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ANALYSIS OF THE STATE PRODUCTION OF CHEMICAL PLANT PROTECTION PRODUCTS

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Abstract:

The given article is devoted to a review of the development and current state of the receipt fungicides and seed dressing. The study of the formation processes of the assortment of fungicides and seed dressing agents, determination of its compliance with the needs of consumers, analysis of the historical and technical state of production is relevant and timely to identify promising ways of their development. It is known that the main task of agricultural production is to increase the yield of basic agricultural crops. In this connection, the issue of protecting agricultural crops from diseases and pests is acute. Plant protection chemicals, including fungicides and seed disinfectants, play a major role in resolving this issue. Thus from the analysis of the state of production and use of chemical plant protection products, it was revealed that the products of large-scale industries are the basis for providing the industry of chemical plant protection products with raw materials.

Keywords: Chemical plant, protectio prodnucts, raw materials

Annotation:

As you know that each crop is affected by one or more pathogens. In the context of concentration and specialization of agricultural production, the role of fungicides and seed dressings increases significantly. Which are designed to protect plants from diseases and occupy the third place in terms of production, consumption and assortment. Plant disease usually occurs in the field before harvesting. For most cereals, vegetables and industrial forage crops, the main source of disease is contaminated seed. Disinfection of seeds (dressing) is the main method of control in this case. The effect of the use of fungicides and seed disinfectants is expressed in reducing crop yield losses.

Thus the study of the formation processes of the assortment of fungicides and seed dressing agents, determination of its compliance with the needs of consumers, analysis of the historical and technical state of production is relevant and timely to identify promising ways of their development.

It is known that the main task of agricultural production is to increase the yield of basic agricultural crops. In this connection, the issue of protecting agricultural crops from diseases and pests is acute. Plant protection chemicals, including fungicides and seed disinfectants, play a major role in resolving this issue.

It is believed that the information about attempts to use various materials, including chemicals, for plant protection appeared much earlier. So, about 1000 BC Homer mentioned that "the infection is repulsed with the help of the divine and purifying evaporation of sulfur." The first preparations were proposed even before our era, so in the 3rd century BC the ancient Greek scientist Democritus suggested: before sowing seed treatment, treat the seeds with hare cabbage juice; spray plants with pure infusion of olives without salt, which have fungicidal and insecticidal effects. At the beginning of our era, Pliny suggested that in order to prevent the "grain disease" he advised "to impregnate the seeds with wine or mix them with crushed cypress leaves".

The beginning of the history of the development of chemical methods of combating diseases is considered to be 1882, when the French naturalist Pierre Millard made the discovery of Bordeaux fluid.

The first studies to study the movement of plant sap in 1726 was carried out by Hals. In the middle of the 17th century, preparations of copper, arsenic and mercury began to be used for seed dressing. In 1867, Hoffmann August Wilhelm, a German organic chemist, one of the founders of the German synthetic dye industry, discovered the fungicidal properties of formaldehyde, but it was not until the end of the 19th century that it began to be used to treat grain seeds and potato tubers. Until now, the mixture of copper sulfate and lime milk (Bordeaux mixture),

proposed in 1887 in France by P. Millard and W. Geyon for the fight against plant diseases, has not lost its significance. It should be noted that the use of plant protection products in this historical period was only episodic, non-systemic in nature.

Some researchers have tried to destroy pathogens inside the seeds, such as head smut or some Helmintosporium species. Goiter reported the effectiveness of formaldehyde, Hiltner - mercury chloride, Reim - organic mercury compounds. In the early nineties, formaldehyde was already widely used for dressing seeds and cereals. In 1903, Masei used copper sulfate to treat the roots of cucumbers, as a result of which the infection of cucumbers with Cercospora melonis decreased, and in 1913 Spinke found that the treatment with lithium salts of wheat and barley prevented the development of powdery mildew (Erysiphe graminis).

Paul Müller's monograph Die innere Therapie der Pflanzen (Internal plant therapy) collected early works and described the author's own experiments on the use of various substances in the fight against pathogens and insect pests.

