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The Drug Izatizon Protects Plants, Animals, Insects, Birds, Fish And Humans Against Mass Viral Diseases

L. Zaika[1]., O. Bolsunova[1], V. Zayets[1], A. Potopalsky[2].
Institute Of Molecular Biology And Genetics Of The NAS Of Ukraine, Kyiv, Ukraine
Institute Of Health Promotion And Rebirth Of People Of Ukraine, Kyiv, Ukraine

Abstract
There is currently a crisis of stability caused by climate change, which in the future may cause unforeseen epizootic situations. The destruction of the habitat of living beings leads to a decrease in the natural resistance of the body to harmful environmental factors and the mass spread of already known and new viral, microbial-viral, fungal infections, and oncological diseases. Therefore, the situation requires the use of targeted agents with high specificity of antiviral, antimicrobial, antitumor action and a parallel immunoregulatory effect.
A comprehensive approach to solving many modern problems in the field of agriculture and human health has been developed and proposed for use. It is based on the use of original molecular biotechnology [1].
Keywords: *izatizon, infectious diseases, immunomodulatory and antiviral action*

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The drug izatizon has a broad spectrum of antiviral, antitumor and antibacterial activity and is registered in veterinary medicine for the treatment and prevention of viral diseases of farm animals, poultry, insects and plants, it is also recommended for the treatment of people with viral diseases and tumors [2]. A technology for combating mass viral diseases based on the drug izatizon has been developed. New drugs have been created that affect biological processes, methods for their use in medicine, veterinary medicine and agriculture have been developed and tested.

Izatizon is active against DNA and RNA viruses [3] and has pronounced immunomodulatory properties [3, 4]. Based on the study of the biological and therapeutic properties of izatizon, schemes for its use in veterinary medicine have been developed. A patent has been received for its invention [5].

In poultry farming, izatizon was used in the 1970s for laryngotracheitis and Marek's disease in birds. The drug provides a high therapeutic and prophylactic effect and, importantly, increases the main indicators of livestock productivity and determines the high economic feasibility of using the drug (increase in egg production by 22% and body weight gain of chickens by 17%) [6].

Experimental studies of the effect of izatizon on the avian laryngotracheitis virus (ALT) caused by DNA herpesviruses, conducted on chicken embryos (9-10 days of incubation) showed that this drug has a strong virucidal effect. It should also be noted that it has a significant prophylactic and therapeutic effect when administered 3, 6 and 8 hours after infection of embryos with this virus. When embryos were infected with the virus and the drug was administered in doses of 1.6, 2.0 and 3.6 mg / kg, prevention of virus reproduction in the chorioallantoic membrane of embryos was noted in 64.0%, 84.0% and 91.6% of cases, respectively [7].

After the use of izatizon, it was found that the drug contributed to an increase of the natural resistance of birds [8]. The use of izatizon aerosol for therapeutic and prophylactic purposes in the event of an outbreak of ILT in chickens provided a protective effect and a high economic effect. The egg production of birds in the experimental group significantly exceeded the control. The effect of izatizon in Marek's disease depends on the frequency of administration and the course dose, i.e. it has a therapeutic effect on the body affected by a tumor of viral origin with repeated use.

Izatizon has antiviral activity, inhibits virus reproduction and reduces morbidity during experimental infection and in production conditions even without vaccination. [9,10,11].

The effectiveness of using izatizon for the prevention and treatment of animal diseases in Ukrainian farms has been studied for many years. High therapeutic effectiveness of the drug in combination with basic treatment has been established. [12].

Thus, in acute catarrhal bronchopneumonia of calves, which were administered izatizon in combination with basic treatment, a mild course of the disease was noted, and clinical recovery occurred on average on the sixth to eighth day, while in calves of the control groups a more severe course of the disease was noted and clinical recovery occurred on average on the tenth to twelfth day, in addition, forced slaughter of calves was carried out in the control groups. It should be noted the high prophylactic and therapeutic effect of izatizon in infections of

the upper respiratory tract of calves, foals, piglets [13, 14]. Significant success in the treatment with the drug was achieved in purulent-necrotic processes (wounds, abscesses, phlegmon, purulent-necrotic lesions of the extremities, arthritis) and septic inflammations of the bone-tendon joints by Professor V.I. Izdepsky and his assistants at the Department of Surgery of Belotserkovsky State University [15].

Due to its universality and comprehensive action, izatizon can also be successfully used in fish farming. Long-term experimental studies on the effect of izatizon on the resistance of fish organisms and their productivity were conducted at the Institute of Fisheries of the National Academy of Sciences of Ukraine. It follows from the experimental data that one-year-old carp fish that took the above-mentioned preparation according to the scheme of 0.5 ml / kg of fish weight for a month with an interval of one day differed in weight, hemoglobin content, total protein, leukocyte formula, phagocytic activity of neutrophils, proliferative activity of lymphocytes from the control fish. It should be noted that izatizon contributed to an increase in the weight of the experimental fish, which was 13% more than the control fish. The reaction of fish to stressful environmental conditions: their infestation with parasites, fish viability, the degree of their resistance to infectious diseases was on average 31% higher in fish that took izatizon [16]. As a result of joint work with the Institute of Fisheries of the National Academy of Sciences of Ukraine, a patent of Ukraine for utility model No. 30040 of February 11, 2008 was received. "Method for preventing diseases in industrial freshwater fish".

