UNDERSTANDING SPRAY OIL QUALITY

KEY POINTS

This technical data sheet provides an overview of the key factors influencing spray oil quality.

QUALITY = EFFECTIVENESS + SAFETY

Spray oils vary considerably in quality. It is important to understand how they differ so you can use the right oil in the right circumstances. The quality of the spray oil you use will define two things:

- **Effectiveness:** How effective it will work in helping control fungal disease and pests.
- **Safety:** How safe it will be to the fruit, tree and environment.

So how do we determine how safe and effective a spray oil will be? Below is a checklist that provides an effective guide to ensuring product quality. SACOA's premium horticultural oil *BIOPEST®* is used to illustrate the points made.

	FACTOR	DISCUSSION	EXAMPLE
1.	**VIRGIN OIL**	Spray oils should originate only from a virgin mineral oil, NOT recycled oils.	*BIOPEST®* is produced from a pharmaceutical grade virgin paraffinic mineral oil.
2.	**PRODUCT PURITY**	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 So how can we measure purity? A widely accepted measure is unsulphonated residue level (USR or UR). Base oil quality and the level of product refinement will determine a spray oil's USR. This measures the absence of potentially damaging impurities (referred to as aromatics and other unsaturates). In oils, spray oil should not contain any more than 8% impurities (ie, 92% USR).	*BIOPEST®* offers less than 1% impurities (ie, 99% USR) which is the highest level achievable with current refining technology - thereby minimising the potential for plant or fruit damage.
3.	**CHEMICAL COMPOSITION / PARAFFINIC CONTENT**	Mineral spray oils are developed primarily from the lubricant portion of petroleum and are composed essentially of hydrocarbons - compounds containing hydrogen and oxygen. There are three types of these molecules found in spray oils which are important in understanding how spray oils work, or don't work: 1. **Paraffin chains:** These have the highest insecticidal value and plant safety. A spray oil should comprise at least 62% paraffin chains to be regarded as a paraffinic oil. 2. **Napthene rings:** These have a lower insecticidal efficacy than the paraffin chains. 3. **Aromatic rings:** These are the toxic structures that can cause plant damage.	*BIOPEST®* comprises 74% paraffinic molecules.

4.	**ACTIVE CONSTITUENT**	Spray oils are required to list the amount of active constituent in the product on the product label. For example *BIOPEST®*'s is 815g/L of paraffinic oil. What does this mean? It means that by weight, *BIOPEST®* contains 815g of paraffinic oil in every litre of product. It is less than 1kg because of two things: 1. **Specific gravity:** The specific gravity of most spray oils is less than one. If an oil's specific gravity is say 0.815, this means that 1L of oil weighs 0.815kg. Hence 1L of product contains 815g/L of paraffinic oil. 2. **Surfactant:** The surfactant used may take up between 1%- 3% of the weight of the product, or up to 15% as in the case of Crop Oil concentrates (COCs) such as SACOA's *ENHANCE® Spray Adjuvant.* In terms of pest and disease management what is important in this measure is the type of oil used. Is it a paraffinic oil?	*BIOPEST®*'s is 815g/L of paraffinic oil. 
5.	**WEIGHT OF THE OIL**	How long a spray oil remains on a pest or foliage will strongly influence how effective it will be and how long it remains will depend greatly upon its molecular size or 'weight', as measured by carbon number. Carbon number (e.g. nC24) measures the number of carbon atoms in each molecule of oil and is used to indicate an oil's molecular size or 'weight'. Common carbon number values of spray oils are nC21, nC23, nC24 and nC25. This factor will influence its sticking ability i.e. the heavier the oil the greater the sticking power and residual contact. There is a trade-off however, as there is also a greater potential for plant damage.	*BIOPEST®* is an nC24 rated oil, whereas most of its competitors are lighter eg, nC21. As *BIOPEST®* is uniquely pure it will keep the active on the plant longer without damaging the plant or fruit.
6.	**DISTILLATION TEMPERATURE RANGE (BOILING RANGE)**	The distillation range is obtained by subtracting the distillation temperature where 10% volume is distilled from the temperature at which 90% volume is distilled. A 'narrow range' oil is a highly refined oil that has a 'narrow range' of temperature distillation. This ensures that the level of the more volatile, low boiling components and the level of the less volatile, high boiling components are both low. The low boiling components evaporate too quickly to be effective, and the high boiling components stay on the plant too long and could damage it.	*BIOPEST®* is a highly refined narrow-range oil.
7.	**SURFACTANT QUALITY**	Surfactant quality can have a significant impact on mixing and spraying by assisting the mixing of the oil with water, and improving the wetting, spreading and penetrating properties of the oil.	All of SACOA's products contain rapidly biodegradable emulsifiers, reducing the potential for phytotoxicity.

8.	**REGISTRATION AND ORGANIC CERTIFICATION**	Products should be registered with the APVMA for their intended use pattern, and should be certified organic for use in organic production.	*BIOPEST®* has the most extensive APVMA approved label for horticultural applications. *BIOPEST®* is certified organic by Australian Organic. Certified Allowed Input ACO CERT. NO.11392
9.	**RESEARCH RESULTS**	Product quality and efficacy should be supported by independent research results in the lab and field.	Twenty years of independent work by a range of state government, university and industry researchers.
10.	**PRODUCT SUPPORT**	What support does the product have?	• Ongoing research into use in tree cropping, cotton, bananas and broadacre. • Extensive supporting data and documentation available.

FIND OUT MORE

Further information is available at SACOA.com.au or by contacting SACOA on 08 9386 7666 or contact your local SACOA representative;

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