

# Preservatives for agricultural pesticides

Product selection guide





Protect agricultural pesticide formulations and raw materials from microbial contamination with DuPont Microbial Control.

There are multiple challenges in maintaining raw materials free of microbial contamination. DuPont Microbial Control understands the need to bring a robust product to market that preserves its physical properties and withstands challenging storage, distribution and repacking conditions where microbial contamination might be present.

DuPont has developed significant capabilities in application technology, regulatory compliance, and environmental assessment. This enables DuPont to fully serve customers in the Agricultural Pesticide market.

### **Regional and global support**

DuPont Microbial Control is well positioned globally and regionally to assist you with products, services, and information on our regulatory approvals. Our regional Customer Application Centers have developed exceptional expertise in regional microbial problems and regulatory requirements, but are also connected globally to offer you assistance with your specific needs.

### **Unmatched expertise**

Rely on one of the most experienced team of experts in the microbial control technologies industry. Our products are developed by conducting exhaustive tests in the specific application, using state-of-the-art laboratory capabilities.

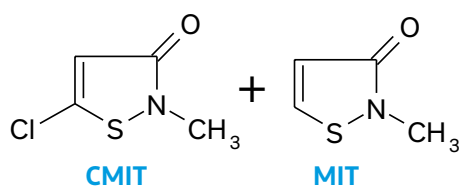
#### **Let us help you with:**

- Preservation recommendations
- Analytical support
- Formulation optimization
- Problem solving
- Technical consultation
- Customized training

## Broad product portfolio

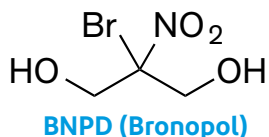
Our BIOBAN™, KATHON™, ROCIMA™, and DOWICIDE™ branded products are compatible with most agricultural pesticides formulations. We understand microbial control—and we have the products and expertise to support most of your needs.

DuPont Microbial Control offers a broad portfolio of preservatives that are compatible with most agricultural pesticides formulations, such as suspension concentrates.



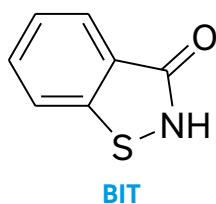
**(KATHON™ MK Biocide;  
KATHON™ CG/ICP Biocide)**

5-chloro-2-methyl-4-isothiazolin-3-one  
2-methyl-4-isothiazolin-3-one



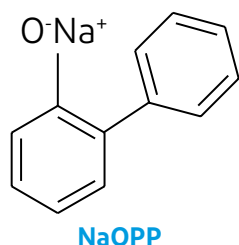
**(BIOBAN™ BP-PLUS Preservative;  
BIOBAN™ BP-30 Preservative)**

Bronopol: 2-bromo-2-nitro-1,3-propanediol



**(ROCIMA™ BT 2S)**

1,2-Benzisothiazolin-3-one



**(DOWICIDE™ A Antimicrobial)**

Sodium o-Phenylphenol



## Choosing the right product for your formulation

Choosing the right preservative for agricultural pesticides requires a clear understanding of preservation needs, formulation compatibility, and regulatory approvals for the specific pesticide.

The antimicrobial ingredients contained in these preservatives are considered inert ingredients when formulated in agricultural pesticide formulations. The selection guide below helps you identify which preservative may suit your specific formulation and final use. Please consult with your DuPont Microbial Control representative for more information to determine the right preservative.

**Table 1.** Summary of physical properties and spectrum for DuPont Microbial Control preservatives

Product	Form	Temp. stability	Bactericide	Fungicide
KATHON™ CG/ICP Biocide KATHON™ MK Biocide	Liquid	< 40°C	•	•
BIOBAN™ BP-PLUS Preservative	Solid	< 40°C	•	
BIOBAN™ BP-30 Preservative	Liquid	< 40°C	•	
ROCIMA™ BT 2S	Liquid	> 40°C	•	
DOWICIDE™ A Antimicrobial	Solid	> 40°C	•	•
ROCIMA™ 586	Liquid	< 40°C	•	

