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PS-034. Anticoagulant rodenticides' effects on human health

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Anticoagulant rodenticides are the most commonly used pesticides to control harmful rodent populations. The process of controlling rodent populations is imperative to human health but poses challenges when the rodenticide compounds used are also toxic to humans and domestic animals. Anticoagulant rodenticides are classifield as 1st and 2nd generation by the World Health Organization examples. of 1st generation anti-coagülant are warfarin, coumachl and coumatetralyl. Anticoagulant rodenticides came into use in the 1940s with the use of warfarin. By the late 1950s, resistance to some of these first-generation anticoagulants had arisen. This led to a search for alternative compounds that could continue to produce effective rodent control. They were collectively termed the "second-generation" compounds and included difenacoum, bromadiolone and flocoumafen 4-hydroxycoumarins, and the indanedione derivatives chlorophacinone and diphacinone. These second-generation rodenticides have a prolonged efficacy because of their strong binding to target enzymes that are highly lipophilic proteins. The mechanism of anticoagulant rodenticides' toxic effect consists in inhibition of vitamin K1 reductase in liver microsomes, thus interrupting the cell turnover of vitamin K1. Consequently, the liver stores of active vitamin K1 are depleted and the synthesis of coagulation factors involved in extrinsic and intrinsic coagulation cascade pathways stops. Most cases of anticoagulant rodenticide exposure involve young children and, as a consequence the amounts ingested are almost invariably small. In contrast, intentional ingestion of large quantities of long-acting anticoagulant rodenticides may cause anticoagulation for several weeks or months. Substantial ingestion produces epistaxis, gingival bleeding, widespread bruising, haematomas, haematuria with flank pain, menorrhagia, gastrointestinal bleeding, rectal bleeding and haemorrhage into any internal organ; anaemia may result. Severe blood loss may result in hypovolaemic shock, coma and death. The ideal rodenticide is highly toxic to rodents in small amounts but relatively nontoxic in small quantities to non-target species.

Keywords: Anticoagulant, Health, Rodenticides