

GRAPES



- › **Think**
Innovation
- › **Trust**
Quality
- › **Expect**
Performance

This booklet contains practical information to assist in the use of SACOA products in vineyards.

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*BIOPEST® now certified for organic use by
Biological Farmers of Australia*



Table of Contents

ABOUT THIS BOOKLET

This booklet provides practical information to assist in the effective and safe use of SACOA products in vineyards.

A FOCUS ON SACOA

SACOA Pty Ltd is a leading developer and supplier of spray oils and adjuvants in Australia.

Since our inception in 1991 we have grown to become an international Australian-owned company supported by active partnerships with world-leading manufacturers and research and development groups.

QUALITY AND SERVICE

As a committed industry leader SACOA delivers a range of assurances and services to our reseller clients including QA production facilities, ongoing research programs and extensive marketing support via brochures, guides, manuals and presentations - available in print and online.

SUSTAINABLE FARMING

Conscious of the importance of sustainable farming practices, SACOA offer a range of products perfectly suited to use in Integrated Pest Management (IPM) and organic programs.

INNOVATIVE SOLUTIONS

Beyond their sustainable farming benefits, our range of spray oil and adjuvant products provide reliable and economically proven solutions for modern farming's many challenges.

More information on our company and our products is available at www.sacoa.com.au.

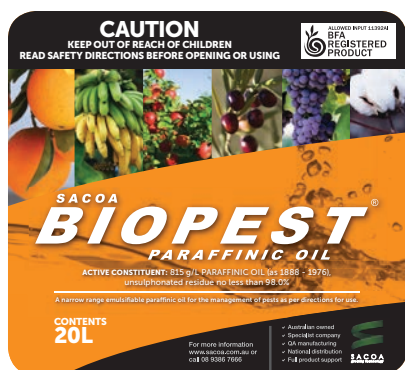
TABLE OF CONTENTS

01	Grape IPM Solutions.....	3
02	About SACOA.....	4
03	The Next Generation in Powdery Mildew Control.....	6
04	Research Results	8
05	Application Guide.....	11
06	Mixing & Crop Safety	12
07	How BIOPEST® Works	13
08	BIOPEST® Registration.....	19
09	STIFLE® Registration	20

01 Grape IPM Solutions

SACOA'S GRAPE IPM SOLUTIONS

SACOA offers a range of products suitable for vineyard Integrated Pest Management (IPM) programs:



SACOA BIOPEST® PARAFFINIC OIL - ORGANIC PRODUCT

SACOA BIOPEST® Paraaffinic Oil (BIOPEST®) is a highly refined iso-paraffinic oil designed for use as a fungicide, insecticide and as a premium carrier / adjuvant. BIOPEST® is registered for use in the control of powdery mildew, grapevine scale and mealybugs in grapes.

BIOPEST® has proven itself for many years to be the market leading bio-rational spray oil throughout Australia. It's unmatched performance and the long term research and development we have undertaken have worked to ensure it continues to hold a strong leadership market position.

BIOPEST® is also certified for use in organic vineyards by Biological Farmers of Australia.

As a completely odourless, safe and effective iso-paraffinic spray oil formulation BIOPEST® represents the next generation in powdery mildew control for grape growers - the ideal evolution from old technology, unpleasant sulphur.



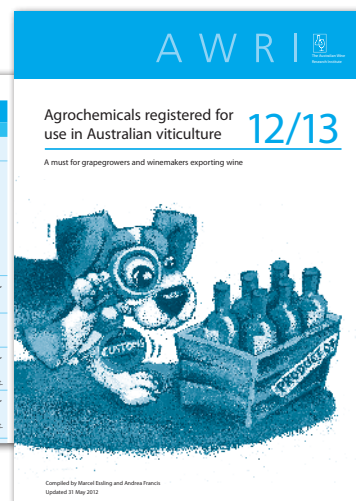
SACOA STIFLE® DORMANT SPRAY OIL

SACOA STIFLE® Dormant Spray Oil (STIFLE®) is an emulsifiable, highly refined, agricultural winter spray oil formulated to control a variety of pests and diseases during the winter dormant period.

It is a highly effective and economical controller of scale and other sucking pests in vineyards.

Following extensive testing by SACOA, both BIOPEST® and STIFLE® are now listed in the Australian Wine Research Institute "Dog Book" as registered chemicals for use in Australian Viticulture

