TRUMP†

SPRAY OIL

PURITY

REFINED

VICCHEM

The Right Chemistry

The Victorian Chemical Company (Vicchem) was incorporated in 1933, is an Australian owned and operated specialist manufacturer and global marketer of agricultural and industrial chemical products that is based in Melbourne, Australia.

During the 1980's several other agricultural products were developed including Bloat control Products for cattle and Insecticidal spray oils for Horticulture. During the 1990s development work focused on adjuvants for Broadacre applications. HASTEN™ is a key product that has been commercialised from this work and it is now available in many countries.

Our agricultural products now include spray adjuvants, wetting agents, soil adjuvants, an organic insecticide, a growth regulator and bloat control products. Applications include broadacre cropping, horticulture, cotton and pastoral.

Victorian Chemicals has played a key role in the development of products based on oils for Australian Horticulture. Through our Chemists and R&D team we have a focus on continuous improvement for our entire range. Through this approach we combined our surfactant technology with the purest paraffinic oils available to provide farmers with the safest, most technological and purest horticultural oil on offer.

Oils and surfactants have established important and useful roles in Australian Horticulture. The most significant roles are as adjuvants to enhance the efficacy of various Horticultural products or as contact pesticides which act by smothering or suffocating certain insects, mites and fungi.

TRUMP† contains the highest purity paraffin oil and custom surfactant package, designed to minimize phytotoxicity and assist growers in maximizing the value of their produce by killing pests directly and enhancing the performance of certain tank mix partners.

About Spray Oils

Petroleum oils have been used for many years for their insecticidal properties and were known as an effective means of controlling certain insect pests as early as 1890. They were quite crude and predominantly used by farmers for applications upon dormant trees. Significant research was conducted in the first half of the twentieth century to determine the components responsible for phytotoxic affects and pest control properties. Thankfully this has led to a greater understanding and highly refined formulations that are both very effective and safe.

TRUMP† – Exceeds All Industry Standards

There have been many ways used over the years to asses, describe and market the safety and pesticide properties of spray oils. Below is a summation of these attributes and their relative importance.

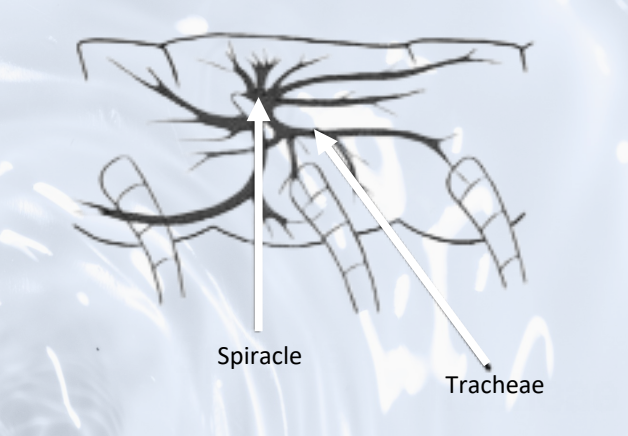
Attribute	Notes	TRUMP† Result
Virgin Oil	High quality insecticidal oils should only be made from new petroleum products.	Yes
Purity	The USR value is a measure of the degree of refinement, highly refined oils have USR above 98% which can partly indicate the phytotoxic potential however processing oils above a 95% USR does not improve pesticide efficacy or plant safety.	99%
Composition	Oil is designated as paraffinic if it contains more than 60%. This is the portion that provides the best pest control with the least risk of plant injury. Paraffinic oils used in crop should contain no aromatic content as this is the most likely to cause crop damage and contribute the least to insecticidal action.	No Less Than 74% Paraffinic and 26% Naphthenic (Aromatic 0%)
Active Constituent	The nominal amount of active constituent as stated on the label.	No Less Than 830g/L
Viscosity	Viscosity of spray oils tend to have a range from 11-13 centistokes (at 37.8 °C) and the ones with higher viscosity are expected to have greater pesticide efficacy.	12cSt (0.12mm²/s)
Weight/Carbon Number	Most agricultural oils range from C21 to C25, representing the range where the balance between minimising plant damage and maximising insecticidal ability is at its most favourable.	Average cN24
Boiling Temperature (50%)	Oils with lower boiling points volatilize more quickly after the application.	Approx. 387 C
Boiling Range	The boiling range is the spread between the 10% and 90% boiling points. The smaller the difference the more “narrow range” and the less variable the components are.	Approx. 73 C
Refractive Index (ASTM D-1218)	May be used in combination with other tests to estimate the distribution of naphthenic, paraffinic, and aromatic carbon atoms.	1.46
Surfactant/Emulsifier	Included, high quality surfactant/Emulsifier manufactured under an internationally recognised quality management system.	Yes
Technical Back Up	Ability to add value through the provision of technical advice, training and resources.	Yes
Organic Certification	Compliant with the requirements set out in the Australian Certified Organic Standard.	Yes

