



PENBOTEC® 400 SC

The best to protect your fruit



JANSSEN PMP

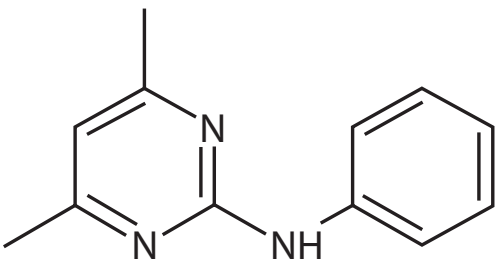
PRESERVATION AND MATERIAL PROTECTION
a division of Janssen Pharmaceutica NV



The Product

PENBOTEC® 400SC is based on the active ingredient pyrimethanil, an a.i. with a high level of efficacy on the key citrus pathogens and a reduced risk classification according to EPA criteria. The product offers both preventive and curative activity.

The product contains 400 g/l pyrimethanil and is formulated as a Suspension Concentrate (SC).



Application

PENBOTEC® 400SC is a very effective and versatile product, that can be applied through a variety of application methods such as dip, drench, and flooder applications as well as aqueous and wax line spray applications. Each of these application methods has its own level of treatment quality which will ultimately influence the effectiveness of the fungicide.

Whichever application method(s) is/are used, the treatment needs to be optimized to achieve an even coverage of the fruit surface with a sufficient residue for quality long-term storage and retail shelf-life.

	Rate in %	Rate (fl. Oz. / 100 gal)	Treatment time (min)	Concentration pyrimethanil (ppm)
Dip, wash tanks	0.25%	32	2	1,000
Drencher	0.125%	16	2 - 4	500
Aqueous line spray	0.50%	64	1	2,000
Wax line spray	0.50%	64	1	2,000

For optimal use of the product, it should be applied as soon as possible after harvest but ideally within 16 hours to best protect harvest wounds.

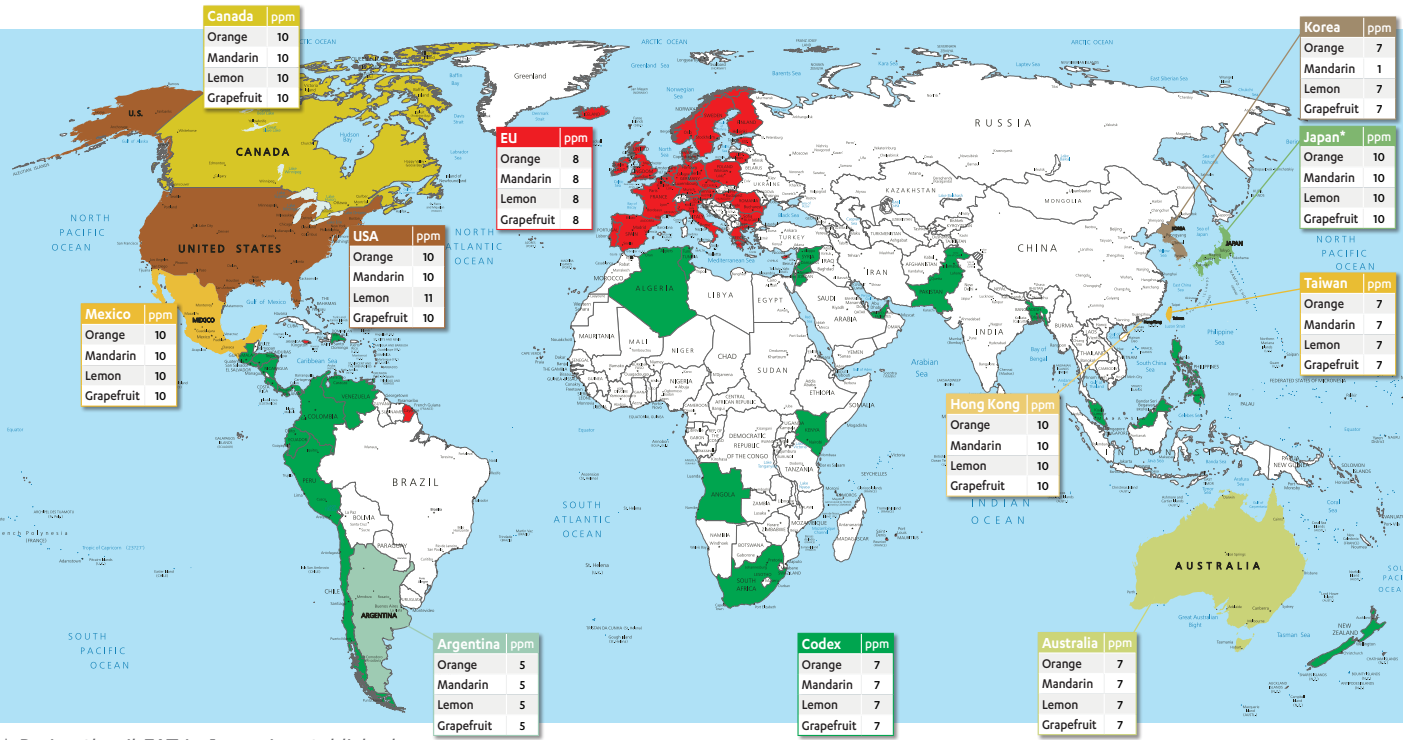
PENBOTEC is formulated as a suspension concentrate, with particles of active ingredient suspended or floating in the treatment solution. Therefore, continuous agitation/stirring is required to prevent settling and to maintain a homogeneous treatment solution necessary for achieving a uniform disposition of residues on the fruit. Other key factors influencing residues include treatment time and pH and temperature of the treating solution. For any questions you may have regarding the parameters influencing applications and residues, please contact a technical representative of your Service Company.