Active Constituent (a)	Activity group	Some registered products	Restriction on use
POWDERY MILDEW			
boscalid	7	Filan (do not apply to any set berries)	Use no later than 9% capfall (E-L 19-20%).
azoxystrobin	11	Amistar 250 SC, Azoxystrobin 250 SC, Connect 800 WG, Mirador 250 SC, Supremova 250SC	Use no later than 80% capfall.
hexaconazole	3	Hex 50 SC, Viva	
metrafenone	U8	Vivando	
spiroxamine	5	Prosper 500 EC	
tebuconazole	3	Folicur 430 SC, Laguna Xtreme, Orlus 430 SC, Zolo 430 SC	
tebuconazole + azoxystrobin	3 + 11	Custodia	
paraaffinic oil	n/a	BioPest	Use no later than E-L 315, berries pea-size (7mm diameter).
trifluorystrobin	11	Flint 500 WG	
sulfur, present as elemental or crystalline sulfur	M2	Dusting Sulphur, Dusting Sulphur 900	Use no later than 12 weeks before harvest.
pyraclostrobin	11	Cabrio, Cabrio 200WG	Use no later than E-L 315, berries pea-size (7mm diameter). Do not use within 63 days of harvest.
penconazole	3	Topas 100 EC	Use no later than E-L 315, berries pea-size (7mm diameter). Do not use within 60 days of harvest.
tetraconazole	3	Domark 40ME	



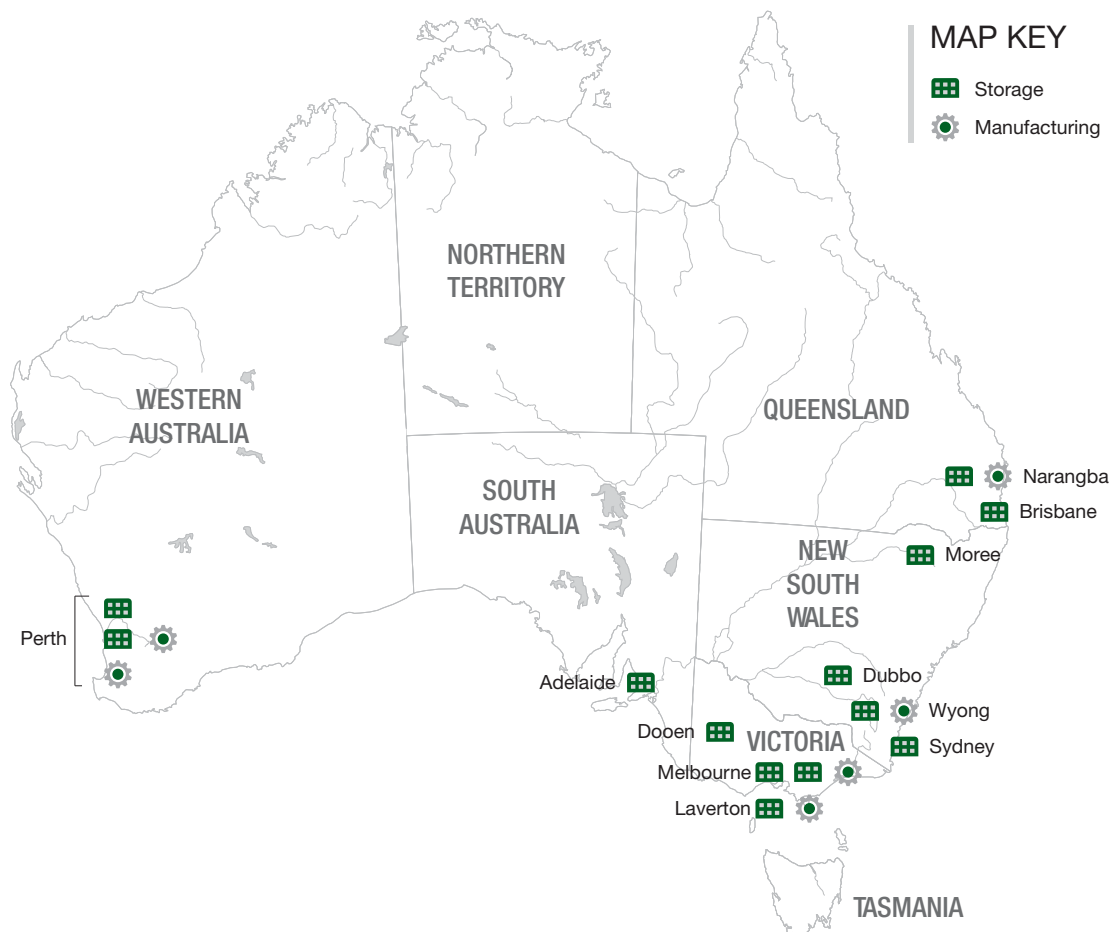
02 About SACOA

ABOUT SACOA

SACOA was established in 1991, concentrating on the development and supply of innovative spray oils, adjuvants and surfactants.

The key strategy then was to develop spray oils and adjuvants from the highest grade mineral/paraffinic oils to enable growers to have absolute confidence in their application. During this time SACOA has achieved much and are now viewed as leaders in the development and uptake of these bio-rational pesticides in many crops.

Manufacturing capacity exists in Perth, Melbourne, Wyong and Brisbane. These facilities are 'closed loop' systems, ensuring product quality. Reliable supply is ensured via a national network of depots, with our administration managed from Perth.



02 About SACOA

PRODUCT RANGE

In addition to BIOPEST® and STIFLE®, SACOA's ongoing research and development program has delivered a range of innovative and effective spray oils, adjuvants and surfactants for use in horticulture, broadacre and cotton.

