

Information sheet 1.05

Cleaning, disinfection and disinfestation (sanitation) of facilities, tools and machinery

This information sheet is a supporting document to Appendix A ('Standardised checklist of risk reduction options') of the Guidance of the EFSA Plant Health Panel on quantitative pest risk assessment

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A. Description of the RRO

Various methods may be used in order to clean, disinfect or disinfest (sanitation) workers' hands and clothes, tools, machinery, transport means, facilities and other accessories (e.g., boxes, pots, palettes, palox, supports, hand tools) used to grow, harvest, store, or process plants or plant parts (including germplasm other than seeds, plantlets for planting, seeds for seedling, plants at the production site, plant material for food or feed, cut flowers, wood and wood packaging material). By way of example, routine hygiene measures in potato production are described in the EPPO standard PM 10/1 (1). The requirement of sanitation and hygiene practices for pest management programmes is included in ISPM 36 on integrated measures for plants for planting.

The methods implemented, based on physical or chemical principles, are aimed at removing pests themselves or dirt (i.e. plant debris, dust, mud, soil or growing media residues) that may contain pests, disinfect surfaces that may be contaminated by contact transmissible pathogenic agents. They lead to a reduction of pest populations that could be moved from infested lots to non-infested lots. Disinfestation of soil and growing media is described in information sheet 1.06.

Basically, cleaning can be achieved through sweeping (i.e. hand sweeping, with machines), washing (normal or high pressure), bathing, dipping with or without addition of chemicals (i.e. chlorine, detergents, biocides), at room or higher temperatures, or by other methods as fumigation / vapours of biocides. Hereafter, all methods based on contact with water (i.e. action of water at various temperatures, pressures, time of application, etc., with or without addition of chemical compounds) are named "washing", while methods based of physical removal of all kind of detritus (i.e., sieving, sweeping, brushing) are named "sweeping". Methods that imply application of biocides as a gas are merged as "fumigation". Disinfestation by heat treatment is described in information sheet 1.14.

B. Risk factors

Table 1. Points of application of measures

Points where measures may be effective	Cleaning, disinfection and disinfestation (sanitation) of facilities, tools and machinery				
	during growth at the place of production	while harvesting	Post-harvest	At import ¹	At place of destination
Washing	x	x	x	x	x
Sweeping	x	x	x	x	x
Fumigation	x	x	x	x	x

¹Only when facilities, tools or machinery used for handling and storing consignments can be a pathway.

C. Parameters to consider regarding effectiveness of the RROs

Table 2. Main parameters to take into consideration regarding the modulation of the effectiveness of the RROs.

Parameters to be considered as they may influence the effectiveness of RROs	RROs		
	washing	sweeping	fumigation
Parameters related to the method			
Temperature	x		x
pH	x		
Associated biocides or disinfectants	x	x	x
Duration of contact	x	x	x
Pressure	x		
Intensity of mechanical effects	x	x	
Parameters related to the practical implementation of the method			
Impact of temperature	x		x
Impact of humidity	x	x	x
Impact of level of dirtiness	x	x	x
Impact of duration of the treatment	x	x	x
Parameters related to the pest load on the consignment and to the localization of the pest			
Effect of the pest load on efficacy	x	x	
Effect of pest localization (surface, pipelines, crevices, etc.)	x	x	x
Level of dirtiness	x	x	x
Susceptibility of the pest (including length of survival on non-plant material)			
Parameters related to the re-colonisation of consignments post treatment			
Possibility of (re)colonisation by pest after the treatment	x	x	x
Other parameters			
Impact of dust and/or organic material on the survival of the pest, and the efficacy of the chemical treatments	x	x	x

D. Applicability / feasibility of the RRO

Cleaning, disinfection and disinfestation (sanitation) of equipment and facilities (including equipment, premises, storage areas) are good cultural and handling practices employed in the production and marketing of any commodity. In some cases, these practices can be easily applied with a little extra cost (i.e., disinfection of pruning saws and shears, hand washing), whereas in others it may be either technically or economically complicated (i.e., glasshouse disinfection should be applied between crop cycles when greenhouses are totally empty), or even completely contraindicated (i.e., use of water when moisture may favour fungal development). In the table below some of the main limitations for this RRO are listed.

Table 3. Potential limitations to the practical application of RROs.

Limits to be considered regarding applicability	RROs		
	washing	sweeping	fumigation
Regulatory limitations: availability of authorized pesticides (fumigants)			X
Pest susceptibility / accessibility	X	X	X
Impact on the material to be cleaned	X	X	X
Environmental limitations	X		X
Social or ethical aspects			X
Potential side effects	X		X
Economic considerations	X	X	X

E. Other RROs that may lead to similar effects

These RROs aim at preventing the transfer of pests from contaminated plants or lots of plant parts to non-contaminated ones mediated by machineries, facilities, tools, human contacts and so on.

Therefore, any RRO aimed at reducing the pest prevalence in the target commodity either (1) at origin, (2) during transport or (3) at destination may have similar effects.

When possible, dedicating tools (e.g. facilities, packaging, machinery, protective clothes) to plant material with known phytosanitary status, or resorting to single use clothes or packaging material, may limit the necessity to implement washing, sieving and sweeping.

F. Combinations of RROs that include this RRO

Most of the techniques that aim at cleaning or sanitising the environment of plants or plant products are part of good plant protection practice and may be included in systems approaches for pest risk management (ISPM 14) combined with other methods also reducing pest prevalence.

They can be part of RROs aimed at establishing a pest-free production site (PFPS).

G. Conclusion

Synoptic conclusion for the RROs.

Target	Area of application	Expected effect	Main technical limitations	RROs with similar effects / most often in combinations
Pest or vector	On facilities, tools and machinery at place of production	Reduction of the prevalence of the pest or its vector	Tolerance of material to be treated Availability authorized fumigants (for fumigation)	Most IPM measures targeting the pest or vector
	On facilities, tools and machinery at pre-harvest			These RROs can be used sequentially (i.e., sweeping and fumigation) and can be further combined with other physical or chemical methods (i.e., hot bathing in an insecticidal solution)
	On facilities, tools and machinery at post harvest			
	On facilities, tools and machinery at import			
	On facilities, tools and machinery at place of destination			

References

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- ISPM 14, 2002. The use of integrated measures in a systems approach for pest risk management. International Plant Protection Convention (IPPC), FAO, Rome.
- ISPM 36, 2012. Integrated measures for plants for planting. International Plant Protection Convention (IPPC), FAO, Rome.