**Pre-harvest and post-harvest tolerance exemption**  
40 CFR 180.910

**pH ≤ 8.5**

- BIOBAN™ BP-PLUS Preservative
- BIOBAN™ BP-30 Preservative

**Pre-harvest tolerance exemption**  
40 CFR 180.920

**pH ≤ 8.5**

- BIOBAN™ BP-PLUS Preservative
- BIOBAN™ BP-30 Preservative
- ROCIMA™ 586
- KATHON™ CG/ICP, KATHON™ MK Biocides

**pH > 8.5**

- ROCIMA™ BT 2S

**Pears and citrus fruits post-harvest tolerance**

**pH > 8**

- DOWICIDE™ A Antimicrobial

\*See table below for further limitations or restrictions of use.

DuPont Microbial Control preservatives below are regulated and approved by the USEPA under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) for use as in-container preservatives for agricultural pesticides. Therefore, they can only be used in a manner consistent with their FIFRA registration and labeling and in accordance with good agricultural practices.

Product	Active ingredient	EPA-FIFRA dosage limits
KATHON™ CG/ICP Biocide KATHON™ MK Biocide EPA registration #: 707-166	<b>CMIT/MIT (CMIT in combination with MIT):</b> 5-chloro-2-methyl-4-isothiazolin-3-one & 2-methyl-4-isothiazolin-3-one <i>Active ingredient concentration in product as supplied is 1.5%</i>	0.04% to 0.15% (400 to 1500 ppm) of product as supplied, or 6 to 22.5 ppm of active ingredient
ROCIMA™ BT 2S EPA registration #: 707-314	<b>BIT:</b> 1,2-benzisothiazolin-3-one <i>Active ingredient concentration in product as supplied is 19%</i>	0.05% to 0.25% (500 to 2500 ppm) of product as supplied, or 95 to 475 ppm of active ingredient
BIOBAN™ BP-PLUS Preservative EPA registration #: 464-675	<b>Bronopol:</b> 2-bromo-2-nitropropane-1,3-diol <i>Active ingredient concentration in product as supplied is 99%</i>	0.01% to 0.05% (100 to 500 ppm) of product as supplied, or 100 to 500 ppm of active ingredient
BIOBAN™ BP-30 Preservative EPA registration #: 464-685	<b>Bronopol:</b> 2-bromo-2-nitropropane-1,3-diol <i>Active ingredient concentration in product as supplied is 30%</i>	0.033% to 0.167% (333 to 1667 ppm) of product as supplied, or 100 to 500 ppm of active ingredient
ROCIMA™ 586 EPA registration #: 707-315	<b>CMIT/MIT + Bronopol:</b> <i>Active ingredient concentration in product as supplied is 1.06% CMIT/MIT + 7.50% Bronopol</i>	0.05% to 0.225% (500 to 2250 ppm) of product as supplied, or 43 to 192 ppm of active ingredient

**NOTE:** DOWICIDE™ A Antimicrobial (EPA registration # 464-78) containing NaOPP (Sodium o-phenylphenate), and supplied in a formulation containing 71.7% active ingredient, holds approval as a preservative of pears and citrus fruits at dosages 0.05% to 3.09% (500 to 30900 ppm) of product as supplied, or 359 to 22155 ppm of active ingredient. These products must be used in accordance with good agricultural practice.

The general guidelines on tolerance exemptions and guidance for formulation and application in the field are indicated below.

Antimicrobial ingredient	40 CFR 180.910	40 CFR 180.920	40 CFR 180.930	Dosage*
CMIT (in combination with MIT) CAS # 26172-55-4		•		Not more than 0.0022% (22.5 ppm) in the formulation; 0.00022% (or 2.25 ppm) in the final solution applied to growing crops
BIT CAS # 2634-33-5		•		Not more than 0.1% of formulation; Not more than 0.02 lb to be applied per acre
Bronopol CAS # 52-51-7	•		•	0.04% or less by weight of the total pesticide formulation
NaOPP CAS # 132-27-4		•		No more than 0.1% in the final agricultural pesticide formulation

\*Dosage accurate at the time of this publication.



