



Effects of Pesticide Toxicity on Animal Health and Ecosystems; The Importance of Using Safe Pesticides.

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Pesticides are heterogeneous and large amounts of chemical groups used to control and remove pests. Pesticides used in pest control have always been a source of concern for human life [1,2]. Pesticides used in different fields, pesticides are used in order to eliminate agricultural pests to produce agricultural products and to obtain a clean food source, and to control infectious diseases such as malaria and a significant amount of pesticides [3,4]. Human are exposed to pesticides in various ways. Food production of plant and animal origin, and through this production air and water contaminated pesticides reach ecologically. The circulation and accumulation of pesticides in the food chain leads to the formation of high amounts of pesticide residues. Since pesticides are formed as toxic chemicals for living organisms, their toxicity to human, non-target organisms and the environment can be determined by oxidative stress mechanisms [5-8]. Pesticides have greatly benefited human life by increasing the yields of agricultural products. The wide variety of pesticides leads to intensive use. Therefore, both pesticide applications and accumulation in the food chain constitute human health occupational and environmental risks. Exposure to pesticides can cause permanent health problems for human health. nerve, endocrine, immune, reproductive, renal, cardiovascular and respiratory systems and human health. Thus, exposure of the pesticide has been found to be linked to the development of human chronic diseases such as parkinson, alzheimer, cancer types, multiple sclerosis (MS), diabetes, aging, cardiovascular and kidney disease [9-11]. Living systems encounter various stresses during their continuous interactions with their environment such as feeding and breathing. Stress is induced as a result of metabolic-induced chemical processes induced by metabolic activities that occur as a necessity of life. It activates the production of endogenous reactive oxygen species (ROS) produced as by-products of respiration in living organisms [12]. The formation of ROS provides an equilibrium by providing biotransformation in living organisms with antioxidant system mechanism. Oxidative stress occurs with

overproduction of ROS and insufficient antioxidant system. Oxidative/antioxidative imbalance results in damage to macromolecules such as DNA, protein and lipids. Thus, constant exposure to stressors such as pesticides can cause oxidative stress and antioxidant system mechanisms are maintained against cellular ROS, and the increase in damage of macromolecules with oxidative damage can be minimized by repair systems [13]. The most active varieties of the ROS family are in the biochemical process; superoxide radicals (O_2^-), hydroxyl radicals (OH) and hydrogen peroxides (H_2O_2) cause damage to the functional structures of lipid, protein and nucleic acid structures in the cell. Antioxidant system as the first step enzymes CAT (catalase) and SOD (superoxide dismutase) are considered. With the formation of superoxide radicals, SOD enzyme is converted to H_2O_2 by biotransformation and H_2O_2 is detoxified by CAT in the cell [14]. Peroxidation of lipids disturbs the integrity of cell membranes and leads to rearrangement of membrane structure. Glutathione peroxidase (GPx) is a protective antioxidant that acts along with catalase (CAT) in scavaging out hydrogen peroxide to ensure optimum protection against oxidative stress and tissue specific damage. Glutathione reductase (GR) catalyzes the reduction of glutathione disulfide (GSSG) to the sulfhydryl form glutathione (GSH), which is a critical molecule in resisting oxidative stress and maintaining the reducing environment of the cell [4].

Evaluation of oxidative stress induction in organisms exposed to pesticides are important parameters for determination of toxic effects of pesticides. That pesticides can reach the ecosystem; Further studies are needed to clarify the oxidative mechanisms of their impact on aquatic life, water quality and human health. Given the health and environmental toxic effects, the use of pesticides should be limited with a new plan in agriculture. This new plan can be replaced without compromising the reasons for the effective use of pesticide applications and may result in health, environmental and economic benefits [15,16]. In pesticide applications it is important

not to exceed the legally determined safe levels. Consequently, the “safe level” impacts on the environment and human health are important [17].

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