HORTICULTURE	
BIOPEST® Paraffinic Oil	A revolutionary formulation now accepted throughout the industry as an essential IPM insecticide and fungicide.
SUMMER Insecticidal Spray Oil	A highly refined summer oil to assist in the management of a range of pests and fungal diseases.
STIFLE® Dormant Spray Oil	A proven and affordable winter spray oil for use in dormant spraying.
BROADACRE	
ANTIEVAP® Spray Adjuvant	A reliable and affordable summer weed management solution.
CROPSHIELD® Spray Adjuvant	A reliable and affordable post-emergent spray adjuvant.
COTTOIL® Spray Adjuvant	A popular cotton defoliant spray adjuvant and carrier for certain ULV or multi-blend insecticides.
ENHANCE® Spray Adjuvant	A highly refined crop oil concentrate formulation for post-emergent spraying. Particularly well suited to multi-component tank mixes and cold water spraying.
PLANTOCROP® Spray Adjuvant	A highly refined esterified seed oil formulation for use with post emergent herbicides, desiccants and defoliants.
X-SEED® Spray Oil	A food grade canola oil formulation specifically designed to mix with and increase the effectiveness of a range of chemistry including foliar nutrients and biopesticides.
WETTA 1000	An affordable wetting agent. Its excellent dynamic wetting ensures optimum pesticidal efficacy.
COHORT Surfactant	An acidifying and penetrating surfactant that reduces alkaline hydrolysis of glyphosate.
Spray Grade Ammonium Sulphate Herbicide Adjuvant	Specialty product used with Glyphosate based herbicides to minimise antagonism when tank mixing with flowable herbicides.
SOIL SURFACTANTS	
IRRIGATOR™ Banding Soil Wetter	A specialty soil wetting agent applied in furrow for hydrophobic soils.
LURE H₂O™ Soil Surfactant	A breakthrough soil treatment to improve the absorption and retention of early rains to deliver better germination, soil health and plant growth.

THE NEXT GENERATION IN POWDERY MILDEW CONTROL

BIOPEST® provides grape growers with the opportunity to significantly advance their powdery mildew control program with an odourless, safe and highly effective product that delivers the same powdery mildew control as Sulphur, but without the smell and OH&S risks.

Extensive independent research has paved the way for an extension to BIOPEST®'s registration to include powdery mildew along with **grapevine scale and mealybugs**. Importantly the research also confirms the ability for BIOPEST® to deliver the same powdery mildew control as traditional Sulphur-based spray programs.

BIOPEST®'s performance against a typical wettable Sulphur formulation is presented in the table below.

FEATURE	BIOPEST®	WETTABLE SULPHUR ¹
No unpleasant smell	✓	✗
No OH&S issues	✓	✗
Effective powdery mildew control	✓	✓
Secondary control of mealybug	✓	✗
Reduced impact on beneficials	✓	✗
Advanced spreading and sticking properties	✓	✗
Compatible with a range of popular fungicides	✓	✓
Certified for organic use with BFA	✓	✓
No pest resistance issues	✓	✓
Proven performance in other crops	✓	✓
Suitable for use in IPM programs	✓	✓

Table: Based on typical formulation characteristics.

A FOCUS ON KEY FEATURES

EFFECTIVE

Sulphur works, but many people don't like working with it. Three years of in-field independent research have established that BIOPEST® delivers the same powdery mildew control as wettable Sulphur.

SAFE AND ODOURLESS

Unlike Sulphur, BIOPEST® is odourless and completely safe to handle and use. BIOPEST®'s formulation relies upon a food-grade, highly refined iso-paraffinic oil.

SECONDARY PEST CONTROL

BIOPEST® delivers the additional benefit of secondary control of mealybug and scale. BIOPEST® is relied upon in other crops for the management of a range of sucking pests such as mites and whitefly.

ORGANIC USE

As a spray oil BIOPEST® is ideally suited to organic farming. Organic registration for BIOPEST® with BFA was obtained in 2012.



COMPATIBILITY

BIOPEST® is compatible with a range of popular fungicides and other pesticides used in Australian vineyards. See the application guide later in this document for more information.

DEMONSTRATION SITES

SACOA have demonstration sites in major grape growing regions where BIOPEST® is being used in commercial vineyards for powdery mildew control.

Contact SACOA on 08 9386 7666 for more information and to arrange your visit.

04 Research Results

RESEARCH RESULTS

METHODOLOGY AND BACKGROUND

Studies were independently conducted by the Centre for Plant and Food Science from the University of Western Sydney.

Two experiments were conducted to evaluate the efficacy of BIOPEST® for control of powdery mildew on grapes. The first experiment (Experiment 1) was conducted from September 2004 until March 2005 at Loxton (SA) and the second experiment (Experiment 2) was conducted at Mt. Beauty (VIC) from October 2003 until April 2005.

EXPERIMENT ONE

The experiment was conducted on Chardonnay vines at McGuigen's Coldridge vineyard, Loxton SA. The plot had an area of 3Ha and was established in 2000. The vines were planted with 2.5m between vines and 2.75m between rows.

