

## ANAEROBIC SOIL DISINFESTATION (ASD): ADVANTAGES AND DISADVANTAGES



This factsheet contains complementary information to the Best4Soil video on Anaerobic Soil Disinfestation (ASD): Advantages and disadvantages

**Anaerobic soil disinfestation (ASD) is an alternative for chemical soil treatments (fig. 1). The method is described in details in the Best4Soil factsheet “Anaerobic soil disinfestation (ASD): Practical information”.**



Fig. 1: Anaerobic Soil Disinfestation in a glance (from top to bottom):  
Incorporation fresh organic matter  
Closing the surface  
Wetting the soil  
Covering with virtually impermeable film (VIF)

Anaerobic soil disinfestation reduces a wide range of important soil borne diseases, pests and weeds (table 1).

Table 1. Effectivity of ASD against diseases, pests and weeds (source: Wageningen University & Research, Field Crops, Lelystad). Effectivity: - none, + reasonable, ++ good, +++ very good.

PROBLEM ORGANISM	EFFECTIVITY ASD
<b>Fungi</b>	
<i>Fusarium oxysporum</i>	++
<i>Phytophthora fragariae</i>	+
<i>Pythium</i>	++
<i>Rhizoctonia solani</i> AG3	+++
<i>Rhizoctonia tuliparum</i>	+++
<i>Rhizoctonia solani</i> AG2	-
<i>Sclerotinia sclerotiorum</i>	+++
<i>Synchytrium endobioticum</i>	+
<i>Stromatinia</i>	+
<i>Verticillium dahliae</i> <sup>1</sup>	+++
<b>Bacteria</b>	
<i>Ralstonia solanacearum</i>	++
<b>Fauna</b>	
<i>Pseudocentipedes (Symphyla)</i>	+++
<b>Remainings from previous crop</b>	
Volunteer potato seedlings	++
<b>Nematodes</b>	
<i>Ditylenchus dipsaci</i> <sup>1</sup>	+++
<i>Globodera pallida</i>	++

<sup>1</sup>These species are well controlled on light soils but less easy on heavy soils

PROBLEM ORGANISM	EFFECTIVITY ASD
<b>Nematodes</b>	
<i>Meloidogyne fallax</i>	+++
<i>Meloidogyne chitwoodi</i>	+++
<i>Meloidogyne incognita</i>	+++
<i>Pratylenchus penetrans</i>	+++
<i>Pratylenchus fallax</i>	+++
<i>Trichodoridae</i>	+
<b>Weeds</b>	
root-spreading weeds in general (depending on species)	++
<i>Cyperus esculentus</i>	+++
<i>Cirsium arvense</i>	++
<i>Convolvulus arvensis</i>	++
<i>Tussilago farfara</i>	++
<i>Elytrigia repens</i>	++
<i>Persicaria amphibia</i>	-
<i>Sonchus oleraceus</i>	++
<i>Sonchus arvensis</i>	++
<i>Fallopia convolvulus</i>	++
seed-spreading weeds in general (depending on species)	-
<i>Echinochloa crus-galli</i>	-
<i>Poa annua</i>	-
<i>Stellaria media</i>	+++

hours after removing the VIF. Unfortunately, earthworms, springtails and some antagonists are known to be killed by ASD. Disappearance or removal of benign organisms could diminish soil resilience against certain diseases; e.g. resilience against *Fusarium* is known to be unchanged, while the resilience against *Pythium* is temporarily reduced as a consequence of ASD. Therefore the advice is not to grow crops sensitive to *Pythium* in the first season after ASD. Except for *Pythium* no negative experiences have been reported. In the video Anaerobic Soil Disinfestation: advantages & disadvantages [link] you can learn more about the advantages versus disadvantages of ASD.

## CONCLUSION

Although it is an expensive method ASD is a promising and currently feasible for high value crops. Have a look at our videos [link] "Anaerobic Soil Disinfestation: practical information" and "Anaerobic Soil Disinfestation: advantages and disadvantages" for practical insights.

## COSTS

Direct costs are the purchase and application of the plastic material (depending on the location approx. 4000 €/ha). Since ASD should be applied at temperatures above 16°C a limited number of summer crops can be grown in the temperate zone. Additional costs are irrigation, incorporation of the material, management during the application period (preventing damage of the sheet) and removing the plastic. Although its feasibility depends on local circumstances and the value of the main crop, in several field experiments benefits were found to be higher than the costs.

## ADDITIONAL EFFECTS

The biological processes bring positive and negative additional effects such as nutrients from the degraded material but also a risk on phytotoxicity. By postponing sowing/planting for one week after retrieval of the plastic minimises this risk. ASD is not sterilizing the soil, such as steaming. Many beneficial organisms will survive ASD and will recover within days and some of them even in

