

THE VARIATIONS STUDY IN THE OXIDATION PROCESS OF FISH OIL DURING STORAGE

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Abstract

Oxidation of food is responsible for degradation of sensory qualities, nutritional value and even the formation of toxic substances, such as peroxides, which requires thorough knowledge of these processes and taking appropriate measures to avoid losses that can be recorded. This is the direction of this study in which was followed the oxidative changes during the storage of fish oil.

Key words: fish oil, fatty acids, oxidative process.

INTRODUCTION

Nowadays are recorded numerous metabolic imbalances attributed on the one hand, reducing physical exertion, sedentary lifestyle, and on the other hand application of nerve growth, increasing the daily stress and environmental pollution, and food pollution implicitly.

Antioxidants not only increase the lifetime of the product (shelf life), but substantially they reduce the nutritional and sensory impairments of products, increasing range of lipids that can be incorporated into products. As a consequence, because of the possibility of storing quality and increase the possibility oils and fats that can be used in foods, antioxidants lead to lower cost ratio of lipids in the whole product.

Oxidation of fats is the most representative autooxidare process, receive food taste unpleasant, rancid taste known.

The notion of rank is quite broad and not sufficiently precise because, depending on the nature of the product, there are nuances of taste, often very different from each other as a result of decomposition products which are formed.(62)

Specific substances that cause unpleasant taste, are very active on the sense organs, and because of this case very small quantities are required to depreciate the product, so that degradation processes are subject to both animal products rich in fats and vegetable products low in fat.

MATERIAL AND METHODS

Fish oil was obtained by melting the fat harvested from farmed carp, male, age 1 year fish raised in a unit of Bihor County.

Fish oil obtained by melting raw fat carp harvested from the farm, was stored under refrigeration (2 ... 4 ° C) and freezing (-15 ...- 18 ° C), the research have to study the chemical and physical changes of the moment when installing alterative processes (oxidation) will be finish.

To assess the state of freshness during storage were determined: index of peroxide and Kreis reaction (aldehyde epihidrinică).

Measurements were made at intervals of five days for chilled fish oil, and at intervals of one month for frozen fish oil by oxidative processes during installation, highlighted by identifying epihidrinice aldehyde.

They studied three sets of samples for each indicator in both methods of preservation (refrigeration, freezing).

RESULTS AND DISCUSSION

Results on oxidative changes during storage of fish oil under refrigeration are shown in Figure 1.

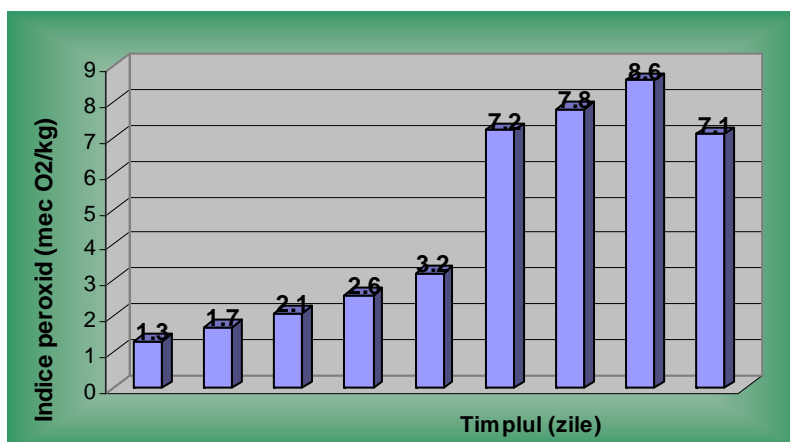


Fig. 1 Variation of the peroxide for chilled fish oil

Results on oxidative changes during storage of frozen fish oil are shown in Fig.2

