Terbuthylazine and other triazines in Italian water resources

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ABSTRACT

The concern on the presence of pesticides in Italian water resources historically broke out around 1980 after severe episodes of ambient, raw water and drinking water contamination due to some herbicides, atrazine (ATR), its metabolites desethylatrazine (DEA) and deisopropylatrazine (DIA), simazine, cyanazine, bentazone, molinate, which affected mainly the maize, grain and rice producing environments and on human health since the early 1960s. Serious consequences as the suppression of biodiversity in terrestrial and aquatic ecosystems with the aim to cause adverse effects on harmful animals, insects, plants, weeds, bacteria, fungi in order to limit their spread on soil surface, in air, into deep soil, on various sections of plants (fruits, leaves, stems, roots, seeds), on livestock, on lentic water surfaces, on aquatic vegetation and pools. Besides the undeniable advantages which occurred with the adoption of pesticides in terms of high yields in intensive farming, increasing of food production, evolution of agronomic techniques and quality improvement of foodstuffs, heavy drawbacks have been observed and documented on soil and aquatic environments and on human health since the early 1960s. Serious contamination episodes affected non-target animals and plants with important consequences as the suppression of biodiversity in terrestrial

1. Introduction

Pesticides represent a wide category of inorganic (e.g. sulfur, calcium and barium polysulphides, copper sulfate and hydroxide, copper oxychloride) and organic chemicals (e.g. chlorsulfuron, organophosphates, pyrethroids, methylcarbamates, chloracetanilides, chlorotriazines, phenoxy carboxylic acids, phenylureas, thiocarbamates, triazoles, phenylamides etc.) which are intentionally applied in agricultural ecosystems with the aim to cause adverse effects on harmful animals, insects, plants, weeds, bacteria, fungi in order to limit their diffusion and inhibit their growth and survival. Pesticides are mainly used in agriculture, horticulture, vineyards, orchards, forestry, industry, public hygiene, gardening and domestic activities. They are generally spread on soil surface, in air, into deep soil, on various sections of plants (fruits, leaves, stems, roots, seeds), on livestock, on lentic water surfaces, on aquatic vegetation and pools. Besides the undeniable advantages which occurred with the adoption of pesticides in terms of high yields in intensive farming, increasing of food production, evolution of agronomic techniques and quality improvement of foodstuffs, heavy drawbacks have been observed and documented on soil and aquatic environments and on human health since the early 1960s. Serious contamination episodes affected non-target animals and plants with important consequences as the suppression of biodiversity in terrestrial