Mode of Action

A mode of action is the way in which the active ingredients work to inhibit or eliminate the target pest organism. Because of TRUMP† Spray Oils numerous modes of action, pests have a very low chance of developing resistance.

Suffocation

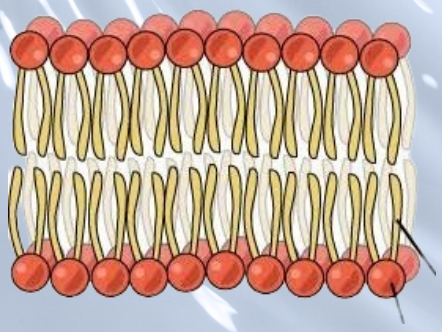
Many target pests exchange gases by way of spiracles (breathing tubes) located along the body. Blockage of these tubes is the most common mode of action. The scientific literature suggests high efficacy on many pest species such as lepidoptera, coleoptera, and hemiptera (aphid, mealybug and scales). The extent and rate to which oil penetrates spiracles depends on the viscosity and ratio of paraffin, lighter oils penetrate more quickly.



Cuticle Disruption

Around 90% of internal water is lost by many insects via cuticle transpiration. Therefore resistance to desiccation is dependent on the waxy cuticle layer whose main function is to water proof and control transpiration. Its been found that mineral oils cause a softening of the cuticle which correlates positively with a greater mortality by dehydration.

Cellular/Nerve Disruption



A cell membrane is the outermost barrier that separates the internal contents of a cell from the external environment. These membranes consist of lipids that align themselves (as shown here) with the hydrophilic (water loving) heads out and the hydrophobic (water hating) heads in.

Treatments with petroleum oils may disrupt the cell membranes and therefore the nervous system of insects. Scientists suggest that the nerve disruption is due to cell membrane permeability (leaky cells) and the displacement of lipids, some of which are also involved in the nervous system, leading to reduced synaptic transmission and loss of coordination and motor abilities.

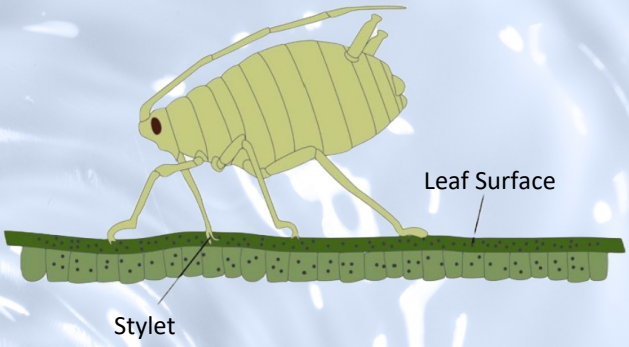
Once the spray oils have penetrated the cuticle they can accumulate in the lipid (fat) - containing tissues, the hind gut and nervous system and may go on to affect the energy supply provided by the tissues leading to eventual death.

Mode of Action

Behaviour Modification

Depositing a thin film of oil onto plant surfaces may inhibit insects from feeding or attaching eggs to surfaces. This has been observed in many pests such as Citrus Leaf Miner, Codling Moth, Leaf Hoppers, Pear Psylla, White Fly and various lepidopteran species.

Prevention of feeding is an important strategy in the prevention and spread of plant virus that rely on an insect vector such as aphids where oil can block mouth parts (stylets).



Egg Viability

Studies on the effect of various petroleum oils on lepidoptera have shown both contact toxicity and suffocation leading to the arrest of embryonic development and almost complete egg mortality, presumably through mechanical interference with normal gaseous exchange. Oils of around c24 (such as TRUMP† Spray Oil) are also considered an effective ovicidal treatment of Mites (seen here) by egg desiccation and better spreading on older bark of deciduous trees.