Interest in chemotherapy arose in the mid-thirties, as many new organic compounds became available from the mid-thirties and the choice became wider.

Hassebratsk protected wheat seedlings from damage by rust fungi by treating seedling roots with p-aminobenzenesulfamide.

Simultaneously with the search for effective substances that protect plants, methods of their successful use in agricultural practice were also developed. Over the years, crops have been processed in a variety of ways. We used seed dressing, pelleting, spraying furrows with a liquid preparation, scattering of granules and row application of granules with a combined seeder, etc.

Currently, a large number of pathogens of agricultural plants are known. Thus, more than 30,000 pathogenic microbes have been registered for 3,000 plant species, 25,000 of them are fungi, about 600 are nematodes, more than 200 are bacteria, and at least 300 are viruses.

On average, about 10-15% of all crop losses are associated only with diseases. Each crop is affected by one or more pathogens. More than 100 pathogens have been identified for rice, 10 for wheat, about 60 for maize, and more than 50 for barley. Of course, not all of them are the main ones, but depending on environmental conditions, their role may increase.

Plant diseases usually occur in the field before harvesting. There is a close relationship between pre-harvest diseases and subsequent post-harvest losses.

In the literature, there is information that pre-harvest losses of agricultural crops on a global scale are about 35%. After harvesting, an additional 10-20% of the yield is lost due to the action of insects, microorganisms, birds, and rodents. Thus, the annual yield losses reach ~ 48%, despite the use of both chemical and non-chemical methods.

For most cereals, industrial and forage crops, the main source of disease is contaminated seed. Disinfection of seeds is the main method of control in this case.

For crops of cultivated plants, in addition to seed treatment, it is necessary to disinfect greenhouse or greenhouse soil, which will significantly increase the yield of healthy seedlings and reduce the introduction of infection into open ground.

According to the biological effect, fungicides are divided into direct (disinfectant) preparations, which manifests itself at the time of etching, and a protective effect, when the preparation has some persistence, which provides protection of seeds and seedlings for a longer time. The most common method of seed treatment is the semi-dry method, in which a small liquid consumption is provided (water is added together with the preparation or a liquid seed dressing is used). Usually, for cereals with a semi-dry method of dressing, 8-10 liters of liquid are consumed per 1 ton of seeds.

The disinfectants are produced in the form of dusts, wettable powders, liquids, flowable pastes, etc.

Seed dressing is an important technique in modern technology of grain exposure. It protects seedlings, and healthy seedlings are the basis of the future harvest.

According to the estimates of the Food and Agriculture Organization of the United Nations (FAO), abandoning the use of pesticides would lead to loss of crops (%): wheat - 24, rice - 48, corn - 36, barley - 21, millet - 37. On average, the yield of agricultural crops would decrease by 30%, and the rise in prices for products would be 50-70%.

The world market for pesticides is estimated at ~ 20 billion dollars / year, there are about 1000 active ingredients and tens of thousands of formulations. In the structure of the chemical industry of the leading countries of the world, the share of the pesticide sub-industry is from 2.2 to 3.2%. In countries with an export orientation - this figure can reach a higher level, for example, 15% in Switzerland.

Nonetheless about 75% of pesticides produced and consumed in the world came from the USA (29% of consumption), Western Europe (28%) and Japan (16.8%). The USA, Germany, Great Britain, Switzerland, France, Japan also stand out in this, among developing countries - Brazil and India.

The predominant part of CPS is represented by organic compounds. In the USA their share is 93%, in Japan ~ 70%.

In developed countries, losses in crop production, according to FAO, in general are about 25%, in developing countries they reach 40%.

4 million tons are used every year all over the world. pesticides; of which 500 thousand tons - in the USA. In the United States, the area of agricultural land that uses non-chemical control methods is almost 2 times larger than

the area treated with pesticides. In other countries, this ratio appears to be in the range of (2 - 10): 1. The most commonly used pesticides in the USA are used on 1A of all agricultural areas . The total cost of treatment with these pesticides is about $ 2.5 billion per year, the economic effect is estimated at $ 10 billion.

