

Disinfection



Disinfection in Horticulture

Hygiene in all cropping systems



- » Disinfectant for horticulture with the required GBM approval
- » Kills bacteria, fungi, viruses and viroid
- » Also effective against resting spores
- » Stable solution
- » Long effectiveness
- » Measurable effectiveness
- » Harmless for materials
- » Neutral odour
- » Environmentally friendly
- » Long shelf life

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royal brinkman
global specialist in horticulture

Product characteristics



Product characteristics:

Active ingredient: benzoic acid (90 g/l)
Formulation: soluble concentrate
Mode of action: contact
Application method: (foam) spraying, pouring, dipping, brushing

Packaging units::

MENNO® florades are available in packs of 10, 200 and 1.000 litres.

Background information Benzoic acid:

Benzoic acid is a naturally occurring component in many fruits and vegetables. It is being used as a food additive to prevent the growth of yeasts, bacteria and fungi. (for example, in jam, beer, dessert sauce, fruit juice, peanut butter, syrup, mustard, mayonnaise etc.) Benzoic acid is also part of cosmetics and medicinal crèmes.

Hygiene management

Disinfection is becoming more and more important in every cropping system. Because less curative crop protection products are approved we must look at other means of keeping crops free of disease. Besides clean crops, food safety, certification and product liability also play an important role. MENNO® Florades is a multi-purposely usable product, as a result all aspects of a high-quality hygiene management program are covered.

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Application: effective disinfection of



With MENNO® florades effective disinfection can be carried out:

- » empty glasshouses and warehouses
- » plant containers
- » pots, trays, crates
- » concrete floors
- » plant nursery boxes
- » transport and harvest trolleys (incl. wheels)
- » machines
- » tools, knives
- » cultivation tables
- » gloves
- » shoes (hygiene stations & disinfection mats)
- » irrigation mats
- » irrigation systems (exterior)
- » Virus-free preparation of cuttings

Approval

MENNO® Florades is approved as a crop protection product and therefore the only disinfectant effective against all bacteria, fungi (incl. resting spores), viruses and viroid. The active ingredient is Benzoic acid.

Dosage

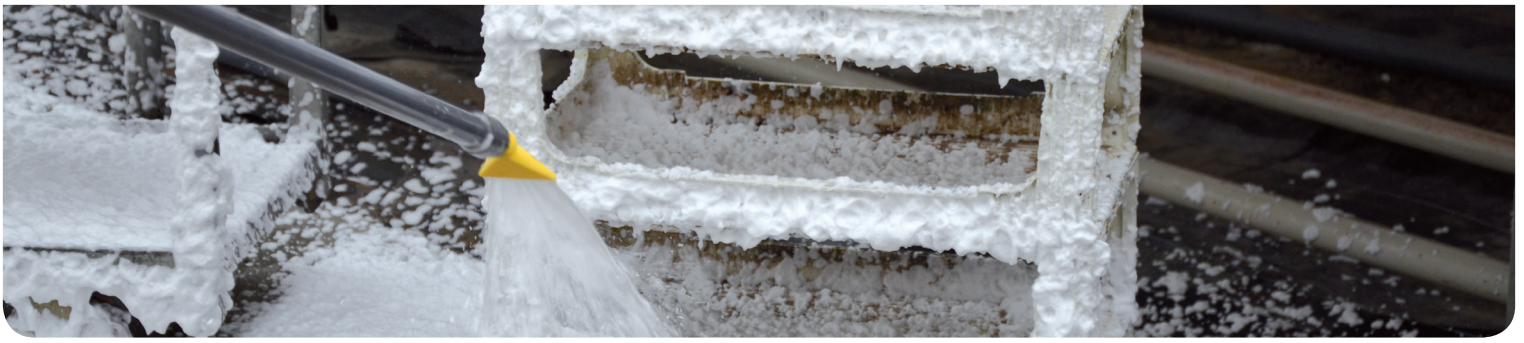
The effectiveness of a disinfectant is dependent on the dosage in combination with exposure time.

Assuming the surface is clean, a concentration of 2-4% is advised.

Exposure time

The dosage and exposure time are inextricably linked. The higher the concentration, the shorter the exposure time required. At a maximum concentration of 4% this is for the most persistent pathogens maximum one hour. Some fungi are already killed after a few minutes, but more time is needed for more persistent diseases. Because disinfection is not a selective, the goal must always be to kill all pathogens effectively. Therefore, we always recommend that you keep the contact time as long as possible. The longer the surface is wet, the better all organisms are killed. Especially the killing of





remaining traces and viruses takes a lot of time. Resting spores are the generative form of fungi and often very persistent. They can still lead to an outbreak of a disease after years. MENNO® florades offers the possibility of foaming. This to achieve a longer exposure time and gives a good visual check of which parts have been treated.

Stability

One of the most important properties of MENNO® florades is the stability of both the product and the solution. Unlike other disinfection products, benzoic acid is stable over a long period of time, which enables control of even the most resistant resting spores. This has been demonstrated in various research projects.

Amount of water

Water is a carrier, it enables the active ingredient to be in contact with the infectious agent. That's why it is recommended to always use a high-volume spray technique when applying disinfectant products.

