

Working Group 3 Improving nutritional quality and safety of food crops
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Managing strategies for organochlorine contaminated soils for a safe food production

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Background: Organochlorine pesticides such as dieldrin, DDT and others are highly persistent pesticides, which were applied world wide against pests in horticulture, fruit and arable crops. Although they are forbidden since more than thirty years in the European Union (EU), the compounds remain still in soil. Several crops are known to accumulate these pesticides in eatable parts up to critical levels. For instance dieldrin is detected in high economic value crops such as cucumbers (*Cucurbitaceae*) and in tomatoes (*Solanaceae*). Besides plant type and climatic conditions, soil properties, e.g. pH and soil organic carbon content influence the pesticide uptake. In particular in labelled food and feed stuff production, such as organic farming according to EU Regulation (EEC) No. 2092/91, consumer expectations in safe, high quality food are extremely high. Since organic farming is prospering – more than 10% of vegetable production is certified organic in Switzerland – the organochlorine residues in organic food stuff have become a major issue for food control authorities. Enquires showed that imported food from EU countries was partly highly contaminated with organochlorine pesticides such as pumpkin seed and oil. Hence, the organochlorine problem in food stuff is expected to occur EU wide.

Prestudy: Facing this problem we performed a case study and analysed the organochlorine content of 15 fields and their grown fruits from the most important Swiss organic cucumber growers. Two out of these 15 field soils revealed dieldrin contents leading to surpassing of the tolerance level. The Swiss organic label organisation has the option in their standard now to exclude polluted soils for productions of highly accumulating vegetables.

Objectives: In the frame of a just starting project we aim to develop sustainable production techniques, which are economically and ecologically sound and guarantee a high quality product. The first strategy consists of manipulating the soil properties by the addition of organic matter to the soil as a binding agent for the organochlorine pesticides in form of compost or brown coal products (charcoal). The second strategy aims at selecting plant varieties which exclude the uptake of organochlorine pesticides. Since tomatoes and cucumbers are very often cultivated by grafted plants, where a robust and vital root stock is occluded by a desired variety, we will select for excluder root stocks. For cucumbers, root stocks from the groups of *Cucurbita moschata* x *C. maxima*, *Sicyos angulatus* and *Cucurbit ficifolia* are currently in use, but we will test further ones. In the third approach we will test bacteria strains which will degrade the organochlorine pesticides in the soil. We will use strains which are already pre-screened under laboratory conditions, but not yet tested under near farm conditions. These three strategies will be tested in the greenhouse in pot experiments with contaminated field derived soils. The most promising treatments will then be applied in plane field *in situ*.

References

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