The peculiarities of the therapeutic effect of izatizon in beekeeping are that it acts at low concentrations, hundreds of times lower than those recommended in animal husbandry. It should be taken into account that 24 hours after treatment with izatizon preparations, their presence is not detected in bee products. Considering the harmlessness of izatizon for bees, it should be classified as an environmentally friendly promising agent for widespread use in beekeeping. This will reduce the use of antibiotics, sulfamides and other chemical drugs, the use of which in beekeeping leads to a decrease in the quality of products due to drug contamination [17,18,19].

In the former Soviet Union, Ukraine occupied one of the leading places in the production of natural silk. The need for this material has not lost its relevance to this day. In this regard, scientific research is being conducted to revive this important branch of the national economy.

In the process of mass cultivation of laboratory insect cultures, various anomalies of morphological, biochemical and physiological nature are observed as a consequence of the action of a number of stress factors that lead to mass diseases of these cultures. The studies were conducted on a model culture of oak silkworm Antheraea pernyi G.-M. (Lepidoptera, Saturniidae), the original Ukrainian breed Polesie Tassar, developing in a univoltine mode. Branches with leaves of English oak (Quercus robur L.) were used as food. During the studies, baculoviruses were isolated - causative agents of nuclear polyhedrosis and granulosis. [20]. Experimental infection with viruses was carried out orally using known methods [21, 22, 23, 24.]. During the experiment, experimental variants were formed, which provided for feeding oak leaves treated with an aqueous solution of izatizon in various concentrations, which were applied to oak leaves during the development of the 4th - 5th caterpillar instars of the silkworm. Such indicators as the level of viability of caterpillars, the reproductive potential of females, the yield of natural silk were used as evaluation predictors, and the protein content in the hemolymph of caterpillars was also established and the total fund of hemocytes was taken into account [25,26].

It was found that the viability of the experimental batches of oak silkworm was 87.4%, the fertility of females was 210.8 eggs, and the silkiness of cocoons was 10.9%. The protein content in the hemolymph was 10.8%. The total hemocyte pool was 6026 cells/mm3. Similar indicators in the control were, respectively: viability - 42.6%, fertility - 156.7 eggs, silkiness - 7.4%, and the protein content in the hemolymph was 4385 cells/mm3. Reliable differences were obtained for all indicators of the experimental variant in comparison with the control.

The effect of izatizon on plant productivity was studied. A plant selected for the experiments was a hybrid of rye and corn, bred by the method of targeted vectorless transfer of hereditary information from one plant to another. The plant is of the winter type of development and has some common features with the parent plants - diploid rye and corn [27]. Before sowing, the seeds were treated with izatizon by soaking in solutions of different concentrations. The results of the experiment showed that izatizon significantly enhanced vegetative development and contributed to an increase in yield [28].

Izatizon is widely used in human medicine on volunteers due to its broad spectrum of action, unique immunomodulatory properties and absence of side effects [29 - 33]. The drug is recommended for infectious viral diseases (flu, AIDS, epidemic encephalitis, viral hepatitis A, B, C, coronavirus); acute diseases of the upper respiratory tract (rhinitis, laryngotracheitis, bronchitis, bronchopneumonia, acute respiratory infections - ARVI); tuberculosis of the lungs, bones, genitals; diseases of the oral cavity (glossitis, gingivitis, stomatitis, periodontitis, periodontosis); diseases of the skin, glands and mucous membranes (herpes of the skin and mucous membranes, including the genitals, shingles, burns, erysipelas, purulent wounds and trophic ulcers, abscesses, furuncles, carbuncles, mastitis, lymphadenitis, psoriasis, fungal infections); urological and gynecological diseases (nephritis, endometritis, salpingitis, trichomoniasis, chlamydia, erosions, genital warts, prostatitis, prostate adenoma); eye diseases; hemorrhoids.

The wide spectrum of biological activity of izatizon can be explained by the conformationally labile structure of the methysazone molecule, the main active molecule of izatizon [34].

The immunomodulatory properties of izatizon are manifested in the stimulation of the formation of T- and B-lymphocytes, activation of the proliferation of these cells in the body and stimulation of the production of key cytokines - interleukins 1 and 2. All this contributes to an increase in the body's ability to develop specific immune reactions during antigen stimulation. It belongs to substances that mainly act on the functioning of the cellular link of immunity, which may reflect an additional mechanism of its antiviral activity. Izatizon enhances the activity of natural killers and macrophages, i.e. non-specific elements of the immune system that play an important role in the elimination of viruses. Thus, izatizon increases the body's resistance, provides high anti-inflammatory, antihistamine and therapeutic and prophylactic effects [35].

Consequently, izatizon influences biological processes occurring in the cell and in the body as a whole based on its unique structural formula and selectivity of action.

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