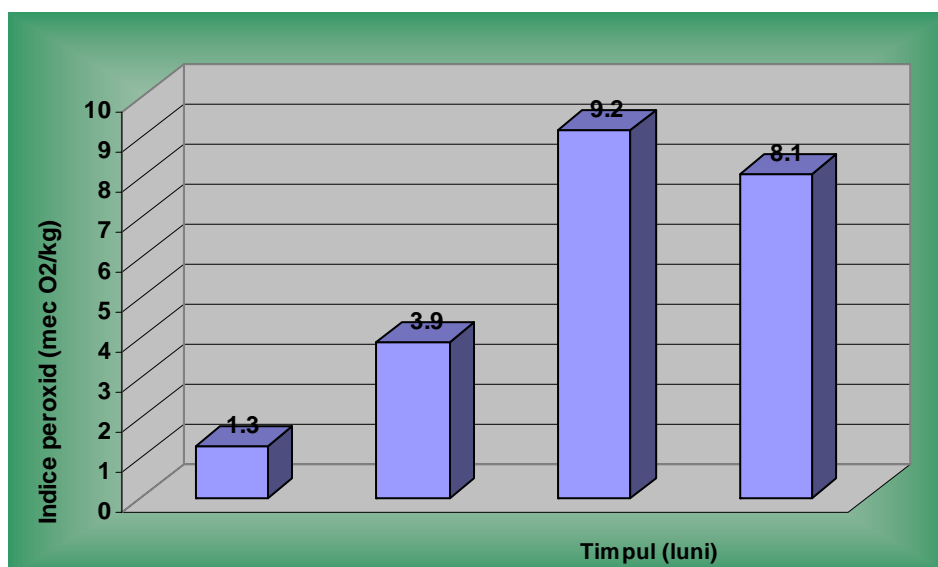


Fig. 2. Variation of peroxide value of frozen fish oil

CONCLUSIONS

Discussion and conclusions on oxidative changes during storage of fish oil:

- the peroxide value of fresh fish oil was 1.3 meq O₂/kg, the evolution process following an upward slope. In the first 20 days in refrigerated storage conditions has been a slow increase of the peroxide, which corresponds to initiation stage of the oxidation, followed by a corresponding surge propagation phase in which it forms the largest amount of hydroperoxides as well as primary compounds of oxidation, reaching 7.2 meq O₂/kg for 35 days an increase is relatively constant, up to 8.6 meq O₂/kg because of balance formed between the peroxide and secondary compounds, after which the peroxide value decreases as a result of hydroperoxides split in secondary compounds, Kreis is currently the most positive reaction and indicates the presence of aldehyde epoxidic and installation of advanced oxidation process;

-in the first month of frozen storage conditions has been a slow increase of the peroxide, which corresponds to the initiation phase of oxidation, followed by a corresponding surge in the propagation phase is the most abundant form of peroxides, and in three months the peroxide value decreases because hydroperoxides split in secondary compounds. Kreis is currently positive reaction indicating the installation of advanced oxidation process.

-between the fats analysis, the highest values of the peroxide during storage were determined for fish oil, because the fish oil absorb a greater amount of oxygen due to the multiple double bonds of unsaturated fatty composition.

- The most susceptible to oxidation is fish oil in both refrigeration and freezing conditions due to high content of unsaturated fatty acids in the double ties fixing oxygen, leading to shape secondary compounds that gives rancid taste and smell.

REFERENCES

1. Segal, B., Valentina Dan, Rodica Segal, V. Teodoru, (1985). Determinarea calității produselor alimentare, Ed. Ceres, București.
2. Semeniuc Cristina, Mihaela Rotar, Camelia Guș, C. Bele, Sonia Socaci, C. Laslo, (2009). Influence of storage conditions in evolution of fatty acids profile from infant formula. *Journal of Agroalimentary Processes and Technologies*, 15:2, 293-297.
3. Stănescu, V. și C. Savu, (1992). Controlul de laborator al produselor alimentare de origine animală, Atelierele I.A.N.B., București.
4. Tholstrup, T., L.I. Hellgren, M. Petersen, S. Basu, E.M. Straarup, P. Schnohr, B. Sandstrom, (2004). A solid dietary fat containing fish oii redistributes lipoprotein subclasses without increasing oxidative stress in men, *Journal Nutrition*, 134 :5, 1051-1057.
5. Tofană Maria, (2006). Aditivi alimentari. Interacțiunea cu alimentul, Ed. Academicpres Cluj-Napoca.
6. Tofană Maria, (2006). Poluarea produselor alimentare, Ed. Alma Mater, Cluj-Napoca.
7. Toso, B., G. Procida, B. Stefanon, (2002). Determination of volatile compounds in cows' milk using headspace GC-MS. *Journal of Dairy Research*, 69:4, 569-577.