

Nanochemistry and biotechnology

Liposomes – models for establishment of interaction mechanism between phospholipids and terpenoid esters

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The most explored nano-systems for biological studies and medical application are presented in the form of liposomes [1]. Liposomes, phospholipid vesicles, are generally used as nanosized vehicles for drug encapsulation and delivery [2]. However, it is worth mentioning the wide use of liposomes as an effective tool for interaction study between lipids and compounds designed for topical and transdermal application.

The present research is focused on establishment of interaction mechanism between lipids of artificial membranes (liposomes) and synthesized esters based on mono/bicyclic terpenoids and gamma-aminobutyric acid (GABA). The changes in physico-chemical properties of lecithin membranes were registered by method of fluorescent probe (pyrene). The objects of study are presented as GABA esters with: menthol (**1**), thymol (**2**), carvacrol (**3**), guaiacol (**4**), borneol (**5**) and eugenol (**6**). In order to determine the changes in membrane microviscosity, the ratio of fluorescence intensities at 475 and 394 nm (I_{475}/I_{394}) was used (table below).

Compound	I_{475}/I_{394}	Compound	I_{475}/I_{394}	Compound	I_{475}/I_{394}
1	0.44	3	0.32	5	0.09
2	0.31	4	0.29	6	0.16

As seen, an increase in I_{475}/I_{394} value is clearly observed for esters **1–4** compared with control (0.13). Thus, the application of terpenoid esters as percutaneous absorption enhancers leads to a decrease in the microviscosity of model membranes and, consequently, to an increase in the penetration of medicinal substances through the stratum corneum.

1. *Schwendener R. A. Liposomes in biology and medicine // Adv Exp Med Biol.-2007.-620.-P. 117-128.*

2. *Ramos-CabrerP. Liposomes and nanotechnology in drug development: focus on neurological targets // Int J Nanomedicine.-2013.-8.-P. 951-960.*