EXPERIMENT 2

The experiment was conducted on 2.2Ha of Pinot Noir vines at Bogong Estate vineyard 4km from Mount Beauty in the Kiewa Valley, Vic. The plot was established in 1997. It consisted of 43, 140 to 200m long rows with shorter rows on the edge near the road. Vines of variety Pinot Noir were planted with 2m between vines and 3m between rows.

In both experiments vines were drip irrigated and standard agricultural practice was followed.

SPRAY APPLICATION

All sprays were applied using a mist-blower fitted with hollow cone nozzles. High volume sprays were applied and the volume was gradually increased as the canopy developed and became denser.

TRIAL SPRAY PROGRAM

The following tables detail the spray programs for Experiment One and Experiment Two.

EXPERIMENT ONE SPRAY PROGRAM

DATE	MINERAL OIL TREATMENTS		CONVENTIONAL PESTICIDE TREATMENT	CONTROL	VOLUME OF SPRAY APPLIED (L/HA)
	BIOPEST®	CONVENTIONAL PESTICIDES			
01/10/04	Yes	No	Microthiol ¹ Tri Base Blue ²	No	500
11/10/04	Yes	No	Microthiol Tri Base Blue	No	500
20/10/04	Yes	No	Prosper ³ Tri Base Blue	No	800
29/10/04	Yes	No	Prosper Tri Base Blue	No	900
12/11/01	Yes	No	Thiovit Jet ⁴ Tri Base Blue	No	1200

04 Research Results

DATE	MINERAL OIL TREATMENTS		CONVENTIONAL PESTICIDE TREATMENT	CONTROL	VOLUME OF SPRAY APPLIED (L/HA)
	BIOPEST®	CONVENTIONAL PESTICIDES			
29/11/04	Yes	No	Thiovit Jet Penncozeb ⁵	No	1200
06/12/04	No	Mycloss Thiovit Jet	Mycloss ⁶ Thiovit Jet	Mycloss Thiovit Jet	1200
15/12/04	No	Mycloss Thiovit Jet	Mycloss Thiovit Jet	Mycloss Thiovit Jet	1200
04/01/05	No	Captan Thiovit Jet	Captan ⁷ Thiovit Jet	Captan Thiovit Jet	1200

- (1) Elementary Sulphur (Nufarm)
 (2) Tri basic Copper Sulphate (Nufarm)
 (3) Spiroxamine (Bayer)
 (4) Elementary Sulphur (Syngenta)
 (5) Mancozeb (Nufarm)
 (6) Myclobutanil (Dow)
 (7) Captan (Makhteshim)

EXPERIMENT TWO SPRAY PROGRAM

DATE	MINERAL OIL TREATMENTS		CONVENTIONAL PESTICIDE TREATMENT	CONTROL	VOLUME OF SPRAY APPLIED (L/HA)
	BIOPEST®	CONVENTIONAL PESTICIDES			
14/10/04	No	Thiovit	Thiovit ¹	Thiovit	714
19/10/04	Yes	Kocide	Thiovit Kocide ² Legend ³	Kocide	423
04/11/04	Yes	Captan	Thiovit Captan ⁴	Captan	423
15/11/04	Yes	Captan	Thiovit Bayfidan ⁵ Captan	Captan	423

04 Research Results

DATE	MINERAL OIL TREATMENTS		CONVENTIONAL PESTICIDE TREATMENT	CONTROL	VOLUME OF SPRAY APPLIED (L/HA)
	BIOPEST®	CONVENTIONAL PESTICIDES			
29/11/04	Yes	Scala Captan	Thiovit Legend Scala ⁶ Captan	Scala Captan	620
14/12/04	Yes	Kocide	Thiovit Kocide	Kocide	20

- (1) Elementary Sulphur (Syngenta)
- (2) Copper hydroxide (Griffin)
- (3) Quinoxifen (Dow)
- (4) Captan (Makhteshim)
- (5) Triadimenol (Bayer)
- (6) Pyrimethanil (Bayer)

RESEARCH CONCLUSIONS

Conclusions from the two two-year studies were as follows:

- BIOPEST® provides effective preventative control of grapevines against powdery mildew when sprayed at 7-14 days interval after budburst to bunch closure at concentration of 0.5 and 1%.
- BIOPEST® provided full control (100%) of powdery mildew when disease pressure was moderate and very good control (75-92% adjusted efficacy) when disease pressure was high.
- BIOPEST® provided the same level of protection against powdery mildew as a conventional fungicide program even under high disease pressure.
- BIOPEST® did not reduce yield or grape quality with regard to total soluble solids, titratable acidity and pH.

In addition, SACOA conducted additional research in association with AWRI, which confirmed that, when applied according to label directions, BIOPEST® had no adverse impacts on fermentation or final wine taste and quality. Following this research, AWRI have listed BIOPEST® in their "Dog Book" as being suitable for use against powdery mildew up until stage E-L 31 (formally referred to as bunch closure).



05 Application Guide

APPLICATION GUIDE

The application of BIOPEST® is odourless, safe and straightforward.