The use of PENBOTEC® cannot be advised in systems where also chlorine is in place.

Available MRLs in the world

Maximum Residue Levels (MRLs) are the upper legal levels for pesticide residues in or on food or feed based on good agricultural practices and to ensure the lowest possible consumer exposure.

Pyrimethanil MRLs are widely established internationally **level** as shown in the map below.



* Pyrimethanil FAT in Japan is established

Definitions:
FAT: Food Additive Tolerance
MRL: Maximum Residue Limit
List of CODEX Alimentarius members available on <http://www.codexalimentarius.org/>

EU	ppm
Orange	8
Mandarin	8
Lemon	8
Grapefruit	8

EU countries
EU-member states: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovak Republic, Spain, Sweden & United Kingdom.
+ Norway, Iceland and Liechtenstein.
+ French Pacific Islands, French West Indies, Jamaica, Netherland Antilles.
(It's, in this case, an extended list to be taken into account)

Codex	ppm
Orange	7
Mandarin	7
Lemon	7
Grapefruit	7

CODEX countries
Algeria, Angola, Bahamas, Bangladesh, Barbados, Chile, Columbia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Israel, Jordan, Kenya, Lebanon, Malaysia, New Zealand, Nicaragua, Pakistan, Panama, Peru, Philippines, Singapore, South Africa, Trinidad & Tobago, Tunisia, United Arab Emirates, Venezuela



