Izatizon application, its analogs and new medicinal forms for bee rehabilitation

Lozyuk L.V., Onischuk P.D., Potopalskiy A.I., Lozyuk R.M., Sokolskiy S.S., Melnik V.N.

SPD "Dobrodeya", Lviv, Ukraine;
Joint-stock company "Biostim", Krasnodar, Russia;
CNRI of beekeeping, Krasnodar, Russia;
Institute of health promotion and rebirth of people of Ukraine, Kyiv, Ukraine,
E-mail: potopalsky@imbg.org.ua

Beta-tiosemicarbazons of izatin with different substitutes are very perspective. They have found their application in the chemoprophylaxis and viral disease treatment. β-tiosemicarbazons N-methyl- and N-ethylizatin are the most active among them. Their antiviral effect is resulted from the action on RNA- polyribosome and DNA- polyribosome nuclease complex, expressed by viral reproduction inhibition and immunomodulating activity.

We have studied molecular mechanisms of these compounds, and found out that they were very effective and have a wide influence spectrum due to increased penetration into the organs and tissues. This leads to the inhibition of viral intracellular reproduction and bacterial infection.

Izatin β-tiosemicarbazon decreases reproduction activity of smallpox vaccine virus, it also inhibits rhinovirus and flu virus reproduction. It is determined that Izatin β-tiosemicarbazon activates alkalotic DNKase and inhibits acid DNKase. Here it completely decreases reproduction of smallpox virus, flu A, parainfluenza of the 3-d type, arboviruses and adenoviruses.

We have also determined the antiviral action of tiosemicarbazon class compounds concerning to RNA-containing viruses. Tiosemicarbazon and marboran derivatives delay viral reproduction of different groups: poliomyelitis, rhinoviruses, mixoviruses and paramyxoviruses.

New izatizon medicinal forms. Izatoniy and lozeval were used for the treatment of mixed viral-bacterial infections.

It is very convenient and profitable to use new forms like aerosol, but at the same time, they can be added into the water and food. In case of stomach infections an alimentary introduction of prolonged action substances is favorable. For this purpose consistent medicinal forms of prolonged action (izalact, lactizet) were created. These forms do not yield to the liquid ones, getting into the organism through alimentary tract their advantage is that they don't provoke stressful situations, their production technology is cheap and they are the albuminous and vitaminous food supplements at the same time. This is very important for beekeeping where alimentary way of medicine introducing is the main and albuminous and vitaminous additions are very favorable during the absence or breaks in nectar providing in hive, what is observed on the Caucasus and in the foothills of the Carpathian Mountains.

Prevention and treatment of bee viral diseases. Viral diseases usually affect bees in the period of intensive family growth, when weather and seasonal factors lead to the lack of albuminous and vitaminous components of larvae that grow. Viruses that have affected their organisms invoke death on different stages of the germination.

Bees quickly find sick and dead larvae and throw them away from the honeycombs. We have found, during our examinations, that heterogeneity of the brood is typical for such families. Chronic clinical course is characterized by the large larvae mortality after the closure of the honeycombs. There are little islands of closed honeycombs with dead larvae inside among the majority of empty honeycombs from which young bees have hatched. They can be easily removed with the pincer. They hang as a liquid sacks on the tip of the pincer. Evolution of sick families stops. Viral paralysis affects adult bees. They suffer from the paralysis of muscles, stems, wings. Bees move along the circle, fall down from the combs to the bottom of the hive and die in convulsions. The whole bee families die if not treated.

Till the izatizon appearance and application viral disease prevention in Krasnopol's DVPG was possible only due to large expanses: extra nutrition with the adding of coniferous essential oils (coniferous natural extract, 2 grams per 1 litre of the syrup) was used largely during the month (in spring even during 1,5-2 months). Antibiotics of wide action spectrum (tetracycline, oxytetracycline, tetrachloride, etc.) or thymol (1 l. per litre of the syrup) were also used for the prevention. Antibiotics in such quantity contaminate bee's nest for a long time, get into the honey through nutrition and decrease its marketable and consumer qualities. Moreover antibiotics price has risen. Neat coniferous essential oil or coniferous extract become more expansive and scarce from year to year.

