

Composites on the basis of silica with immobilized cholinesterase included into polymeric shell

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Composites with immobilized cholinesterase are of interest for researches due to their heightened stability relative the influence of environment and prolonged activity of fermental preparation. Properties of such materials are dependent on the way of their obtaining, but not only chemical composition. In the present work the results of the influence of silica constituent part forming of composite material with fermental activity on its properties are presented. In one case the fermental preparate in polymeric shell was introduced into sole SiO₂ obtained from sodium methasilicate, with farther sol-gel transition. In the second – the introduction of highly dispersed silica A300 and fermental preparation in polymeric shell was at the same time during passing into suspension in aqueous medium. On both cases the relationship of SiO₂ : polymer: fermental preparation and pH value of medium were the same. The obtained composite materials were white powder-like products.

Microphotographs of two types of hybrid materials obtained by scanning electron microscopy (SEM) are shown on figure 1. Morphology of composites is highly dependent on obtaining method. In Fig. 1a (sol-gel synthesis) the smoothed over surface with complicated relief is observed. In ref. [1] on the base of experimental result it was proposed the location of fermental preparation enclosed in polymeric shell in pore space of silica matrix. In connection with these the surface of material imagined to be rather uniform. In Fig. 1b (passing in suspension) may be observed the formation of aggregates and voids into and between them. In these voids is highly probable the location of fermental preparate in polymeric shell. The composite is notable for its not uniform, the structure to high extent is open for diffusion processes connected with transfer of substrate to ferment.

The study of fermental activity obtained composites showed that in both cases the combination of organic(polymeric shell) and inorganic(silica matrix) in assist their stability. Immobilized preparats are more stable to compare with native forms. Composite obtained by sol-gel method keep its activity more longer then passing into suspension one, but for the last the value of activity is higher.

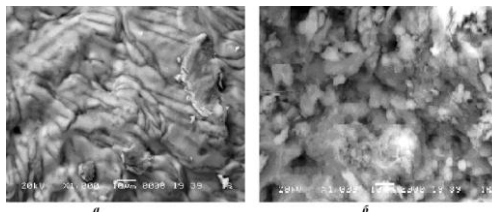


Figure 1 Microphotographs of two types of hybrid materials obtained by scanning electron microscopy(SEM)

1. Паентко В.В., Матковский А.К., Юрченко Г.Р., Зуб Ю.Л. Получение золь-гель методом композитов на основе кремнезема, желатина и гомогената печени курицы домашней Gallus gallus // Хімія, фізика і технологія поверхні.–2012.–Т.3.–№1.–с.108-113