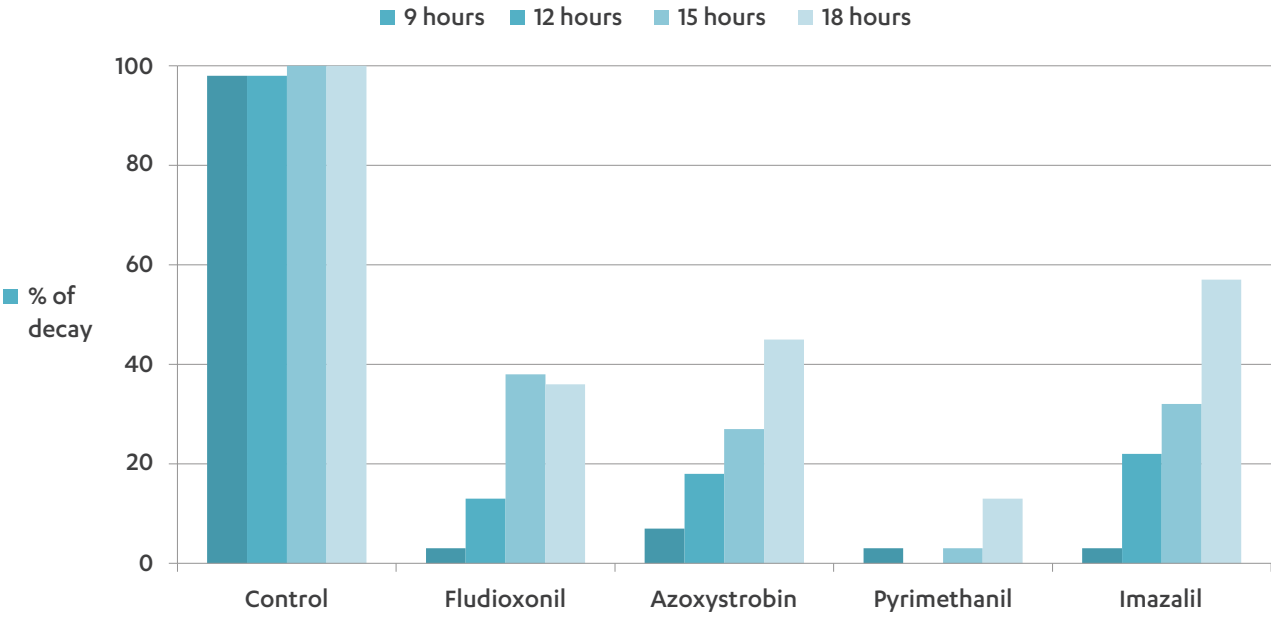
Efficacy of PENBOTEC® 400SC

Based on numerous studies from various research institutes and in practice in all citrus producing areas of the world, it can be concluded that PENBOTEC® 400SC does have some key strengths which make it extremely suitable for control of citrus postharvest diseases.

First, the active ingredient, pyrimethanil possesses strong curative activity and furthermore it has a long-lasting residual activity. Treating fruit with PENBOTEC® 400 SC also offers a treatment with an active ingredient which will hardly degrade over time. The consequence is an excellent protection of the treated fruit over long storage and transport periods, even preventing re-infections at handling after storage.

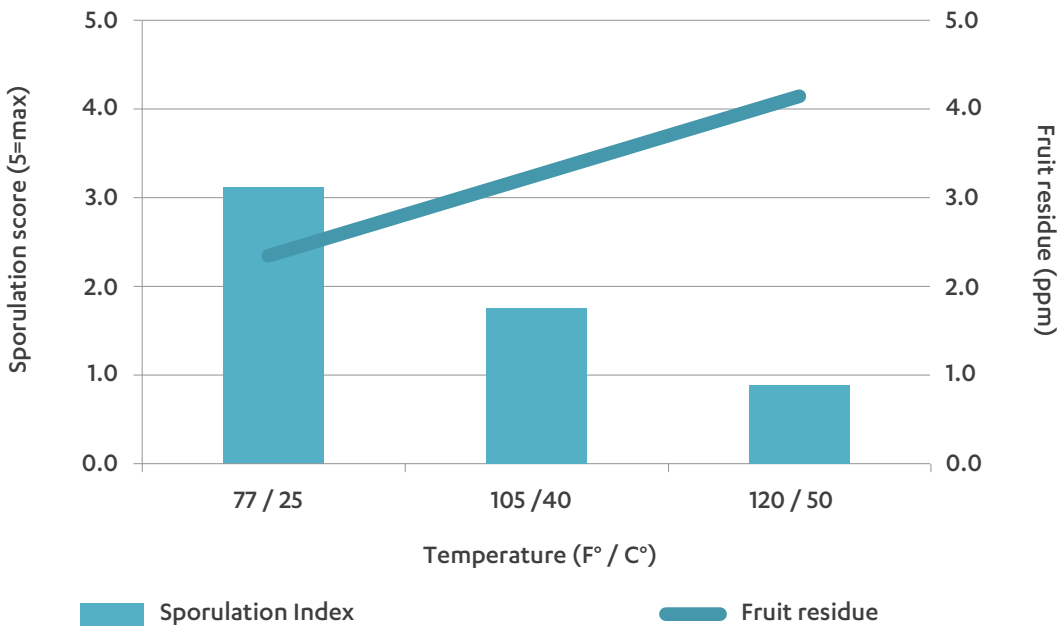
The kick-back activity of PENBOTEC 400 SC, provides some flexibility in the time between harvest and postharvest application. Because other products have less curative activity than PENBOTEC 400 SC, there is a shorter window for application between harvest and first treatment.

