21. SUMMARY

This thesis deals with pesticides as such, in more detail it deals with pesticide substances of organophosphorous nature. In the introduction of the general part of the paper, there are mentioned the common definition of pesticides, their significance, classification according to various criteria and their terminology. Further on, there follow the chapters concerning The origin and the development of new pesticides, The historical evolution of pesticide use and The history of pesticide consumption in the World, in Europe and in the Czech republic. The other chapters of the general part focus on pesticide residues, legislation regulating use of pesticides and the relation of pesticides to environment.

The special part of the thesis is divided into several chapters that are aimed on organophosphorous pesticides, toxicity of pesticides and pesticide preparations. Particular chapters are referred to in following order – Organophosphorous pesticides, Summary of pesticide substances of organophosphorous nature, Pesticide toxicity, Pesticide intoxication, Particular intoxication cases and their symptoms, Intoxication therapy, Real cases of intoxication and Preparations containing pesticide-active substances.

The two enclosures form a part of this thesis too. The first of them gives the list of all chemical classes and subclasses into which the particular divisions or subdivisions of pesticides are divided. In the second one, there are listed all pesticide preparations registered in Czech republic on the date 16th January 2006.

Pesticides are substances that are able to regulate undesired organisms, especially weed, pests and diseases caused by them. Pesticides constitute indivisible part of contemporary agricultural production. They protect plants, provisions of food and pasturage against undesired organisms. They are also useful in industry, households and other properties. They can be classified according to their effect, origin or chemical names. Chemical pesticides have been used since the very beginning of 19th century. At first they were used as inorganic substances based on some fundamental elements, such use, however, was gradually abandoned for their high toxicity. Therefore there appeared then organic pesticides as organochloric, organophosphorous or carbamate pesticides.

The massive use of organic pesticides brought disparate results. On one hand, it helped farmers to produce desired necessary quantity of plant food, products and raw materials to satisfy gradually increasing needs of growing population, on the other hand, there, however, appeared undesired effects of such pesticide use. That is why scientists continually try to develop new, more effective and especially safer pesticide substances. The research on new pesticide-active substances is in progress not only on the level of synthetic organic dissection, but also on the base of purely natural substances. Pyrethroid pesticides are the typical example.

Organophosphorous pesticides (OP) contain in their molecules organically fixed phosphorus. Substances of that structure were first discovered at the beginning of the 20^{th} century, though their pesticide activity was found out later. The chemical class OP is further subdivided into the particular subclasses according to the chemical structure: organophosphates, organothiophosphates, phosphonates, phosphonothioates, phosphonothiophosphates, phosphoroamidates, phosphoroamidothioates or phosphorodiamides. The OP chemical class is to be found among acaricides, fungicides, herbicides, insecticides, nematicides and rodenticides.

The OPs belong among the most toxic pesticides at all. They inhibit irreversibly acetylcholinesterase (AChE), the enzyme responsible for acetylcholine degradation. In virtue of its cumulation, there use to appear the symptoms of emergent intoxication. The chronic intoxication can occur once after several years past the exposure and they are most often the consequence of various biological effects of OPs, such as mutagenity, teratogenity, hormondisruptive or neurodegenerative effects.

Anyone who gets in touch with pesticides should be informed on the possible intoxication symptoms. Only the early intoxication recognition can safeguard the immediate help. The time plays a key role in the cases of OP-caused intoxication, because if there occures a process of fadeaway (ageing) of the inactivated AChE, there is no chance then to reactivate it. The intoxication therapy includes basic steps from the first aid, from the possible medicaments, intestinal adsorbents, anticholinergic substance-atropin and AChE reactivators (oximes) are usually served. The key factor of a successful OP-intoxication treatment is the interruption of exposure. The condition of

a intoxicated person is to be observed and checked till the transferring of the person under the medical care.

During dealing with pesticides, it is necessary to use thoroughly protective utilities, follow the safety rules presented on a label of a preparation, keep pesticides in an original container, keep them out of reach of children, and so on. Only in this way, it is possible to prevent a possible intoxication. People, however, do not follow these safety instructions and every year, there happen to appear thousands of cases of those who get intoxicated all over the world. The most endangered groups are small children and farmers from developing countries.

The OP use should be liable to strict safety measures, such substances should not be available to laic public, they should be applied by skilled professional expert. Only in this way the public health protection can be safeguarded and environment damages can be prevented. Today, only 38 pesticide preparations containing an active substance of an organophosphorous type are registered in Czech republic. In the preparations, though, there occur 11 OPs only.