## Industrial hygiene

Proper industrial hygiene practices are critical for microbial protection of agricultural pesticides especially due to the contamination susceptibility of some of the typical raw materials used in their manufacture.

A combinational approach of routine scheduled manual cleaning, along with biocide treatments, can offer the following benefits:

- Minimize wild strains of bacteria and fungi in manufacturing facilities before they become acclimated and well established
- Enhance in-can preservative longevity
- Decrease the number of contamination events to reduce customer complaints and costly product recalls
- Help maintain manufacturing efficiency

- Minimize the prospect of recycled water, equipment and raw materials from becoming sources of microbial contamination in final products

Good housekeeping measures reduce microbial dissemination and include:

- Minimize sources of stagnant water
- Flushing, draining, drying, capping/covering hoses
- Keeping tank lids closed
- Cleaning tanks to bare metal
- Establishing routine visual inspections and microbial sampling because clean does not mean microbe-free

### **DuPont Microbial Control offers:**

- Industrial hygiene training
- Industrial hygiene audits of manufacturing facilities
- Post-audit evaluation kit



**DOWICIL™ QK-20 Antimicrobial contains DBNPA active and is an excellent option for plant hygiene needs:**

- Broad spectrum of activity against bacteria, fungi and algae
- DBNPA active ingredient is fast acting, minimizing downtime and delays due to contamination
- DBNPA active ingredient is compliant with Green Seal GS-11 standards
- Easy to use
- Lacks the significant foaming associated with quaternary ammonium compounds (QAC's)/quats
- Fast-acting, short-term problem solver that kills microorganisms and then degrades
- Versatile product for numerous plant hygiene applications
- Contact DuPontMicrobial Control for DOWICIL QK-20 implementation strategies

**DOWICIL™ QK-20 Antimicrobial**

Quick Dosage\* reference guide for industrial microbial clean-up applications

**Process water & raw material clean up**

125 – 2000 ppm (0.0125 – 0.20%)

**Direct product addition**

125 – 500 ppm (0.0125 – 0.05%)

**Recycle water/recycle product clean up/recycle wastewater**

125 – 2000 ppm (0.0125 – 0.20%)

**Standard cleaning of vessels, storage tanks/containers, piping and hosing**

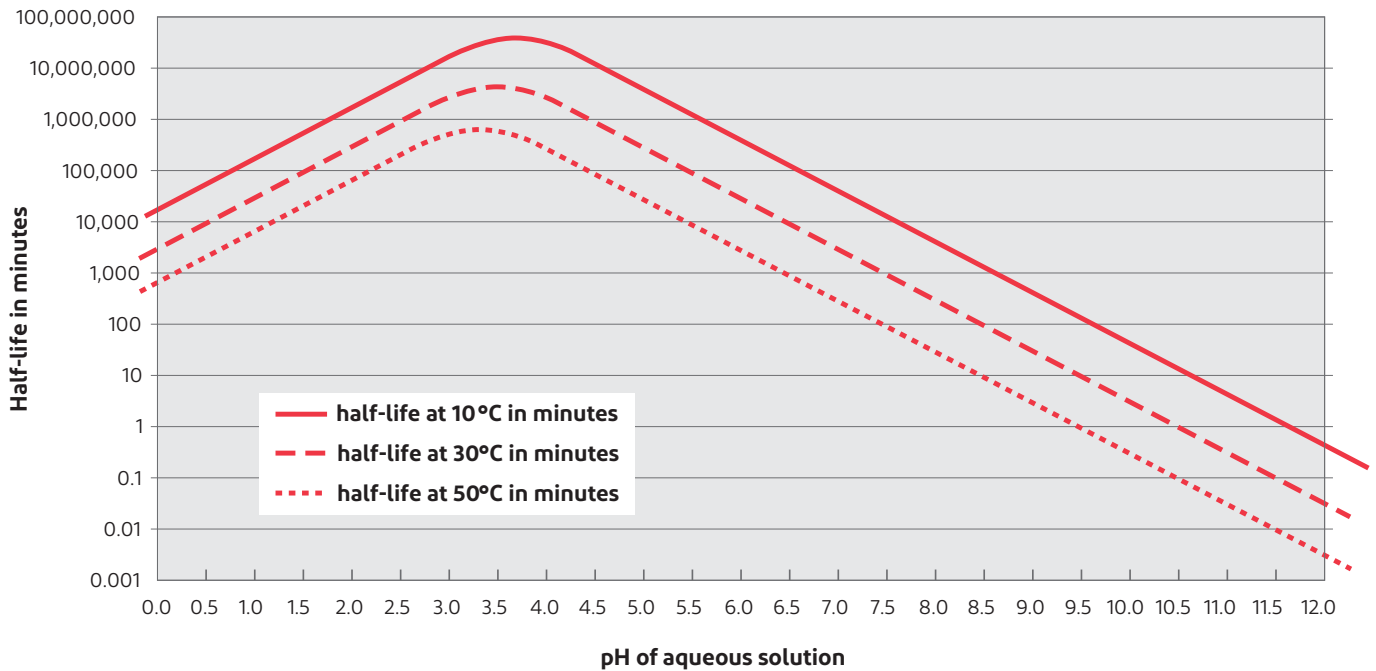
50 – 250 ppm (0.0050 – 0.0250%)