Efficacy on *Penicilium Digitatum* (Green Mold) of 4 active ingredients applied 9, 12, 15 and 18 hours after artificial inoculation

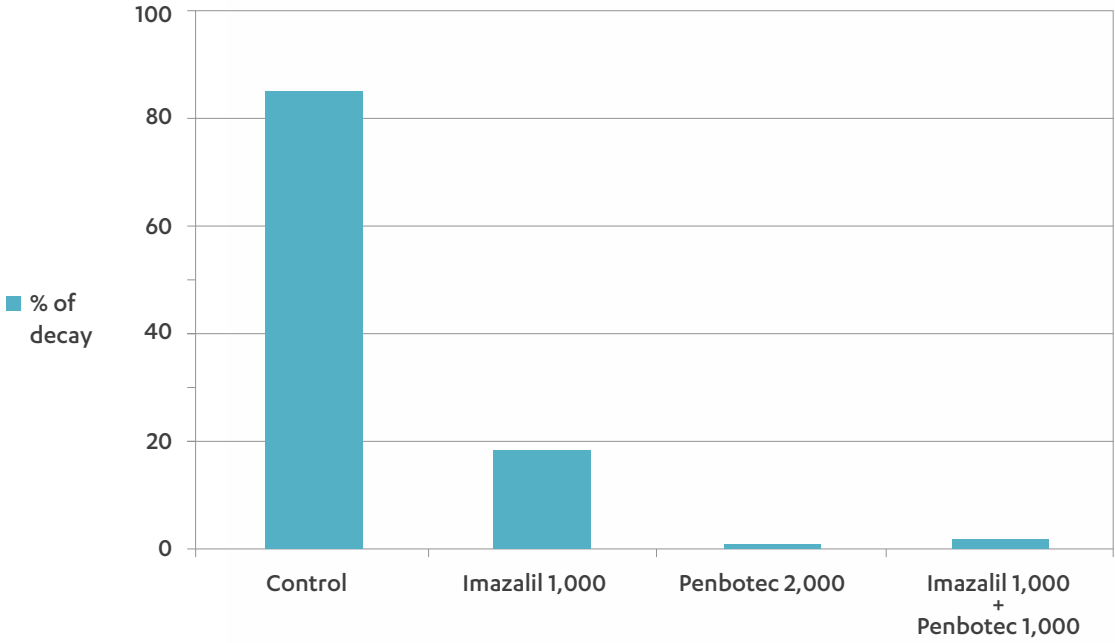


While PENBOTEC® contributes to sporulation control a sufficiently high residue is needed to obtain such activity. A level of 4 ppm is advised to get sporulation control activity of the same level as imazalil, still the industry standard for unsurpassed sporulation control on the market.

Control of Green Mold sporulation with PENBOTEC used at 500 pmm on lemons with different hot water treatments



Comparison of PENBOTEC with FUNGAFLOR (Imazalil) at different concentrations on *Penicilium Digitatum* (Green Mold)



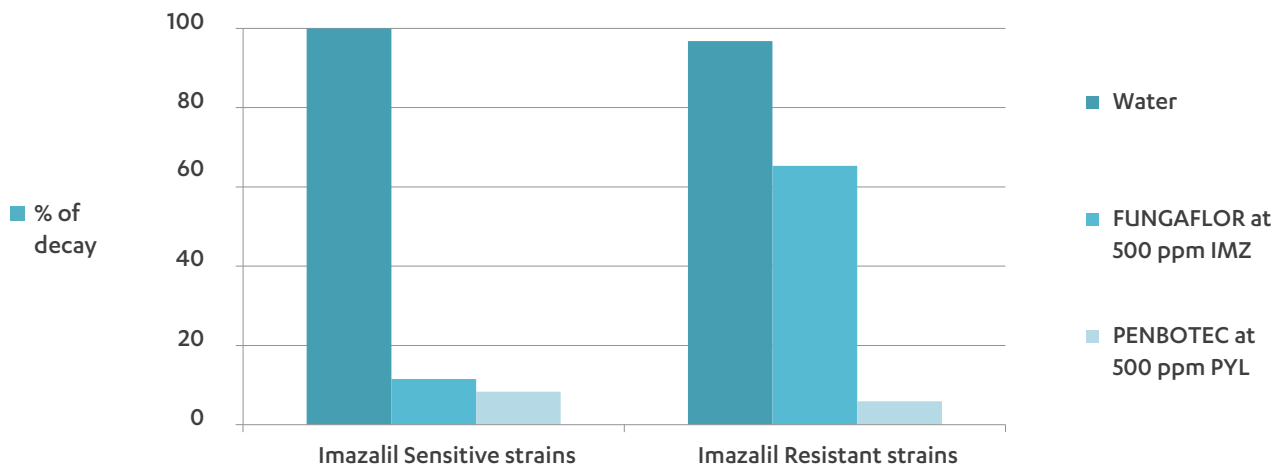
As citrus fruit is stored and/or transported over several weeks all over the world, a long lasting activity is a critical attribute for any good postharvest product in the citrus fruit segment. With ever increasing pressure on the few currently available postharvest fungicides, it is essential that proper management practices are utilized. Low residues and under dosing can hasten the development of resistance.