An indication of the amount of water that should be used with different applications

cultivation tables (ebb-/flow)	: 0.2 L/m ²
cultivation tables with irrigation mats	: 2 L/m ²
glasshouse structures, machinery	: 0.6 - 0.8 L/m ²
empty greenhouses, glasshouses	: 1500-2000 L/ha

Measurable effectiveness

The effectiveness of the product can easily be measured based on the pH value of the solution. At a pH value between 3.0 - 4.5 the solution is active. This can easily be checked with pH indicator paper or a pH meter. The pH automatically reaches the correct level (depending on the water quality) when preparing the solution. If the pH value is higher than 4.5 when the

solution is reused several times, it can be lowered by adding MENNO® Florades. If the solution is soiled with large amounts of organic material, it is advisable to prepare a new solution.

Operator protection

Because the MENNO® Florades can be irritating to the eyes, always wear suitable protective clothing and face protection when applying the product.

Tank mixes

There is a wetting agent in the formulation of MENNO® Florades therefore additional wetter are not required. It is not recommended to mix the product with crop protection products or biocides. Adding other acids to acidify the working solution is not necessary since the proper pH will set automatically when preparing the MENNO® Florades solution.

General warning

After disinfection of the greenhouse with MENNO® florades, it must dry thoroughly before plants enter the greenhouse. To rule out any risks, after heating up the greenhouse, always ventilate it well just before planting out. This is especially important in cucumber crops. (see also advice on the label). Avoid direct contact with the crop.

Advice & information

Use crop protection products safely. Read the label and product information before use.

For further information, please contact your advisor or the helpdesk of Royal Brinkman.

Phone: +31 (0)174 - 44 61 00 or

E-mail: info@royalbrinkman.com



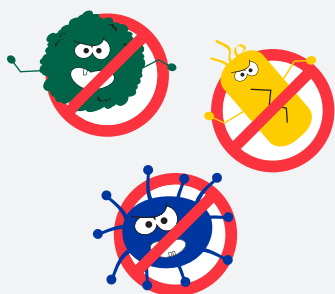
Research and MENNO® Florades

Effectiveness:

MENNO® Florades has proven its effect against most of the bacteria, fungi, viruses and viroids causing problems in horticulture in various research projects. In many cases fungi contain generative and vegetative spores. The vegetative spores are in general relatively easy to control. MENNO® Florades is

also able to inactivate the generative spores (resting spores) due to its stability resulting in a long exposure time. By the inactivation of viruses, the strength of MENNO® Florades is hidden in the fact that both viruses with and without an outer shield are controlled.

Bacteria	Fungi (incl. resting spores)	Viruses
Acidovorax avenae ssp. cattleyae ¹	Agaricus bisporus 9	Tobamovirus
Agrobacterium tumefaciens 1	Alternaria alternata 10	Cucumber green mottle virus CGMMV15
Clavibacter michiganensis ssp. Michiganensis 1	Alternaria solani 10	Odontoglossum Ringspot Virus ORSV5
Clavibacter michiganensis ssp. sepedonicus 1	Alternaria sp. 1	Pepper Mild Mottle Virus PMMV7
Enterococcus faecium 13	Aspergillus sp. ⁶	Tobacco Mosaic Virus TMV2
Erwinia amylovora 3/14	Botrytis cinerea 1	Bell Pepper Mosaic Virus BePMV7
Erwinia carotovora ssp. atroseptica 1	Candida albicans 13	Tomato Mosaic Virus ToMV
Erwinia carotovora ssp. carotovora 1/10	Cercospora beticola 10	Ribgrass Mosaic Virus RMV4
Escherichia coli 13	Chalara elegans 8	Carmovirus
Proteus mirabilis 13	Colletotrichum coccodes 10	Carnation Mottle Virus Car MoV4
Pseudomonas aeruginosa 13	Colletotrichum sp. 1	Melon Necrotic Spot Virus MNSV7
Pseudomonas lachrymans	Cylindrocladium scoparium 1	Pelargonium Flower-Break Virus PFBV2
Pseudomonas putida	Cylindrocladium spathiphylli 1	Pelargonium Leaf Curl Virus PLCV2
Pseudomonas solanacearum 1	Dactylium dendroides 1	Pelargonium Line Pattern Virus PLPV2
Pseudomonas syringae	Fusarium oxysporum f.sp. cyclaminis 1/12	Potyvirus
Ralstonia solanacearum 1	Fusarium oxysporum (stam Elatior Begonia) 1	Potato Virus Y PVY4
Staphylococcus aureus 13	Fusarium solani var. Coeruleum 1	Zucchini yellow Mosaic Virus ZymV7
Xanthomonas campestris pv. begoniae 1	Helminthosporium solani 1/10/11	Cymbidium Mosaic Virus CyMV5
Xanthomonas campestris pv. campestris 1	Mucor sp. 6	Pepino Mosaic Virus PepMV7
Xanthomonas campestris pv. pelargonii 1	Peronospora tabacina 8	Potexvirus
	Phytophthora cinnamomi 1	Potato Virus X PVX4
	Phytophthora cryptogea 1	Nepovirus
	Phytophthora infestans	Arabis Mosaic Virus ArMV2
	Pythium sp. 6	Tomato Black Ring Virus TBRV2
	Pythium ultimum 10	Cucumovirus
	Ramularia beticola 10	Cucumber Mosaic Virus CMV4
	Rhizoctonia solani 10	Tospovirus
	Rhizopus sp. 6	Tomato Spotted Wilt Virus TSWV2
	Thielaviopsis basicola 1	
	Trichoderma harzianum 9	Viroids
	Trichoderma viride 1	Potato Spindle Tuber Viroid PSTVd7
	Verticillium fungicola 1/9	Chrysanthemum Stunt Viroid CSVd 7



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