For the control of powdery mildew apply at a rate of 1L/100 just after woolly bud stage, with follow-up sprays every 14-21 days until bunch closure (E-L 31).

ENSURING EFFECTIVENESS AND CROP SAFETY

The following advice and practices are recommended when using BIOPEST®:

- The target must be completely covered in spray solution as oil is a contact fungicide.
- Increase spray volume as canopy develops. Dilute applications (up to 1,200L spray per hectare) in most cases ensure best results.
- Speed of travel is extremely important, with good spray coverage achieved at 5-6km/hr.
- Do not spray when shade temperatures are or exceed 32°C.
- Do not mix BIOPEST® with Sulphur
- Leave an interval of at least three weeks between a BIOPEST® application and a Sulphur application

More information on crop safety is provided in the following section.

06 Mixing and Crop Safety

MIXING

It is important to ensure safety and compatibility when mixing spray products.

MIXING INSTRUCTIONS

1. a. Add water to the mixing tank to allow proper agitation by pump or paddles.
b. If wettable powder formulation – mix water and powder thoroughly so that powder is totally suspended in the water before the oil is added.
2. a. Add other desired pesticides.
b. If other pesticides to be added are an emulsifiable formulation, do so after the oil and the water has been thoroughly mixed.
3. Add oil under agitation when tank is $\frac{3}{4}$ full. Top off with water to form a milky solution.
4. Maintain agitation until solution is completely used.
5. In small equipment lacking agitators, stir or shake diluted spray frequency during applications.
6. It is important for users to read and follow all instructions on the labels of the proposed tank mixed products.
7. Flush fluid in sprayer hose lines back into tank reservoir if fluid is allowed to stand for more than 20 minutes.

COMPATIBILITY

- Do not use spray oil with Dimethoate, Chlorothalonil, Captan, Carbaryl or any other product containing Sulphur.
- BIOPEST® is compatible with mancozeb, most copper-based formulations and many other pesticides. Refer to product labels or contact SACOA to confirm compatibility with other specific actives.
- If possible, either keep the spray equipment used for these compounds separate from the equipment used for BIOPEST® or make sure that the sprayer is thoroughly cleaned, so that no residue from these compounds remain.

CROP SAFETY

SPRAY UNDER APPROPRIATE CONDITIONS

Oil can cause leaf damage (phytotoxicity) under warm temperatures, high humidity, or wet conditions because the leaf does not have sufficient wax (cuticle) to protect itself. The oil also breaks down on the leaf when exposed to near freezing temperatures. As such, oils should only be applied under good drying conditions. BIOPEST® is rain fast in 24 hours

FOLLOW PROPER TANK MIXING PROCEDURES

Check labels before and do a jar compatibility test prior to tank-mixing. Check to make certain that the oil emulsifies if adding other dry flowables or wettable granule pesticides. Cheaper quality pesticides can be of questionable quality, particularly copper formulations.

THE IMPORTANCE OF GOOD AGITATION

Growers should also take care to maintain good agitation in the spray tank.

ENSURE COMPATIBILITY BEFORE SPRAYING

Certain spray materials like Carbaryl, Captan or Morestan (oxythioquinox) cannot be applied within a certain time before or after oil sprays (10 days) because of the risk of damage to foliage and fruit. Crops are at more risk of damage when treated with oil rates that are too high, during high temperatures, or when plants are stressed.

07 How BIOPEST Works

QUALITY = EFFECTIVENESS + SAFETY

The quality of the spray oil you use will define two things:

- How effective it is in controlling pests and diseases.
- How safe it will be to the fruit and vine.

IT'S CLEAR

BIOPEST® is a revolution in spray oil quality. Formulated with food-grade paraffinic oil, BIOPEST®'s clarity is a clear sign of its quality and purity. The next time you open a drum of oil, check its clarity. Is it 'water clear'?

AND PURE

BIOPEST® has an UnSulphonated Residue (USR) of 98% - the highest practical level achievable with current refining technology. This is a higher purity than any other spray oil product on the market (based on published USR levels).

HOW DO WE MEASURE PURITY?

By USR. USR stands for UnSulphonated Residue and measures the absence of potentially damaging impurities called aromatics. The lower the USR %, the higher the risk of plant damage.

The 'impurities' are generally a grower's worst enemy when applying spray oils. Impurities, when exposed to sunlight, oxidise and form acids on the leaf and fruit surfaces and in certain conditions 'burn' the plant.



THE TRADE-OFF BETWEEN EFFICACY AND PLANT SAFETY

The general rule with mineral spray oils has been that heavier oils offer the best insecticidal properties but carry a greater risk of plant and fruit damage. Until now.