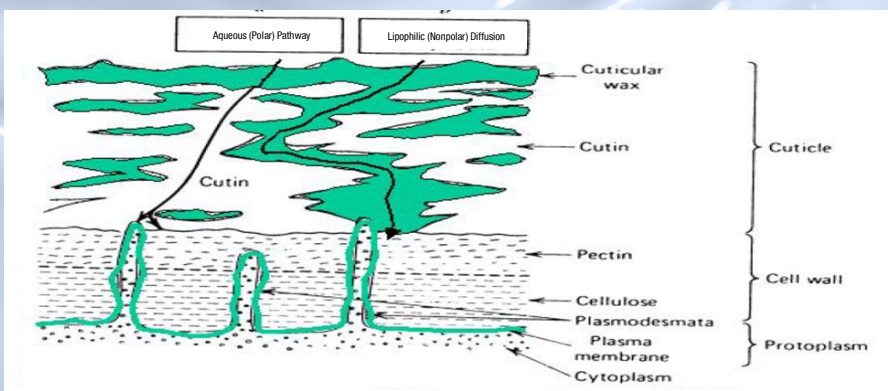
Penetration and deposition

A leaf surface is covered in a (cuticular) wax which prevents fluids passing through.

The narrow range oil in TRUMP† can help oil soluble tank mix partners enter the plant via the lipophilic pathway. Diffusing directly through the plant leaf waxy layer. Oils also reduce losses by evaporation on its way to the target and once deposited on the surface.

Surfactant packages included in commercial formulations can assist water soluble partners enter via the aqueous pathway i.e. gaps, cracks or holes in the plant leaf waxy layer.

Surfactants in TRUMP† also assist sprays to adhere and spread across the target surface.



TRUMP†

SPRAY OIL

Your Biggest Supporter

TRUMP† Spray Oil leads the way in supporting tank mix partners in delaying the onset of resistance through its multiple mode of actions or efficacy improvements.

This means growers get to use good chemistry longer.

Tank Mixing

TRUMP† Spray Oil can also be used in combination with certain fungicides, herbicides and insecticides as a tank mix partner (where specified on pesticide labels) to improve performance through enhanced coverage, penetration and activity.

With Fungicides

Oils have been found to have beneficial effects on various fungal diseases.

Oils coat the stomata (present on the lower leaf surface) and interfere with the entrance of fungal spores.

Some researchers have shown that oils can have fungicidal or fungistatic efficacy leading to suppression or prevention of powdery mildew in grapevines.

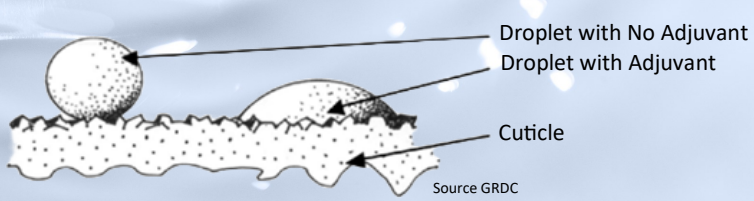
In banana crops, oils have been shown to delay initial infection, arrest development or otherwise enhance and synergise outcomes with tank mix partners

With Herbicides/Defoliants

TRUMP† Spray Oil acts as a carrier, an adjuvant and wetting agent which improves the performance of certain herbicides and defoliants.

It does this by

- Reducing driftable fines
- Reducing evaporation both in flight and on deposition
- Reducing degradation
- Assisting adhesion and spreading
- Improving penetration



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Compatibility

TRUMP† Spray Oil may be tank mixed with other pesticides to improve the level of kill or enhance coverage.

Users should read and follow all instructions on the label of the proposed tank mixed product.

For untried mixes and crops a physical jar test and small scale trial application should be undertaken.

If in doubt for your specific situation contact your agronomist or Vicchem Territory Manager.

Tank Mixtures

The table below provides an indicative guide to chemicals that are known to be or not be physically compatible with TRUMP† Spray Oil. Mixes with known issues highlighted in red.

