride.

The ferrous chloride reacts with alp1ha dipyriddy1 to yield a red complex, which is measured calorimetrically. In this study Vitamin E was evaluated according to Emmerie-Engel reaction [6].

It is concluded from table number 1 that the content of Vitamin E in the three products at the end of the storage period was decreased by 0.24%. However, the moisture percentage in the same three products was increased by the end of the period by 31%.

In the production of white wheat flour from whole grain wheat, the vitamin E content is reduced by about 50% due to the removal of bran and germ, this reduction of vitamin E content is not usually compensated for by fortification, as in the case of some of the

		Biscuit firma A	Biscuit firma B	Biscuit firma C	Average	Standard deviation
Moisture	Moisture before	4.23	3.52	4.26	4.00	0.42
	After at room t	4.88	5.33	5.54	5.25	0.34
Vite	Vitamin E Before	3.29	3.93	4.14	3.79	0.44
	After at room t	2.88	2.64	3.11	2.88	0.24
R. index	Before	372	367	432	390.33	36.17
	After at room t	456	402	434	430.67	27.15
ffa	Before	0.21	0.26	0.09	0.19	0.09
	After at room t	0.46	0.44	0.12	0.34	0.19
Peroxide	Before	0.34	0.11	0.38	0.28	0.15
	After at room t	1.01	0.08	0.46	0.52	0.47
Iodine	Before	61.7	40.9	52.9	51.83	10.44
	After at room t	69.5	57.2	53.1	59.93	8.54
Totox	Before	14.38	32.32	21.6	22.77	9.04
	After at room t	16.87	35.12	21.83	24.61	9.43
P-anisid	Before	13.7	32.1	20.85	22.22	9.28/
	After at room t	14.85	34.96	20.91	23.57	10.32
Fat		14.9	18.33	15.78	16.34	1.78
Melting point		22.5	21.9	28.8	24.4	3.82
Rancimat		53.1	78.1	95.5	75.57	21.31
Saturated. FA		30.3	42.62	41.64	38.187	6.85
Unsaturated. FA		51.51	44.9	52.9	49.77	4.27
Trans SFA		17.98	11.98	5.13	11.7	6.43

Table 1: The Average of Moisture %, Fat %, RI, FFA, PO, iodine, p-aranasiad, melting point, Rancimat and Vitamin E for the three Products in Three Firms before and after at room temperature Saturated. FA Unsaturated. FA, Trans SFA, but totox were calculated $Totox = (2x PO) + p-anisid$ (mg/100g dry matter).

B – vitamin the susceptibility of vitamin E to oxidation is another important cause of losses during processing and storage in its function as natural antioxidant, the oxidation of vitamin E prevents lipid oxidation especially of polyunsaturated fatty acids [7]. Bakery products prepared with fat stabilized with various concentration of tocopherol are appreciably more resistant, to rancidity than samples [2].

A severe problem in the food industry can be summarized within the oxidation of fat- containing foods. The oxidation of the lipids occurs in causing undesirable effects such as, development of off-flavors, discoloration, and nutritional losses in general, and

of vitamin E in specific, as this study shows the decrease in vitamin E post the storage period. Tocopherols are quite commonly used for the stabilization of fats and fatty products against oxidation. A natural Tocopherols, a material derived from vegetable oil distillate additives, increases the vitamin content of finished products, which may – be an added incentive to snack diet- provide a natural source of vitamin E, and protect freshness of the snack diet especially for baby biscuit [8].

In general, high amounts of vitamin E, have a protective effect on the polyunsaturated fats in biscuits. Vitamin E acts as a free radical scavenger, terminating the free radical reaction in autoxidation [9].

Within the observation on table number 1, it is noted that the fat extracted from the biscuit factory B has the highest fat percentage and the lowest vitamin E in comparison with the other two factories with the highest totox (highest fat oxidation). On the other hand, we observe that the fat extracted from the biscuit factory A has the lowest fat percentage, but has the highest vitamin E, the highest trans fatty acid, and the lowest totox (lowest fat oxidation), this concludes that factory A oil has the least deterioration. That means any fat that has the highest amount of vitamin E and trans fatty acid has the highest degree of resistance to oxidation. It is well noted that, trans fatty acid has bad acid effect on heart health, which means we must not have a high trans fatty acid but we must have a high vitamin E content.

The biscuit manufacturer uses a wide range of ingredients of which the oils fats offer the highest potential risk of rancidity in the autoxidation of fats, unsaturated fatty acids are oxidized to hydro peroxides which on subsequent decomposition yield a number of saturated and unsaturated aldehydes and ketones. The oxidation of vitamin E prevents lipid oxidation especially of polyunsaturated fatty acids. Tocopherols are quite commonly used for the stabilization of fats and fatty products against oxidation. A natural Tocopherols, a material derived from vegetable oil distillate additives increases the vitamin content of finished products, which maybe an added incentive to baby biscuits provide a natural source of vitamin E for child's protecting child health [10] and protect freshness of the baby biscuit.

Conclusion

The result of this study showed that loss of Vitamin E during the storage of baby biscuit for 6 months in average 0.24%, and with increase of moisture percentage in products during storage period. Specified amount of Vitamin E is recommended to be added to offset the effects off losses during storage, Vitamin E is powerful antioxidant in our bodies, and in our foods specially in fat and fatty foods.

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