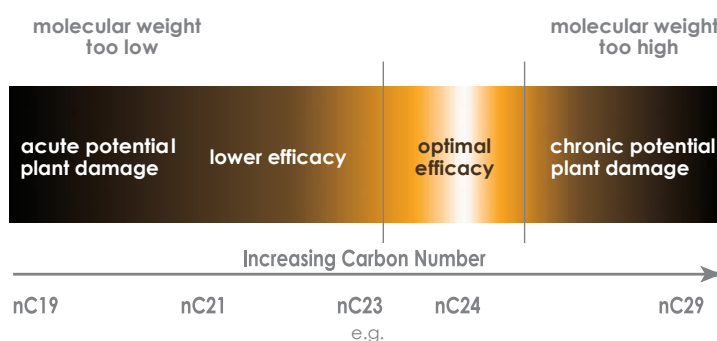
USING CARBON NUMBER TO COMPARE OILS

Carbon number measures the number of carbon atoms in each molecule of oil and is used to indicate an oil's 'weight'. This is a key measure of an oil's potential efficacy and an indicator of the potential for plant damage (other factors also apply).

OPTIMAL EFFICACY + SAFETY

A lighter oil has less potential to damage the plant as a lighter oil volatilises (evaporates) more rapidly. Because of this they are less effective in killing pests.

BIOPEST® is rated as an nC24 oil which provides greater efficacy when compared to other summer oils. Due to its unique purity it does not provide any increased risk of plant damage. BIOPEST® may in fact offer reduced damage potential when compared to lower quality, lighter oils.



SACOA
BIOPEST®
PARAFFINIC OIL

07 How BIOPEST Works

PARAFFIN CONTENT

Spray oils are composed essentially of hydrocarbons - compounds containing hydrogen and oxygen. There are three types of these molecules found in spray oils that are important in understanding how spray oils work, or don't work. The three types of hydrocarbons found in spray oils are:

The Paraffinic Chains: These have the highest insecticidal value and plant safety. Spray oil should comprise at least 62% paraffinic chains to be regarded as paraffinic oil.

The Naphthalene Rings: These have a lower pesticidal efficacy than the paraffinic chains.

The Aromatic Rings: These are the toxic structures that can cause plant damage.

In terms of phytotoxic potential, the amount of aromatics in the oil is a primary influence on the potential for plant damage as the aromatics oxidise when in contact with sunlight, creating acidic compounds that are common causes of plant burn and damage. BIOPEST® has almost untraceable aromatic content.

WHY IS UNDERSTANDING THESE THREE CLASSES IMPORTANT?

The paraffinic (percentage of paraffinic chains in a spray oil) is a primary influence on how effective it will be in assisting pest and disease control. BIOPEST® has the highest paraffinic content of any spray oil currently available in Australia and virtually no aromatics, meaning it has high insecticidal potential and low phytotoxicity (plant damage) potential.

Paraffinic type hydrocarbons contained in spray oils are particularly effective in modifying the protective surface wax of plant tissue and insects. BIOPEST® is an optimised paraffinic based spray oil, which has been proven to act as a nerve poison in some soft shelled insects such as aphids, killing them as quickly as synthetic contact pesticides.

WHY DOES BIOPEST® WORK BETTER?

BIOPEST® offers a uniquely pure, optimal weight oil without the potential plant damage trade-off.

HERE'S WHY.

A Pure Oil - USR over 98%

Impurities cause damage the longer they stay on the plant surface. BIOPEST's USR rating of over 98% means it can stay on the plant surface and keep working without damaging the plant or restricting growth.

Optimal Weight - nC24

BIOPEST persists on the leaf or fruit surface longer. This means more pests and disease are killed and a significantly greater effectiveness in modifying the behaviour of pests.

Quality Surfactant - Biodegradable

Improves the sticking and spreading properties of the oil in a rapidly biodegradable formula.

Efficacy + Safety
More pest control per
spray and for longer
with less risk of plant or
fruit damage.



07 How BIOPEST Works

BIOPEST® - A REVOLUTION IN SPRAY OIL TECHNOLOGY

SACOA BIOPEST® Paraffinic Oil is a highly refined food-grade iso-paraffinic oil formulation designed for use on a wide range of crops.

With an unmatched level of purity, BIOPEST® represents the most advanced attempt yet to provide growers with an IPM compatible product capable of controlling multiple, unrelated pests and fungal diseases simultaneously.

AN ESSENTIAL IPM SOLUTION

As an advanced biorational pesticide and adjuvant BIOPEST® offers a range of IPM benefits:

- Ability to modify pest behaviour
- Minimal impact on beneficial insects
- Not persistent in the environment
- Low toxicity to animals and grower
- Safe to handle
- No pest resistance: As mineral oils work at the physical level and not at the biochemical level, they do not invite resistance to develop. This valuable trait is supported by almost a century of mineral oil use in insect and disease control.
- Won't stimulate pest outbreaks like conventional pesticides

07 How BIOPEST Works

AS A CARRIER OR ADJUVANT

BIOPEST® provides a unique combination of functions as a carrier for chemical and biological pesticides in grapes.

