Annex C Information sheet 1.05

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

*This information sheet is part of Annex C (Standardised checklist of risk reduction options) supporting document to the draft Guidance of the EFSA Plant Health Panel on quantitative pest risk assessment under public consultation (*[*http://www.efsa.europa.eu/en/consultations/call/180212-0*](http://www.efsa.europa.eu/en/consultations/call/180212-0)*)*

1. **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.

1. **Risk factors**

Table 1. Points of application of measures

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Cleaning, disinfection and disinfestation (sanitation) of facilities, tools and machinery | | | | |
| Points where measures may be effective | during growth at the place of production | while harvesting | Post-harvest | At import1 | 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.

1. **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 |

1. **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 |

1. **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.

1. **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).

1. **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**

EPPO (European and Mediterranean Plant Protection Organization), 2006. Disinfection procedures in potato production. EPPO/OEPP, PM 10/1 (1). Bulletin OEPP/EPPO Bulletin 36, 463–466.

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.