**Heavily-fouled solution/equipment cleaning**

≤ 2000 ppm (0.20%)

\*Dosage levels are provided in ppm DOWICIL™ QK-20 product, as supplied. Maximum of 4,500 ppm (0.45%) total DOWICIL™ QK-20 in a batch.

**Graph 1:** Half-life of DBNPA at three temperatures versus pH (minutes)





## Help where you need it.

With Customer Application Centers around the globe, expert assistance to help solve microbial challenges is always within reach. We offer fully equipped, state-of-the-art laboratory capabilities and knowledgeable technical and sales assistance to help find solutions for your microbial control challenges.



**Microbial Control**  
[microbialcontrol.dupont.com](http://microbialcontrol.dupont.com)

<b>China</b>	<b>400 885 1888</b>
<b>India</b>	<b>1 800 419 0899</b>
<b>Europe</b>	<b>+800 3876 6838</b>
<b>Argentina</b>	<b>+0800 333 8766</b>
<b>Brazil</b>	<b>+55 (11) 0800 17 17 15</b>
<b>Mexico</b>	<b>+01 800 849 7514</b>
<b>Canada</b>	<b>1 800 387 2122</b>
<b>USA</b>	<b>1 833 3 DUPONT (1 833 338 7668)</b>

DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with ™, SM or ® are owned by affiliates of DuPont de Nemours, Inc. unless otherwise noted. © 2020 DuPont. All rights reserved.

### DISCLAIMER

The information contained herein is for informational purposes only and is not legal advice. It represents a summary of the information available to us at the time of release, and does not constitute an interpretation of the regulation. The information provided only applies to the products discussed and not combinations of products or all uses and the information is not promised or guaranteed to be correct or complete. It is your responsibility to identify and assess regulations applying to your activities and your purchase and to abide by any law or regulation, which may apply to the specific use you make of our product and your organization. We moreover recommend that you verify on a regular basis, with your local office, the latest regulatory status of our product.

DuPont strongly encourages its customers to review both their manufacturing processes and their applications of DuPont products from the standpoint of human health and environmental quality to ensure that DuPont products are not used in ways for which they are not intended or tested. DuPont product literature, including safety data sheets, should be consulted prior to use of DuPont products. Current safety data sheets are available from DuPont. DuPont assumes no obligation and hereby **DISCLAIMS ALL LIABILITY** for the information in this document. References to "DowDuPont" "DuPont" or the "Company" means the DuPont legal entity selling the products to Customer unless otherwise expressly noted. Other than as set forth in a contract of sale, **DUPONT MAKES NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE INFORMATION AND/PRODUCTS DESCRIBED HEREIN, INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE.** Use biocides safely. Always read the label and product information before use. MC-00122 0619 CDP