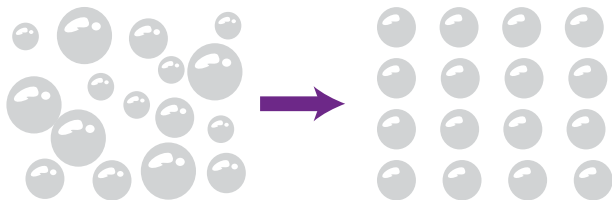
These all work to:

- Get more of the chemical or biological active evenly onto the vine and fruit; and
- Protect the active and keeping it working longer by slowing down volatilisation.

COVERAGE

UNIFORM DROPLETS

Improves spray coverage and reduces loss through drift (small droplets) and runoff (large droplets).



Improves potential contact with pest and improves uptake in plant surface.

STICKING

Improves spray rain fastness.



**SPRAY
CONDITIONS**

Evaporation

Reduces spray loss from evaporation.

Wind Drift

Reduces spray loss from wind drift reducing pesticide spray loss, cost and disruption of beneficials.

07 How BIOPEST Works

BIOPEST® - THREE KEY MODES OF ACTION

As a biorational pesticide, BIOPEST® has three key uses in pest and disease management:

- Insecticide
- Fungicide
- Plant Virus Management

AS AN INSECTICIDE

BIOPEST® effectively manages certain insect pests in three ways:

1. BEHAVIOUR MODIFICATION

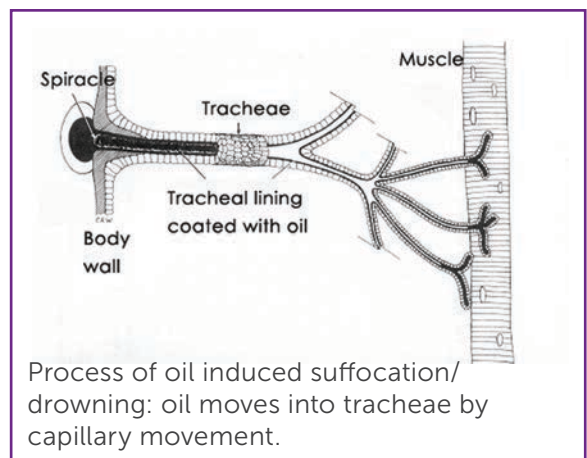
BIOPEST® deters the feeding and egg laying of pest insects. How this occurs is covered in more detail in the section on behaviour modification.

2. SUFFOCATION / DROWNING

BIOPEST® blocks the air holes (spiracles) and lines the breathing tubes (tracheae) through which insects and mites breathe.

3. POISON

In some cases, BIOPEST® may also act as a 'poison', interacting with the fatty acids of the pest and interfering with normal metabolism.



AS A FUNGICIDE

BIOPEST helps manage a number of different fungi in two ways:

1. HOST PLANT PROTECTION

It is believed that BIOPEST® may protect the host plant by interfering with the attachment of the fungi to the plant.

2. ERADICATION OF FUNGI

It is believed that BIOPEST® may help eradicate existing fungi by targeting and breaking down the fungi's cell walls.

AS A PLANT VIRUS MANAGER

BIOPEST® is useful in managing non-persistent viruses transmitted by sucking pests such as winged aphids by interfering with their feeding behaviour and hence disrupting the virus transmission process. As the viruses are generally transferred via the pests' stylet (the piercing and sucking mouthpart) it is prevented from inoculating healthy plants and transmitting the virus from diseased ones.

07 How BIOPEST Works

"So significant are the behavioural effects of mineral oils that they should be regarded as the most important mode of action against arthropods."

Prof. Andrew Beattie et al, 2000

NEW LEARNINGS = NEW OPPORTUNITY

Extensive research by the University of Western Sydney over many years, has opened the door to a new understanding of how a high quality horticultural mineral oil affects insects by modifying certain key insect behaviours such as feeding and egg laying.

INSECTS SHOWN TO BE POTENTIALLY VULNERABLE			
Whitefly	Codling Moth	Leafminer	Grape Leafhopper
Mites	Leafrollers	Aphids	Thrips
Fruit Fly	Psyllids	Budworm	Bollworms
Helicoverpa spp.	Lace bugs	Source: University of Western Sydney	

HOW BEHAVIOUR MODIFICATION OCCURS

1. In order to feed or lay eggs on a host plant, insects and mites must first detect a host plant at the chemical level. This is done through tiny, hollow hairs (sensillae) located on their mouthparts, feet and abdomen.
2. Inside the sensillae are nerve endings which sense specific chemicals produced by the host plant and are detected in the process of probing. Contact with these chemicals can trigger or stimulate an insect to feed or lay eggs at specific locations within the plant.
3. BIOPEST plugs these sensillae. This effectively 'blinds' the insect from identifying food sources or oviposition sites.

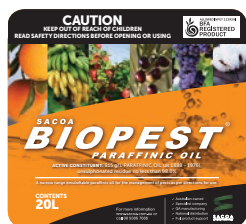


Small hairs called sensillae

BENEFICIAL INSECTS ARE MINIMALLY AFFECTED

As beneficial insects are insect-attacking rather than plant-attacking they have evolved a different set of host detection mechanisms and are minimally affected.

