

ON SOME DEPENDENCES OF VIRUS ADSORPTION FROM STRUCTURAL CHARACTERISTICS OF ADSORBENTS

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This study is in connection with some other investigations (1-3) where we have described our experimental settings and some established regularities about structural characteristics of certain natural mineral adsorbents from North-Eastern Bulgaria.

The aim of this study was to ascertain some dependences between physico-chemical parameters of natural mineral adsorbents from North-Eastern Bulgaria belonging to different types and sizes of viruses dynamically involved in the process of adsorption in water solutions.

From natural mineral adsorbents we have chosen one from the town of Kaolinovo, almost pure kaolinit, i.e. Kaolin-type adsorbent, adsorbent from the village Priseltsi - Varna district, with prevalence of montmorillonit in its composition and adsorbent from the town of Balchik - of Diatomit - type.

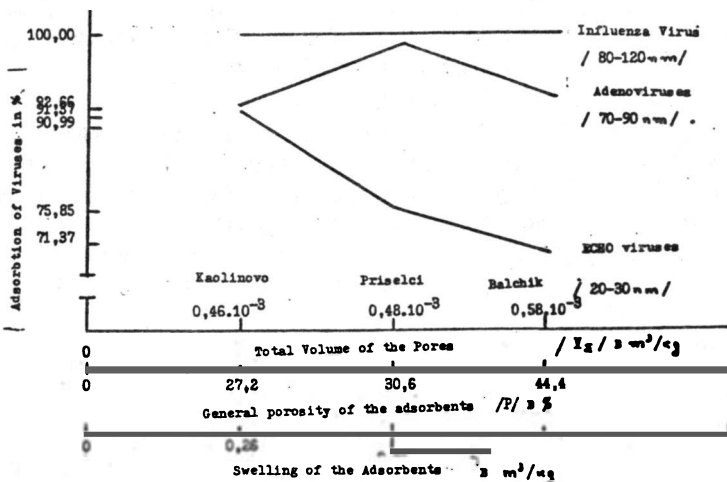
Some physico-chemical parameters of the adsorbents used are given on table 1.

Table 1

| Parameters | Adsorbent | | |
|---|-----------------------|-----------------------|-----------------------|
| | Kaolinovo | Priseltsi | Balchik |
| Swelling in m ³ /kg | 0.26 | 0.36 | 0.42 |
| Joined water in g/g | 0.04 | 0.17 | 0.11 |
| General porosity in % | 27.2 | 30.6 | 44.4 |
| Total volume of pores in m ³ /kg | 0.46.10 ⁻³ | 0.48.10 ⁻³ | 0.58.10 ⁻³ |

Viruses used are: ECHO virus - type 19, size of fragments of 20-30 nm, Adenovirus - type 7, fragment size of 70-90 nm and Influenza virus, type A (Varna 361/77) with fragments size of 80-120 nm.

The results from our study are given comparatively in the following compendious graphic:



It was found that viruses with small sizes were almost completely adsorbed by adsorbents of small total volume of pores, small general porosity, small swelling and little quantity of joined water. It may be taken into consideration that for adsorption of viruses with small fragment sizes Silicate-adsorbents from type 1:1 (4) will be appropriate, and especially these in which structural packets are electroneutrally mainly (layer's charge X 0).

Viruses with intermediate sizes of fragments are best adsorbed on adsorbents with prevalence of montmorillonit in their composition. For that purpose Silicate-adsorbents from type 1:1 will be most convenient but with layer's charge X 0,5-1,0. Viruses with large sizes of fragments are adsorbed almost equally on all types of adsorbents, high dispersed, of natural origin.

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