Chemical	Compatible
Abamectin	Yes
Acetamiprid	Yes
Bifenthrin	Yes
B. thuringiensis	Yes
Buprofezin	Yes
Carbaryl	No
Chlorpyrifos	Yes
Clothianidin	Yes
Dimethoate	No
Fenbutatin-Oxide	No
Imidacloprid	Yes
Lime-Sulphur	No
Maldison	Yes

Chemical	Compatible
Mancozeb	Yes
Methomyl	No
Methidathion	No
Omethoate	Yes
Permethrin	Yes
Pirimicarb	Yes
Propargite	No
Pyrethroids	Yes
Spinetoram	Yes
Spirotetramat	Yes
Sulfoxaflor	Yes
Thiamethoxam	Yes
Spinosad	Yes

Chemical	Compatible
Tebuconazole	Yes
Thidiazuron	Yes
Propiconazole	Yes
Chlorothalonil	No
Sulphur	No
Ethephon	Yes
Clethodim	Yes
Haloxyfop	Yes
Fluroxypyr	Yes
Triclopyr	Yes
Quizalofop-P-ethyl	Yes
Clopyralid	Yes
Flutriafol	Yes

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Good Bug Benefits

Persistent, broad-spectrum sprays aggravate scale and mite problems. TRUMP† is an ideal product to use as part of an Integrated Pest Management (IPM) program due to being soft to beneficial species and therefore less likely to result in pest flare up.

Integrated Pest Management Defined

Integrated Pest Management involves evaluating your pest problems and applying the most appropriate solution from a list of chemical and non-chemical options while still considering the impact on the entire crop.

An example of poor management may be application of broad spectrum miticides that also kill natural enemies of mites or other pests. This in turn may create further problems (commonly referred to as "flare").

Fewer and or softer pesticides are often used in well-run IPM programs. While this is often not the overall objectives it is a natural consequence of considering an entire range of chemical and cultural control options.

Mite Control

Management of Mite populations is closely tied to encouraging and preserving beneficial insects.

Mite Flare can also be caused by

- Plant stress
- Unbalanced nutrients
- Hot, dry and dusty conditions
- Use of some insecticides and fungicides
- Weed spraying/removal of alternative hosts.

IPM Ratings

Based on a series of independent trials conducted in Australia where solutions of TRUMP† were applied directly to predators it was rated to generally pose a low risk when used within normal label applications rates.

According to world leaders in sustainable crop management Biobest and Koppert, mineral oils have been classified as only moderately, slightly or non-toxic to most commercially available beneficial species.

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Common Good Bugs

Used in a well designed integrated pest control program TRUMP† will assist in the preservation of beneficial species such as (but not limited to) the below.

Typhlodromus occidentalis

A common predator of the Two Spotted Mite (TSM) and immature stages or European Red Mite (ERM). Can be distinguished by its smooth shiny body.

Predator mites not located on treated surfaces at the time of the spray survive therefore allowing rapid re-establishment or immediate reintroduction.

Trichogramma carverae

An egg parasite of moths such as heliothis, codling moth, Oriental Fruit Moth (OFM) and Light Brown Apple Moth (LBAM). Eggs are deposited by adult females inside the freshly laid moth eggs.

On hatching, wasp larvae devour the contents of the moth egg, pupate and emerge as adults.

Because of TRUMP† s short term residual activity and low risk, wasps not present or unhatched at the time of spraying quickly re-establish. Commercial releases of Trichogramma can be carried out as soon as the spray has dried.

Mallada signatus

A predator of aphids, scales, mites and mealybugs. Larvae camouflage themselves with their prey. An accomplished killer using their sickle like jaws to pierce, pry and suck the contents of adults or eggs.

Mineral oils have been shown to be harmless (<25% reduction) on both adults and larvae of similar species and also allow reintroduction once dried.

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Product Summary

Highly refined Paraffinic Oil and Surfactants

Low Phytotoxicity Potential

Suitable for use throughout the year

High efficacy on certain insect pests eg. Scales

Suitable for use in Integrated Pest Management (IPM)

No Withholding Period (WHP)

(adhere to the withholding period specified on the label of any companion product(s) used)

Widely compatible

Australian Certified Organic

Australian Organic Registered Farm Input
ALLOWED INPUT 10033AI

Product Description

TRUMP† Spray Oil is a blend of highly refined paraffinic oil and non ionic surfactants that is suitable for the management of pests in a range of crops as specified on the product label. The purity of the paraffinic oil (USR not less than 98%) reduces the potential for phytotoxicity compared to many other oil based products while ensuring a highly effective method for managing pests.