08 BIOPEST Registration



SACOA
BIOPEST[®]
PARAFFINIC OIL

BIOPEST is registered for the control of powdery mildew, mealybugs and grapevine scale in grapes.

Pest	State	Rate per 100L	CRITICAL COMMENTS
Mealybugs	NSW, ACT, QLD, SA, WA, TAS Only	4 to 6 Litres with 300 to 500 Litres Water per Hectare	Dormant – A tank mix using insecticides improves control
			Air carrier or air blast type sprayers strongly recommended to avoid plant injury and reduce effect on bloom of table grapes
Grapevine Scale	NSW, VIC, SA, WA, QLD Only	3L	Apply as a post pruning spray in mid-winter when vines are fully dormant
	TAS Only	2L	
Powdery Mildew	All States	1L	Commence spraying just after woolly bud stage. Follow-up sprays should be applied every 14-21 days till bunch closure (E-L 31)

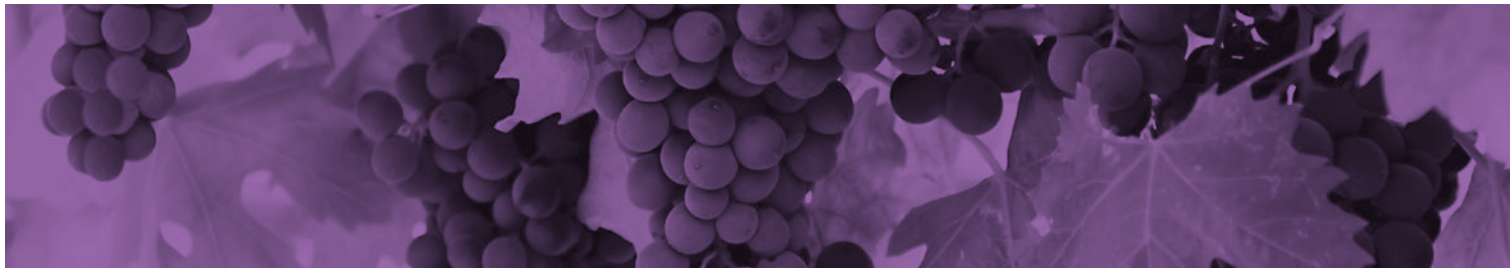
09 STIFLE Registration



SACOA
STIFLE®
Dormant Spray Oil

STIFLE® is registered for the control of scale and mites during dormancy in grapes.

Pest	State	Rate per 100L	Critical Comments
Grapevine Scale	NSW, VIC, SA, WA, QLD	3L	Apply as a post pruning spray in mid-winter when vines are fully dormant
	TAS Only	2L	
Grape leaf blister mites, European red mites, Two spotted mites	TAS	1L	Commence spraying just after woolly bud stage. Follow-up sprays should be applied every 14-21 days till bunch closure (E-L 31)
European red mites	NSW, VIC, SA	3L	Apply as a post pruning spray in mid-winter when vines are fully dormant
	TAS	2L	



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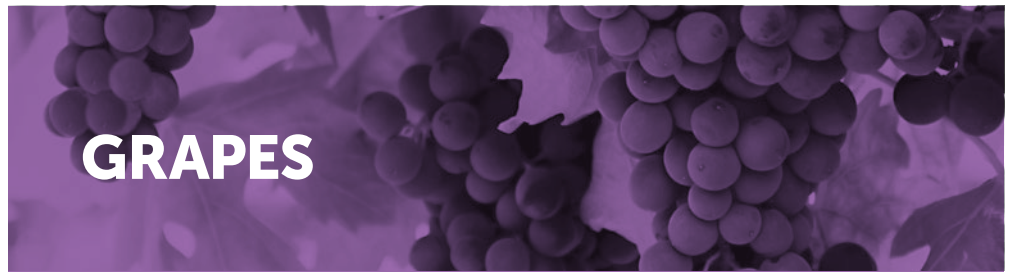
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GRAPES

A FOCUS ON SACOA

SACOA Pty Ltd is a leading developer and supplier of spray oils and adjuvants in Australia. Since our inception in 1991 we have grown to become an international Australian-owned company supported by active partnerships with world-leading manufacturers and research and development groups.

QUALITY AND SERVICE

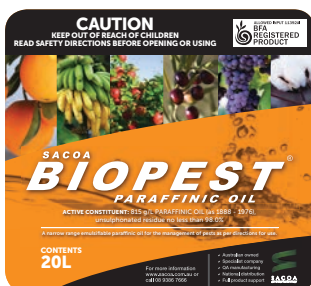
As a committed industry leader SACOA delivers a range of assurances and services to our reseller clients including QA production facilities, ongoing research programs and extensive marketing support available in print and online.

SUSTAINABLE FARMING

Conscious of the importance of sustainable farming practices, SACOA offer a range of products perfectly suited to use in Integrated Pest Management (IPM) programs.

INNOVATIVE SOLUTIONS

Beyond their sustainable farming benefits, our range of spray oil and adjuvant products provide reliable and economically proven solutions for modern farming's many challenges.



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