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### 43. THE ZEOLITES AS SKIN DECONTAMINANTS AGAINST NERVE AGENT SARINE IN VIVO

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#### INTRODUCTION

Zeolites are natural or syntetic aluminosilicates with molecular structure in shape three - dimensional net. They have ion exchange and adsorption of active behavioural efficiency.

For this study mixture of zeolites the KW (code Name) preparing special procedure is used. Theirs possible decontaminations' properties against sarine tested on a mice model with monitoring of vital functions and surviving.

#### MATERIALS AND METHODS

Mice (NOD strain) were shaved before contamination and contamination were practising by skin of back applications solution sarine in isopropanol (c=100 mg/l). (5)

The dose of that solution for mice p.c. application got by the equotion 1 (6):

$$d = D \times m / c \quad (1)$$

where is

d - the dose which applies (ml)

D - the dose per kg mice ( $\mu\text{g}/\text{kg}$ ),

m (mass mice) = 0,03 kg,

c (concentration of solution) = 100 mg/l

First dose of p.c. sarine solution in isopropanole application was due to limit of reliability of  $LD_{50}$  took little less then literature one (6), and this is  $d=0,240$  ml per mice (this is  $D=796,29 \mu\text{g}/\text{kg}$ ). Next doses were growing by geometric factor 1.26.

Lethal dose ( $LD_{50}$  p.c. sarine) was calculated by tables and equotion 2 (6). For calculation lethal dose  $LD_{50}$  (p.c. sarine) is applied 4 doses ( $\mu\text{g}/\text{kg}$ ) : 915.15; 1153.06; 1452.86; 1830.60 and number died of mice per every dose (N): 2, 3, 3, 6. Factor f was calculated of number of died mice and tables (6).

$$\log LD_{50} = \log D_A + \log G_f (1+f) \quad (2)$$

where is

$D_A$  (first effective dose) = 915.15  $\mu\text{g}/\text{kg}$

$G_f$  (geometric factor) = 1.26

$d = \log G_f = 0.1004$

$f = 0.2500$

95% limit of reliability ( $L_R$ ) was calculated by equotion 3:

$$\log 95\% L_R = \log LD_{50} \pm 2d \times q \sigma \quad (3)$$

where is

$\sigma$  - factor for N (2,3,3,6) from Weil's tables (6)

After contamination by doses ( $\mu\text{g}/\text{kg}$ ): 1452.86; 1830.60; 2306.56; 2906.26; 3661.89 and 4613.98, decontamination was done immediately of the KW.

For a calculation  $\text{LD}_{50}$  (p.c. sarine) after decontamination by this mixture of zeolites are applied doses ( $\mu\text{g}/\text{kg}$ ): 2306.56; 2906.26; 3661.89; and 4613.98 by equation 2.

Therapeutic effect was calculated by equation 4:

$$\text{T.E.} = \frac{\text{LD}_{50}(\text{with decontamination})}{\text{LD}_{50}(\text{without decontamination})} \quad (4)$$

All survival animals from experiment were returned in cages, in conventional conditions, and their survive were monitoring in next 24 hours.

## RESULTS

For the purpose of this experimental work, we determined the lethal dose of sarine percutaneous  $\text{LD}_{50}$  (p.c. sarine) = 1208,37  $\mu\text{g}/\text{kg}$  for this strain of mice. (5,7)

The mice that were decontaminated by the KW survived 3.03  $\text{LD}_{50}$  (circa three lethal doses) of sarine p.c. (4)

95% limit of reliability (95%  $L_R$ ) for  $\text{LD}_{50}$  (p.c. sarine) is 945.60 – 1544.00  $\mu\text{g}/\text{kg}$ , what is in limit of literature data. (7)

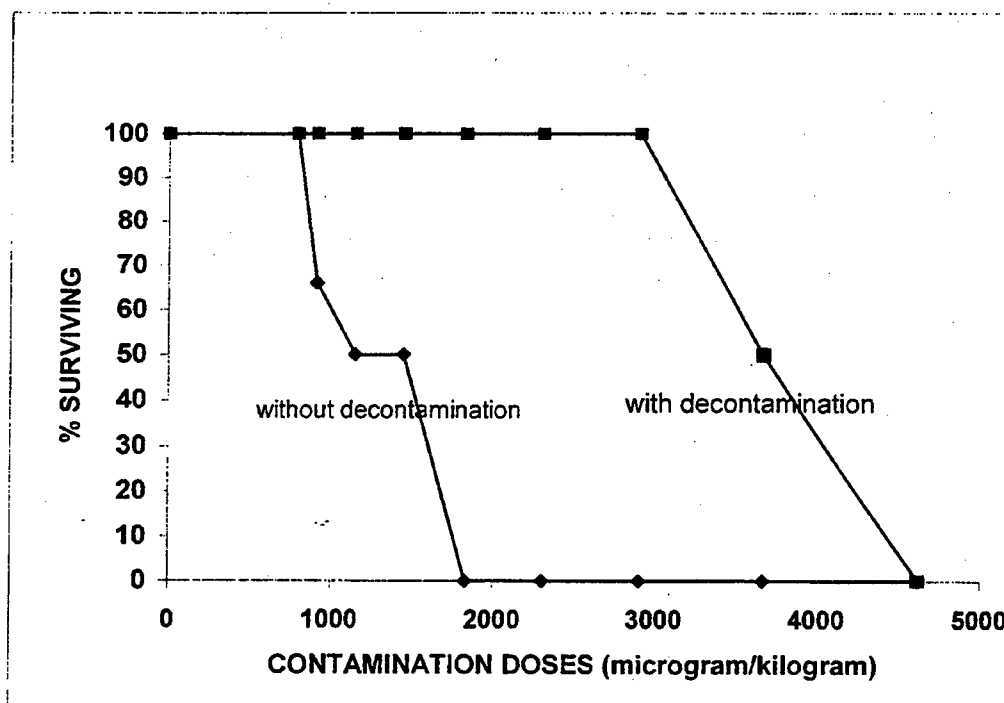


Figure 1: Surviving mice of contamination (solution sarine) with and without decontamination

## CONCLUSIONS

The preliminary results show that it is possible to use the KW to skin decontamination sarine efficiently.

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