In conditions of concentration and specialization of agricultural production, a necessary condition for increasing the yield of grain, vegetables, industrial and other agricultural crops, along with the use of promising agricultural techniques, intensive technologies, new high-yielding varieties, is the competent use of chemical plant protection products. From the point of view of environmental safety, the most promising are fungicides and seed disinfectants.

Seed disinfectants and fungicides include: alcohols, nitrophenols, monocyclic halogen derivatives, polychlorocyclodienes, hexachlorobenzene, aliphatic nitro compounds, quinones, dicarboxylic acids and their derivatives, amino acids and their derivatives, aryl esters of N-alkylcarbolamino acid salts alkylene- N^1,N, bis (dithiocarbominic) acid salts – N, N^1, sulfenic acid derivatives, aromatic thiocyanates, hydrosine derivatives, azo compounds, aliphonic series, aromatic series, phosphorous acid derivatives, furan derivatives, pyrrole derivatives, pyrone derivatives, quinoline derivatives, oxazole derivatives, derivatives isoxazole, benzathiazole derivatives, imidazole and benzimidazole derivatives, oxatin derivatives, morpholine derivatives, etc. Let us consider some of them.Fungicides and seed disinfectants can be classified according to their chemical composition into five main groups: alcohols; halogenated compounds; carboxylic acids, their derivatives and substituted analogs; heterocyclic compounds; other connections. Methanol has been proposed as a seed treater for the control of hard smut. He did not find wide application. Most of the methanol produced in the world is used to obtain formaldehyde: in the USA and the USSR, ~ 50% of methanol was used for this purpose, in Western Europe - more than 60%.

The creation of new effective chemical plant protection products depends on the raw material base, since for the creation of newly developed drugs it is necessary to have sufficient raw materials. Therefore, we carried out an analysis of raw materials, products of large-scale industries, which is important for long-term forecasting of the development of the production of fungicides and seed dressings.

The main source of methane production is natural gases from gas and gas condensate fields. The oil and chemical industry uses about 20% of this raw material produced in our country.

The products of large-scale industries are raw materials for the production of fungicides and seed dressings (Figure 1).

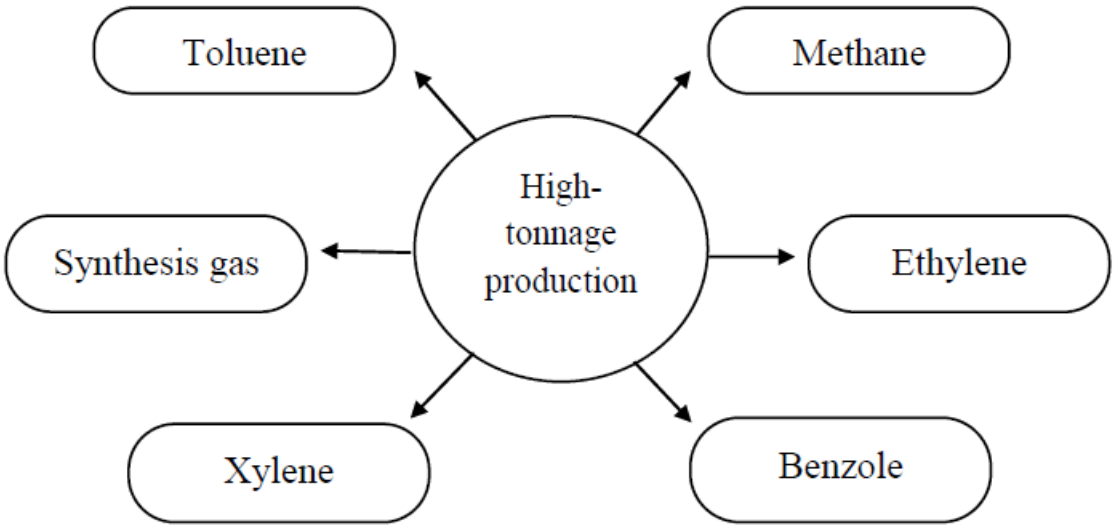

Figure 1. Products of large-scale industries (raw materials for the production of fungicides and seed dressings).