IZATIZON – is a complex preparation, N- Methyl-isatihn β-tiosemicarbazon, dimethyl sulfoxide and polyethylene glycol-400 are its components. Izatizon in the aerosol form was studied for prevention and treatment of bee viral diseases. Research and production pedigree farm of bee raising DVPG "Krasnopolyanske", scientific production association "Dobrodeya", RF NSI of beekeeping, joint-stock company "Biostim" and Institute of health promotion and rebirth of people of Ukraine have conducted combined researches. Positive results were obtained during izatizon application in aerosol form on 5 ml. for a honeycomb with bees. These honeycombs were double or triple sprayed with the interval of 2-3 days for viral disease prevention. Sprays were carried out if the temperature was not lower than 18C.

IZATONIY – it is an izatizon medicinal form with wide antiviral and antibacterial action spectrum. This preparation is recommended for veterinary application during mixed infections. It inhibits RNA and DNA-viruses, and also, displays mucolytic and antibacterial effect (resolution № 432-3 from 07.01.89, approved by the Veterinary central administrative board of Russia). Izatoniy comprise N- Methyl-isatihn β-tiosemicarbazon, 1,2- ethylenebisamoniy dichloride, dimethyl sulfoxide and polyethylene glycol-400.

Izatoniy has been studied since august 1993 during mixed viral-bacterial infections in the suburban bee-gardens and also in the bee-garden №3 DVPG "Krasnopolyanske" (150 bee families). This treatment was carried out in the same way like with izatizon. The only distinction was that it was solved with water (1:50). The frame combs were widen up to 2,5-3 sm. before spraying, then they were returned to the normal condition exactly after the treatment. Medicinal effect, in all cases, occurred after the second application with the 48-72 hours interval. The preparation consumption was 15 ml for every beehive (0,3 ml of neat preparation). Trial treatments were put into practice on the half of researched bee-gardens, on the other half – regular scheduled prevention works. Bees were fed with sugar syrup with oxytetracycline 500 000 units for 1 litre, counting on 150-200 ml of the solution for a beehive (2 times with 5-7 days interval). 2 ml of the coniferous extract were added to such syrup.

Izatoniy application forwards bee multiplication. There were no disease signs found during control verifications in June and at the end of August in bee families treated with izatoniy. Capped brood was without omissions and in average each frame was 300-400 combs larger than untreated one's. In the tentative groups larvae afterripening was on 5-8% higher than in untreated one's.

Beekeepers received in 12-15 times more production (queen bees, larval food, honey) from the tentative groups than untreated could give according to the results of the 1993-1996 seasons. Heterogeneity of the brood was observed in the bee-garden №31 in the village Kozachiy Brid in Adler's area. (antibiotics were ineffective). This bee-garden, during all the time of its existence, fulfilled the production plan at the beginning of June but not in August. The plan was fulfilled due to queens, larva food and bee comb frames production.

So, izatoniy application not only prevents infections but also stimulates evolution of bee families.

IZALAKT, LAKTIZET – consistent forms of prolonged action with the whole milk application instead of albuminous and vitaminious additions and N- Methyl-isatihn β-tiosemicarbazon and 1,2- ethylenebisamoniy dichloride carrier. 10 gr. of any preparation have to

be solved in the syrup and fed in 50-s ml for each hive during 2-3 days along the week if the signs of mixed viral-bacterial diseases appear. You can repeat treatment course if necessary.

Application of all or some separate components of this complex (depending on the concrete conditions) is the best way to enrich bee vital activity and productivity.

Good honey yield depends on food supply with different natural and cultivated meliferous plants. We advise for all beekeepers to keep "beekeeper's carpet", that consists of new honey plants. These are fabulous annotinous and perennial flower plants: esculent, pabular, technical, medicinal and fancy. All these plants are originated in the Institute of Molecular Biology and Genetics NAS of Ukraine and in the Institute of health promotion and rebirth of people of Ukraine by method of molecular modification of hereditary apparatus. That's why these plants are resistant to droughts, frost-killing, salinity, etc. The most valuable of them are: Echinacea "Polisska beauty", Phytolacca "Polisska Fascicle", cyanosis "Polisska blue", elecampane "Polisskiy Giant", kvagista, ground-cherry, kavbuz, delphinium, pilotweed, giant hyssop and others.