

Effect of Lambda-cyhalothrin (LCT) and toxicity on human with preventive measure

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Abstract:

The Lambda-cyhalothrin (LCT), a synthetic pyrethroid insecticide used in agriculture as well as on application of public health. LCT is moderately persistent, low water solubility and has high affinity to organic matter. The effect of Lambda-cyhalothrin or ICON as a moderate insecticide in prevention of activities of insects or insect in agriculture (crop), due to the use through different food stuffs (plant or animal product) enter into human body or blood via digestive system. Bioaccumulation of the drugs in different organs of human body is noted that cause of toxicity in tissues of liver, brain and reproductive organs, that was invented through different laboratory works or application of drugs in albino rat or mice. The ginger and ascorbic acid (vitamin-C) is a strong antioxidant prevent aging, tissue building and repair, produced naturally in every cells specially hepatic cells of human and also present in fruits, vegetables, meats. The glutathione treatment may be preventive in toxic effect or harmful of lambda-cyhalothrin in human. The curcumin (CMN) is another important antioxidant against LCT .

Key Words: Lambda-cyhalothrin(LCT), Toxicity in human organs, Glutathione.

INTRODUCTION:

The pesticides are used to control or prevention the harmful effects in agriculture. The different types of pesticides are used in agriculture as herbicide, insecticides, termiticides, nematicides, molluscicide, piscicide, avicide, rodenticide, bactericide, antimicrobial, fungicide, insect repellent, animal repellent. The pyrethroid insecticides as a synthetic pesticide which has toxic effect in nervous system of human. The synthetic pyrethroid are more than 30 % of insecticides which has agricultural, domestic and veterinary utilization (1). The molecular formula of LCT is $C_{23}H_{19}ClF_3NO_3$ and molecular weight 449.9, low water solubility, 0.005mg/L. The biodegradation rate of lambda-cyhalothrin is moderate, half-lives 12 – 72 days in aerobic and anaerobic condition (2). The pesticides are used in agriculture for human welfare, has a neurotoxicity in human. The neuromuscular system is the main target organ of the drug that can cause of paralysis or death (3). The lambda-cyhalothrin can cause of tremendous secretion of neurotransmitters (NTs) like gamma amino butaric acid or GABA

or noradrenaline that affects activity of hormone as well as the reproductive function is disrupted. The ICON can cause of enlargement of thyroid glands that provides glucocorticoid level then sexual behavior is impaired (4). In skin irritation studies, lambda cyhalothrin caused no skin irritation in rabbits but guinea pigs exposed to the ICON shows signs of skin sensitivity (5). The lambda-cyhalothrin diffused through placenta and has been found it accumulated in cytoplasm that accelerates oxidatative damage. The liver cells are more affected throughing releasing of enzymes ALT and AST into blood stream. The curcumin (CMN) is effective in preventive measure of DNA damage by oxidative stress of Lambda cyhalothrin (6). Liver is a target organ and primary site of detoxification and is generally the major site of intense metabolism and is therefore prone to various disorders as a consequence of exposure to the toxins of extrinsic as well as intrinsic forms. Liver is also site of biotransformation by which toxic compound has been transform in less harmful form to reduce toxicity but lambda-cyhalothrin cal induce hepatotoxicity. The main target of lambda-cyhalothrin is neuromuscular junction which transfer neural signal that cause of muscular contraction as well as movement of part of body is possible. The LCT can cause of neurotoxicity in species like rats, mice, dogs through oral, dermal and inhalation drug treatment (7). The WBC count increased in the treatment of lambda-cyhalothrin that provides information about activation of defence and immune system in albino mice. The result of MCH and MCHC level decreased in blood that indicates anemia is formed in the LCT treated albino mice (8). The lambda-cyhalothrin induced cancer in human, there is no information available till now.

HEALTH HAZARDS OF ICON:

Generally, the results of LCT treatment in different animals can be investigated, but direct record of the drug treatment in human are not found. The indirect report through different animals like mice, albino rats, dogs, etc are found. The health hazards of lambda –cyhalothrin can be find out in human being is performed by finding out the treatment of the drugs in others mammals. Hazards as well as toxicity of lambda-cyhalothrin in animals dependants with route of exposure, and amount of drug applied, when it inhaled the rate of toxicity is less than intake orally, that was investigated in mice and albino rats. The moderate toxicity, irritant of skin for rats but mild effects in rabbits (5). The experimental report shows that the ICON or lambda-cyhalothrin can cause of irritation of skin, nose, throat, etc., the other changes or effects are dizziness, headache, nausea, lack of appetite, fatigue, coma, etc noted in human (9). The activity of GI tract may be hampered and may noted vomiting, diarrhea, abdominal pain. The liver cells are damaged proved by treatment of LCT, the result shows that the level of ALT and AST is more into blood stream (10). The cause of lambda-cyhalothrin may be chronic obstructive pulmonary disease (CPOD). The sperm motility or activity can moderately reduced by lambda-cyhalothrin treatment in fish (11).

HOW ACTING LAMBDA-CYHALOTHRIN:

The lambda cyhalothrin can major cause of neurotoxic and hepatotoxic effect. The neuromuscular junction is functional by release of neurotransmitters like Ach, GABA, etc that cause of signal propagation through neurons, muscles then muscle contraction, release of hormones, enzymes through target organ is possible. The lambda-cyhalothrin can cause of increase spontaneous release of the neurotransmitter, GABA, noradrenaline (NE) that result the functional activity of hormne is hampered (12). The GABA is a inhibitory neurotransmitter, chemical massenger that is endogenous agonist that promotes chloride influx producing hyperpolarisation increasing intracellular chloride

concentration. As the ICON disrupt the hormonal activity so it was suggested that it can cause of disruption of reproductive system.

The lambda-cyhalothrin can cause of hepatotoxicity. As the liver is the main biotransformation site so different chemical are accumulated in plasma membrane or biological membrane that cause of oxidative stress as well as oxidative damage by changing antioxidative system of body in mammals (12). The LCT or ICON indirectly can generate the free radicals such as superoxide radicals, hydroxyl radicals that disrupt antioxidation system as a result can change damage of proteins, lipids, and DNA through exposure of the LCT (6).

PROTECTIVE AGENTS:

The ascorbic acid or vitamin – C has an important ameliorative effect that can prevent the harmful effect of lambda-cyhalothrin in rats. The ascorbic acid can cause of increased level of lactate dehydrogenase (LDH) in plasma and hepatic cells through prevention of hepatotoxicity with treatment of The drug in rats (13). Glutathion (GHS), a tripeptide, an antioxidant that can able to prevent cellular damage by free radicals, produced by oxidative stress due to exposure of lambda-cyhalothrin. The ginger is important traditional plant used as folk medicine, can prevent thyroid toxicity caused by the treatment of lambda-cyhalothrin in rats (14). The preventive or ameliorative effect of pomegranate with treatment of lambda-cyhalothrin pyrethroid drugs can be found in hepatic, brain, kidney cells of albino rats (15).

CONCLUSION:

The pesticides are applied to control different insects in agriculture for more production of vegetables that has effective role in human population, but due to eaten of the foods or vegetables, the drugs are enter into blood circulation, may accelerates toxic or harmful effects in different organs such as liver, kidney, brain and reproductive organs in human. As the lambda-cyhalothrin moderately persistent, soil half-life average 30days, so it is more potent toxic, For the prevention of the toxic effect of lambda-cyhalothrin, use of the drug in agriculture must be avoided. The food particles containing vitamin-C, E must be advised to take through diet.

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