As a result the catalytic conversion of methane is the main method for producing carbon monoxide, which in its pure form is used to produce dimethylformamide, a solvent in the production of nitron fiber and some pesticides. Carbon monoxide is used to make oxalic acid suitable for the production of pesticides oxamate and zineb. Chlorination of carbon monoxide produces phosgene. In the CCPP industry, phosgene serves as a base for the production of derivatives of carbonic and carbamic acids, ureas, isocyanates, which are used in the production of fungicides and seed dressers (Scheme 1).

Carbon monoxide in the form of synthesis gas is used in various production of oxygen-containing compounds. The large-tonnage production of methyl alcohol based on carbon monoxide and hydrogen has been carried out in all industrialized countries. Methanol is an important raw material for the CPPP industry. Methylamines are formed during the catalytic amination of methanol, which are used, for example, as a fungicide thiuram.

Methanol is a feedstock for the production of formaldehyde, one of the most important intermediates in organic synthesis. In the form of an aqueous solution, it is used as an insecticide in the production of phthalophos. Methanol

is also used to produce dimethyl sulfate (CH_30) $S0_2$, which is used as a methylating agent in the industry of organic synthesis and the synthesis of pesticides (seed disinfectants and fungicides).

Ethylene (ethane-ethylene fraction), which is formed during the pyrolysis of ethane, gasoline or gas oil, is an important raw material for large-scale organic synthesis production.

An important raw material for the production of fungicides and seed dressers is ethylene (ethane-ethylene fraction), which is formed during the pyrolysis of ethane, gasoline or gas oil. From Scheme 3 it follows that by the method of direct oxidation of ethylene, as well as from ethylene chlorohydryl, products are obtained for the synthesis of a fungicide, a seed dressing agent Vitavax.

Hence ethylene oxidation produces 71% of the total production of acetaldehyde (29% - by hydration of acetylene) - one of the most important large-tonnage products of organic synthesis. Scheme 3 shows that acetaldehyde is used in the production of acetic acid and acetic anhydride, ethyl acetate - the raw material for the production of CGS.

In the HCPP industry, acetaldehyde is used in the production of the molluscicide metaldehyde, and ethyl acetate is used as a raw material for the production of the fungicide Vitavax.

Acetic acid, a product of acetaldehyde oxidation, is a raw material for a number of large-tonnage CCP production facilities.

Ethylene oxide is obtained by direct oxidation of ethylene, as well as from ethylene chlorohydrin, which is used in the production of pesticides. Ethylene oxide is the main raw material in the production of hydrorelated rostregulator and mercaptoethanol - an intermediate product in the production of the fungicide Vitavax.

On the basis of ethylene, ethyl alcohol is obtained, which serves as a raw material for the production of isobutelene. Metallic chloride is obtained at JSC Kaustik by chlorination of isobutelene. It is used as a fumigant pesticide for disinfecting (dressing) seeds.

Domestic manufacturers recommend a number of drugs for use: Baraka 60% Uzbekistan, Avanche 70% JV India, Bakhor 93% Uzbekistan, Bronotak 12% Uzbekistan, Bronopol 12% Uzbekistan and others. But for various reasons, they still do not find widespread acceptance and can go to the international level.

Thus, from the above analysis of the state of production and use of chemical plant protection products, it was revealed that the products of large-scale production are the basis for providing the industry with chemical plant protection products with raw materials.

In summary the decline in the production of domestic drugs with a low cost and the use of plant protection chemicals (CCPs) led to a decrease in the share of domestic agricultural products, which made it possible to significantly increase imports from abroad. Commercial organizations are the main producers and registrars of fungicides and seed dressings. It is necessary to carry out extensive scientific research to improve and develop technology for obtaining new types of effective fungicides and seed dressings based on readily available and cheap raw materials with low toxicity.

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