Anti-Resistance Strategy

PENBOTEC® is an excellent tool in an anti-resistance strategy as it offers a different mode of action compared to other active ingredients. In this way the product is an excellent measure in an alternation scheme which is one of the two anti-resistance management tools defined by FRAC (Fungicide Resistance Action Committee).

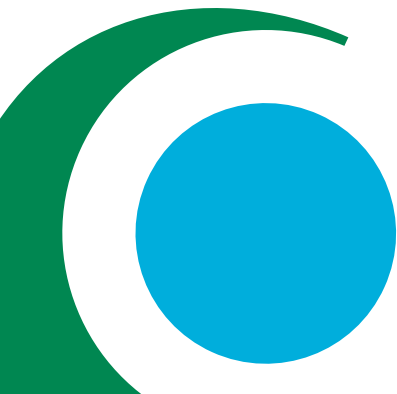
Efficacy of PENBOTEC 400 SC on Imazalil resistant strains



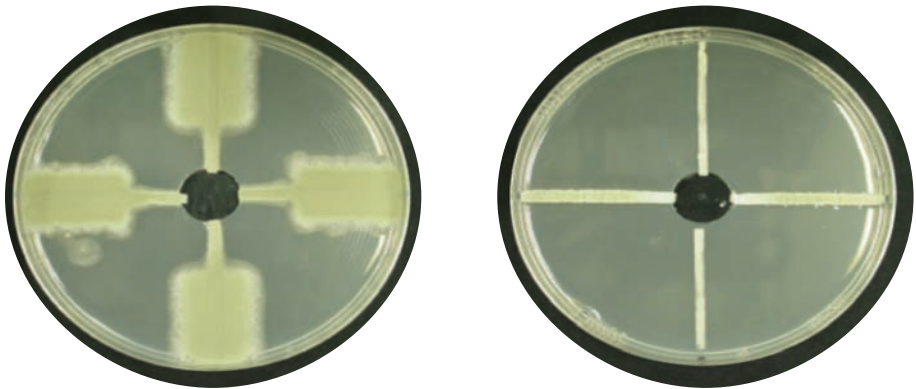
It is advised to use the product in a sustainable way to preserve it for the long term. Alternation alone will not preserve a product based on one active ingredient only for the longer term effective for longer. In a niche market like post harvest there are only a few actives available and these should be used in a sustainable way, keeping them effective for longer.

Combination and alternation strategies, as described by FRAC will delay or even prevent the development of resistance to the molecules and will result in the availability in the market of a sufficient number of tools to protect the fruit from decay, not only today but also in the future.

Any product has to be applied at full dose rate in order to limit the risk of resistance.



Janssen PMP does provide through the service companies it works with, a sensitivity monitoring service to follow up on the resistance development in any of the pack houses. With this tool, it is possible to pick up, in a very early stage, possible issues before they result in an insufficient control under practical circumstances. Based on the results, timely efforts and adaptations of treatment schemes and sanitation measures can be made to preserve your fruit. Especially in the case of a single active product like PENBOTEC®, along with the very aggressive green mold (*Penicillium digitatum*) post harvest disease in citrus, a close follow up of the sensitivity situation to the active ingredient is needed and quick action has to be taken once the first signs of sensitivity shift are appearing.



The 7 good reasons to use PENBOTEC 400 SC®

1. Proven **efficacy** against Green and Blue Mold at global level
2. Very good **curative** and **preventive** effect
3. **Long** lasting **activity**
4. **MRL worldwide** and FAT in Japan established
5. Unique **resistance management tool**
6. **Reliable product** based on a Bayer active ingredient and a formulation from Janssen PMP
7. A broad range of **services** provided by Janssen PMP's distributors, the service companies





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The use of our products is subject to the relevant national legislation. For more information on the status of registration and approval in your country of interest, we invite you to contact us.



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