

SORPTION OF ADENOVIRUS TYPE 7 AND ECHO-VIRUS TYPE 19 ONTO A NATURAL MINERAL SORBENT

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The urban problems related to the rapid development of cities, industrial centers, intensive agriculture, etc. reveal out the considerable necessity of clear water. All that is a direct function of the bigger and bigger quantities of waste waters. Very often they are the dwelling place of various pathogenic microbes which are possible causes of different infectious diseases of bacterial and viral origin (2, 3, 5, 8).

The most often applied materials to clean waste waters are those with certain adsorptive properties. Wide application in these adsorptive processes contributes to the natural mineral sorbents — NMS (4, 9, 10, 11).

Therefore, the object of our present study is to investigate the sorptive possibilities of NMS from East-Northern Bulgaria towards Adenoviruses and Enteroviruses.

Material and methods

NMS from the town of Kaolinovo (Kaolinite) was used in our experiments. It was fractionated in advance after the method of Sabanin (6). The NMS-height in the experimental column was 2,0 cm and the size of the particles was 5—10 microns. Sterilization of any column filled with NMS was performed in a dry sterilizer at 160° C for 1½—2 hours. Our experimental models were Adenoviruses type 7 and Enteroviruses ECHO type 19.

The infectious titres of both model viruses were determined on cell cultures of human embryonal kidney origin (7). A dynamic method of sorption of the experimental viral suspension was performed (1, 5). The experiments were carried out at 4° C, by using 1TCD₅₀/0,1 ml.

The viral suspension passed through NMS (filtrate) was collected every day in sterile flasks and its infectious titre was afterwards measured.

Results and discussion

The results of the sorption of both models are represented on fig. 1. The kinetics and dynamics of the sorptive process is indicated by using sorptive curves of infectious titres of both viruses. The values of the infectious titres of the filtrate are lower than those of the initial viral suspension of any virus. Thus, Adenovirus type 7 shows the following results: from lg TCD₅₀=1,00/0,1 ml to lg TCD₅₀=5,00/0,1 ml; the initial infectious titre is lg TCD₅₀=9,00/0,1 ml. ECHO-virus type 19: from lg TCD₅₀=1,18/0,1 ml to lg TCD₅₀=2,33/0,1 ml; initial titre is lg TCD₅₀=6,14/0,1 ml.

The sorptive curves of both models show obviously that NMS (Kaolinite) is rapidly saturated (after the first experiments). The considerable decrease of initial infectious titres of both viruses is a resultant process even in the first experimental series.

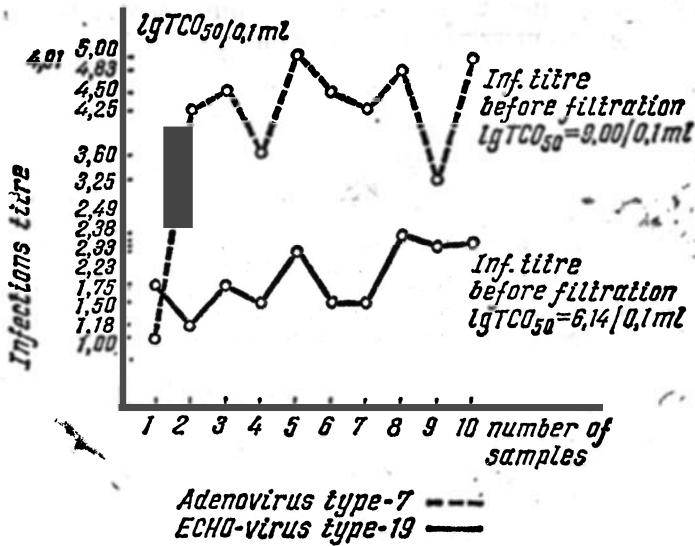


Fig. 1

Conclusions

Analysing the applications of our NMS we conclude:

1) Kaolinite possesses expressed adsorptive properties towards applied in the study model viruses.

2) NMS (Kaolinite) is a valuable material in the production of fractionated forms for a sorptive cleanse and concentration of viruses isolated from various waste waters.

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**СОРБЦИЯ АДЕНОВИРУСА ТИПА-7 И ЕСНО ВИРУСА ТИПА-19
НА ПРИРОДНОМ МИНЕРАЛЬНОМ СОРБЕНТЕ**

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Р Е З Ю М Е

Проведены эксперименты для определения сорбционных возможностей природного минерального сорбента из города Каолиново. Они показывают, что использованный природный минеральный сорбент обладает хорошими сорбционными качествами по отношению к Аденовирусу типа-7 и ЕСНО вируса типа-19. Природный минеральный сорбент быстро насыщается, что позволяет использовать его в вирусологической практике для очистки концентрации модельных вирусов от различных материалов внешней среды.