

Study of Reproductive Function in Animals Under Conditions of Chronic Exposure to 2-Mercaptobenzothiazole

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Abstract

The results of a study of the reproductive function of animals under chronic exposure to 2-Mercaptobenzothiazole at the threshold of chronic action (Limch) are Presented. It was found that chronic exposure to 2-Mercaptobenzothiazole at the level of Limch (2.0mg/kg) has a negative impact on the reproductive function of rabbits, and, to a greater extent, the reproductive ability of females is damaged.

Keywords: 2-Mercaptobenzothiazole; Reproductive function; Rabbits

Urgency

In recent years, more and more attention of researchers is attracted by the issues of environmental problems, the solution of which will largely depend on the life of future generations. Among the various environmental pollutants of anthropogenic nature, petrochemical synthesis products play a role, many of which are widely used in the production of polymeric materials for household, food, veterinary and medical purposes. One of these xenobiotics is the well-known vulcanization accelerator - 2-Mercaptobenzothiazole.

There are a number of information about the ability of migration of 2-Mercaptobenzothiazole in different biological environment of the rubber and veterinary medical purposes; about the negative effect of the aqueous extracts with the contents of the specified ingredient and about the increase of various nonspecific diseases of workers in enterprises for the production of rubber latex products [1-5].

Note the fairly widespread use of 2-Mercaptobenzothiazole in the production of pesticides and medicines for veterinary medicine, as well as the potential danger of contamination of forage lands located in the immediate vicinity of roads [6,7]. In this regard, it is important to clarify the characteristics of the action of small doses and concentrations of this xenobiotic, actually occurring both in production and in the environment in order to prevent its undesirable effects on humans, animals and other useful organisms, which is urgently necessary and relevant. The aim of the study is to assess the reproductive function of animals under chronic exposure to 2-Mercaptobenzothiazole. The material and objects of study were industrial sample of 2-Mercaptobenzothiazole; rabbits, their offspring; blood and other biological materials of these animals. Methods of hematological, path morphological, Toxicological, and biometric studies, as well as recommendations for assessing the reproductive function of animals under the influence of chemicals developed by a number of authors [8-10] were used to evaluate the negative effects of 2-Mercaptobenzothiazole in a chronic experiment [8-10].

Research Results

It was found that daily, for 3 months, the effect of 2-Mercaptobenzothiazole in a dose at the level of the chronic action threshold (Limch) does not cause any visible deviations in the state of physiological health and reduced productivity in experimental rabbits. Hematological studies revealed a statistically significant decrease in the number of red blood cells by 22% ($p < 0.05$) and hemoglobin content by 11% ($p < 0.05$). The remaining parameters (number of leukocytes, the percentage of met hemoglobin, and the level of total and reduced glutathione, the activity of the acetyl cholinesterase enzyme system of the blood) significant deviations, in comparison with similar indicators of blood of intact (control) rabbits, were found.

Three months after exposure to 2-Mercaptobenzothiazole, intergroup and cross-mating of experimental animals were performed. In all cases, mating was carried out simultaneously. The day of pregnancy was considered the presence of sperm in the vagina of females in the estrus stage. After that, the males were euthanized, followed by the study of morphological disorders in the internal and generative organs. All females were brought to childbirth. Path anatomical examination revealed no significant changes in the internal organs and tissues of males when exposed to 2-Mercaptobenzothiazole, compared with the control. Similarly, histological studies of any expressed violations in the morphological structure of the liver, myocardium, spleen, lungs, and a testis of these rabbits has not been established.

Observations of experimental females showed that during pregnancy there were no visible deviations in the state of physiological health. The duration of pregnancy in both experimental and intact females averaged 29-31 days and ended in childbirth, the results of which revealed the following: from intergroup mating of experienced females and males, a litter of 23 rabbits was obtained, among which 2 were dead; from similar mating of intact (control) animals, 23 live rabbits were obtained. Cross mating intact males and experienced females gave offspring in the amount of 25 rabbits, including the dead 3, and when mating experienced males and intact females received 25 live rabbits.

Consequently, chronic exposure to 2-Mercaptobenzothiazole at the level of Limch (2.0mg/kg) has a negative effect on the

reproductive function of rabbits, and, to a greater extent, the reproductive ability of females is damaged. A certain confirmation of this is our results on the study of the state of the young in the early period of postnatal ontogenesis. Thus, 30 days after birth, the survival of rabbits in the groups was: from intergroup mating of experienced and intact (control) producers - 81 and 91%; from cross-mating of experienced females and intact males - 59, and experienced males and control females - 88%, respectively.

Thus, analyzing the above results of our research, we can conclude that in order to prevent the undesirable effects of 2-Mercaptobenzothiazole on the reproductive function of animals, it is necessary to strictly regulate its content in various objects of the environment. Moreover, the existing regulations for the safe use of this xenobiotic in production conditions need correction since the threshold of its chronic action (Limch) has a gonad toxic and embryo toxic effect.

References

1. Sheftel VO (1986) Polymeric materials (toxic properties). Handbook L, Chemistry, p.232.
2. Sheftel VO (1986) Embryo toxic and teratogenic action of components of polymeric materials. Gig and San 5: 42-44.
3. Istamov HI (1994) Ecological aspects of biological action of xenobiotics. Perm, p.206.
4. Salamova N (2006) Complex compounds of rhenium (V) with 2-mercaptobenzothiazole, 2-mercaptobenzoxazole and benzotriazole: Autoref dis kand chem sciences, Vladikavkaz, p.13.
5. (2011) Environmental assessment and ways to reduce the emission of accelerators of sulfur vulcanization of rubbers in the production of rubber products: Dis kand chem of sciences, Kazan, Russia, p.142.
6. Akhmadeev RN (1980) Pharmacology of sulfide and sulfoxide and their use in psoroptosis of rabbits: autoref dis kand Witney, Kazan, Russia, p.24.
7. Akhmadeev RN, Nabiye FG (2000) Drugs for veterinary medicine. Kazan, Russia, p. 42.
8. Elizarova ON (1971) Determination of threshold doses of industrial poisons by oral administration. Medicine, p.192.
9. Larks N So (1981) Pathogenesis, diagnosis, treatment and prevention of animal poisoning with carbonate pesticides: Autoref Dis. Witney M, p. 35.
10. Sanotsky IV (1970) Methods of determination of toxicity and danger of chemical substances. Medicine, p.342.

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