Product Usage Summary

TRUMP† Spray Oil is registered to control various pests including mites, scale, aphids, citrus leaf miner, mealybugs, leafhoppers, lace bugs, thrips, whitefly and fungal disease. (See Table overleaf) TRUMP† can be used on a wide variety of vegetables, fruit, nut, and plantation trees, field crops, shrubs, greenhouse plants and ornamentals as specified of vegetables, fruit, nut and plantation trees, certain field crops, shrubs, greenhouse plants and ornamentals as specified on the label.

TRUMP† Spray Oil can also be used in combination with certain fungicides, herbicides and insecticides as a wetting agent / adjuvant / carrier as specified on the pesticide's label to improve performance through enhanced coverage and penetration.

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Product Performance

TRUMP† Spray Oil assists growers maximize produce value by killing pests directly and enhancing performance of certain pesticide products. It can also provide some fungicidal properties.

TRUMP† Spray Oil kills pests by direct contact by typically coating insects, causing suffocation, desiccation, interacting with an insect's fatty acids and interference with feeding and oviposition. Deposits of TRUMP† Spray Oil can also prevent settling of scale crawlers, by repellence and reduce the number of eggs laid.

When the spray solution contacts the plant surface, the water separates from the oil and evaporates. This leaves a thin layer of oil over the surface of the plant and insects.

Suggestions for use

Always follow the directions for use on all product labels.

Use a sprayer system that will provide good contact of the spray solution with all of the surfaces of the plant/tree. E.g. An oscillating boom with a horizontal outrigger.

Do not spray if plants/trees are suffering from moisture stress or the weather conditions are hot and/or dry.

Pest control is often more effective when using higher spray volumes, to ensure complete coverage, in contrast to higher concentrations of oil in lower spray volumes

Pests Controlled Include

Scale Insects (and eggs)
Red Scale
White wax scale
Pink wax scale
Black scale
Soft brown scale
San Jose scale
Oyster shell scale
Grapevine scale
Olive scale
California red scale

Mites (and eggs)
Spider mites
European red mite
Two spotted spider mite
Brown mite
Pear rust mite
Pear leaf blister mite

Other
Mealy Bugs
Aphids
Whitefly
Leafhopper
Leaf Miner
Thrips

TRUMP† can be applied to Citrus, Stone/Pome, Grapes, Tropical & other Fruits, Berries, Vegetables or Ornamentals to control the pests as listed above.

For specific details on rates, crop, pest, timing and uses with other products refer to the TRUMP† label.

TRUMP†

SPRAY OIL

Other Horticultural Specialties Available

MAXIMUM MARKET ACCESS AND FOOD SAFETY WITH OUR NO RESIDUE PRODUCT RANGE.

Vicchem offers an established range of No and Ultra Low Residue pest control and growth regulator options uniquely suited to Integrated Pest Management, while still providing maximum market access for producers and the highest food safety for consumers.

When used correctly our softer and sustainable chemistries provide adequate control of a range of pests while protecting the environment and natural or introduced predators.

Talk to your nearest reseller or Vicchem Territory manager today!

VICCHEM The Right Chemistry

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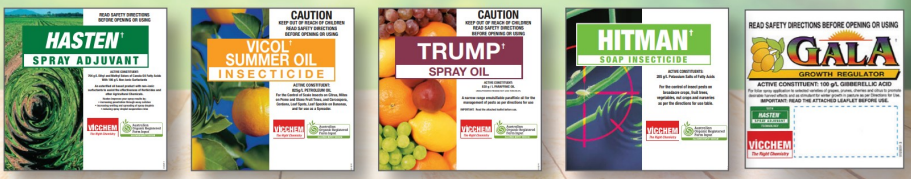

More Information & Contact Details

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The Company

Victorian Chemical Company is committed to providing quality products and professional and friendly service, that our customers can confidently rely on to add value to their businesses. In order to achieve this goal we will continue to develop, our understanding of our customer's requirements, the operations of our company and our technical expertise.

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