

Insecticide residues cross-contaminations from storage facilities and handling equipment to oilseeds during storage

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Residues of organophosphate insecticides (pirimiphos-methyl, malathion, dichlorvos before ban) used for insect control in empty storage facilities or for cereal grain treatment are occasionally found in oilseeds and crude oils. Even if recent studies showed that pests may be found in stored oilseeds, the use of such insecticides on stored oilseeds is not allowed by the French regulation. These residues arise from oilseeds contamination during the mechanical contact with storage structures (e.g. grain bin walls) and grain handling equipment. This uptake of insecticide residues by oilseeds from their storage environment can lead to concentration levels that can sometimes exceed regulatory limits. A two-year investigation was carried out within grain storage companies (11 and 13 respectively) in order to trace the fate of sunflower and rapeseed batches (27 and 22), from their unloading in a silo up to the downloading operation. Standard samples were taken from each surveyed seed batch during the bin outloading and were further analysed by a reference method, for insecticide residue content. Traceability of sunflower and rapeseed batches carried out by the storekeepers allowed us to identify the reasons of observed cross-contamination cases. For sunflower, the most frequently found active substances were: dichlorvos, pirimiphos-methyl and malathion (and chlorpyrifos-methyl in a single case). For rapeseed, it was: pirimiphos-methyl, malathion, chlorpyrifos-methyl (and deltamethrin in a single case). Although, pirimiphos-methyl residues were detected in a large number of cases, most cases of overcoming regulatory levels were observed with dichlorvos and malathion residues for sunflower in 2006-2007. In rapeseed during 2007-2008, the mostly detected substance was pirimiphos-methyl and caused most cases of non-accordance with regulatory levels. Thus, the main cross-contamination hazard of sunflower seeds was observed when the outloading of a sunflower seed batch was carried out immediately after the outloading of a cereal bin that was treated during outloading handling operation, and especially when cereal insecticide treatments are frequent at that store. Main cross-contamination hazard for rapeseed resulted from treatment of cereals at their receipt during the same period than rapeseed receipt, especially when these cereals treatments were frequent on that silo.