

RESEARCH OF PHYSICAL AND CHEMICAL CHARACTERISTICS OF PHOSPHOLIPIDS' WATER SOLUTION

*Lazarenko Tetiana, Mank Valeriy

National University of Food Technologies – Kyiv, Ukraine

*Lazarenko Tetiana, tanjv@ukr.net

Abstract: The electrokinetic potential of phospholipids was determined during the research. Adsorption isotherm of phospholipids that in the surface layer and the possible size of the molecules of phospholipids in the interfacial environment were determined.

Keywords: Phospholipids, electrophoretic phospholipids mobility, potential.

Introduction

Phospholipids are complex lipids containing polyatomic alcohol, phosphoric acid residue, and residues of fatty acids. Phospholipids are an important part of all biological membranes. They determine the plastic properties of cell membranes and membrane organelles, while cholesterol causes stiffness and stability of the membrane.

Phospholipids present in serum in a certain amount, where they perform the transport function. Since they are somewhat hydrophilic, they may be transported in the blood completely hydrophobic molecules such as cholesterol and fatty acids.

Natural phospholipids are divided into two groups depending on the radical spirit, which is part of their composition:

- glicerofosfatydy (containing glycerol residue);
- sfingozynfosfatydy (containing residue sfingozynu found within the animal phospholipids) [2].

Phospholipids are mainly in the form of complexes in oil seed. According to AM Holdokovskoho in a bound form of the sunflower seed is up to 66% of phospholipids [1].

The content of phospholipids in oilseeds is from 0.2 to 2% (Table 1) [2].

Table 1. The content of phospholipids in the seeds of some oilseeds

Culture	phospholipids contents (% of dry matter)
Soybean	1,6-2,0
Linen	0,5-0,7
Sunflower	0,7-0,8
Castor	0,25-0,30

Phospholipids go in the oil removing oil from the seeds and removed along with it, the content of phospholipids in oil depends on the method of obtaining oils (Table 2) [2].

Table 2. The content of phospholipids in some vegetable oils, %

Method of oil extraction	Soybean	Sunflower	Linen
Cold pressing	0,05-0,07	0,05-0,07	–
For pressing	1,1-2,1	0,2-0,8	0,2-0,5
Re pressing	2,7-3,4	0,6-1,2	0,6-0,9
Extraction	3,9-4,5	0,8-1,4	0,8-1,62

When there is a pressing oil or distillation micelles, the phospholipids, which are located in seeds, interact with carbohydrates. At this time so-called melanofosfolipidy are formed. We can see if the higher the temperature of the process and the longer this process

takes place, more melanofosfolips will be accumulated in the oil. This process is undesirable because the presence melanofosfolipidiv causes intense dark color , oil specific taste , smell of fosphatide concentrate.

So, that is the question of removing fospholipids from vegetable oil. This question resolves hydration process. Fospholipids, which are in the oil absorb water, swell, lose their solubility in water and precipitate in the form of flakes under certain conditions. The oils contain waxes and waxy compounds that complicate the process of hydration. However, hydration of vegetable oils with water or steam makes it impossible to remove oil from the full range of phosphorus compounds. In the oil remaining after hydration fosfatydylinyotyly, calcium and magnesium salts of fosphatidic acids related to nehidratuyemyh fospholipids. So the next step transmitting acid processing oils and alkaline neutralization, during which removed nehidratuyemy fospholipids, metal impurities and related substances that contribute to unwanted leakage processes in oils [1].

Foreign scientists began to study this issue and do research in alternative methods of extracting oil from related substances, including fospholipids. Thus E. Hamond and A.Tekin investigated dielectric properties of soybean oil, depending on the content of related substances as fospholipids, sterols, peroxides, carotenoids and others. It was found the temperature dependence of electrical oils and synergistic effects of water and polar lipids to replace electrical systems studied.

Mhebryshvili T. investigated the removal of sediment from vegetable oils in the electrostatic field. The fospholipids, mechanical impurities and waxes were removed from oil. Also, the author confirmed the hypothesis of a significant impact on the electrical conductivity of fospholipids oil.

The possibility of using the phenomenon of electrophoresis for removing fospholipids from vegetable oil is the main question.

Materials and methods

The first phase was conducted electrophoretic mobility of fospholipids. For this purpose we used the unit for the study of Burton electrophoretic phenomena. As the medium we used 7 model solutions of fospholipids. The concentration of fospholipids was respectively 1, 2, 3, 4, 5, 7 and 9%. In the experiment mobility of fospholipids in the positive electrode and their clusters observed.

Results and discussion

During the research it was determined electrokinetic potential\potential of fospholipids. Analyzed the obtained values\potential fospholipids, they can be considered as surfactants. Their surface activity was determined by stalahmometrych method. Based on these experiments adsorption isotherm of fospholipids in the surface layer and the possible size of the fospholipids molecules in the interphase medium were determined.

References

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