BioNeem® is a Neem based biopesticide with a blend of 10,000 ppm of pure Azadirachtin technical (1%w/w) and neem oil (30%w/w) plus liminoids including; Meliantriol, Salanin, Nimbin and a host of other terpinoids in the ratio that occurs naturally in Neem, for effective insecticidal action.

BioNeem® is effective against sucking and chewing pests including mites. With multiple modes of action, the product is well suited in Integrated Pest Management (IPM) and Insect Resistance Management (IRM) programs.

Features:

- Broad spectrum, natural plant based botanical insecticide
- Does not create resistance, resurgence nor residue problems
- Forms a good molecule for use in an IPM programme

Benefits:

- BioNeem® effectively controls the economically important pests such as whitefly, aphids, thrips, mealy bugs, caterpillars and leafhoppers in a wide range of crops.
- Does not affect natural enemies. Safe to use with beneficial parasites and predators, thus offering long lasting pest control.
- Helps to increase productivity by controlling pests and improving crop health.
- BioNeem® is eco-friendly and helps to maintain the Ecological Balance.
- Insects cannot develop resistance against BioNeem®.
- Guarantee of below threshold Aflatoxins B1, B2, G1, G2 < 0.001ug/g
- No residue
- Lower cost per litre or per hectare

Key Points:

- Chemical composition: Azadirachtin technical A&B plus neem oil
- Dosage: 800 - 1200 mls/ha (1ml/litre or 100mls/100litres)
- Method of application: Spray
- Spectrum: broad
- Compatibility: compatible with all horticultural products
- Duration of effect: 7 - 10 days
- Frequency of application: depends on pest incidence or severity of disease
- Applicable crops: multiple (see table)
- Extra description: BioNeem® is the extract of natural neem and contains triterpenoids and azadirachtin technical, which are very effective against insects and safe for humans and animals

GROSAFE CHEMICALS LTD
20 Jean Batten Drive, Mt Maunganui, 3116
PO Box 14 450, Tauranga 3143, New Zealand

ph: +64 7 572 2662
freephone: 0800 220002
email: info@grosafe.co.nz
www.grosafe.co.nz

BioNeem is a Registered Plant Based Insecticide

BioNeem® is a naturally based anti-feeding insecticide. It leads to feeding inhibition and to moulting and a reduction in fecundity and breeding ability. BioNeem® controls a wide range of plant pests without harming beneficial insects. Registered pursuant to the ACVM Act No. P9791.

More than 60 Active Ingredients

The complex Neem limonoid spectrum of more than 60 active ingredients and the multiple modes of action of BioNeem® prevents pests from developing resistance. This complex called BioNeem® Technical is in the formulation as 40g or 40,000 ppm azadirachtins with 10g or 10,000 ppm azadirachtin A and B as the leading active ingredient per litre.

In comparison to other Neem products based on neem oil, BioNeem® contains four times the amount of active ingredient compound in a standardised form. Unlike synthetic insecticides with only one biologically active compound, where their repeated use invariably results in build-up of resistance among the target insects, BioNeem® has multiple actives and no risk of resistance.

Are Azadirachtin and Neem Oil the Same?

Neem oil and azadirachtin are not the same but the two are closely related. Both come from the Neem tree native to India but now grown in warm climates around the world. Both substances are effective for repelling and killing insect pests and also interfere with feeding, mating and egg laying.

Both are safe for humans, wildlife and the environment when used correctly. Bees and other pollinators are also unharmed. Neem oil and azadirachtin may be slightly to moderately harmful to fish and aquatic mammals.

Azadirachtin vs Neem Oil

Azadirachtin has proven to be effective against 200 insect species, including common pests such as; aphids, mealy bugs, mites, scale, thrips, whitefly and leaf rollers.

When azadirachtin is extracted from neem oil, the substance left over is known as clarified hydrophobic extract of Neem oil, commonly known as neem oil extract.

Neem oil extract contains a lower concentration of azadirachtin and is less effective against insects. However, unlike azadirachtin, neem oil is effective not only for insect control but also against rust, powdery mildew, sooty mould and other fungal diseases.

GROSAFE CHEMICALS LTD
20 Jean Batten Drive, Mt Maunganui, 3116
PO Box 14 450, Tauranga 3143, New Zealand

ph: +64 7 572 2662
freephone: 0800 220002
email: info@grosafe.co.nz
www.grosafe.co.nz

Directions for Use

As a preventative treatment before pests appear, apply every 3 -4 weeks.
The higher active components provide for lower use rates, improved efficacy and crop safety.

CROPS	PESTS	RATE/Litre of Water	COMMENTS
Vegetables, Fruits, Ornamentals, Plantation crops, Lawns, Flowers	Mealy bug Mites Scale Thrips Whitefly	1ml	Apply when the pests are first seen. Monitor crop and repeat the application 10-14 days later if necessary. When pest monitoring indicates high levels are present, a cluster of 2-3 sprays at 7 day intervals may be necessary to achieve best control.
	Aphids	1ml	Apply when the pests are first seen. Monitor crop and repeat the application 10-14 days later if necessary.
	Leaf miners (flies)	1ml	Apply when the pests are first seen. Apply 2-3 sprays at 7 day intervals.

Physical and Chemical Properties

Physical form:	Liquid
Colour:	Clear Brown
Odour:	Characteristic repulsive smell
Flash point:	38 - 42°C
pH:	6.5 2
Solubility in water:	Soluble
Specific Gravity (@27°C)	0.92
Corrosion:	Nil
Miscibility:	Miscible in water

Stability and Reactivity

Stability:	Stable
Hazardous polymerization:	Will not occur
Incompatibilities:	Not compatible with highly alkaline substances
Decomposition:	Easily biodegradable

GROSAFE CHEMICALS LTD
20 Jean Batten Drive, Mt Maunganui, 3116
PO Box 14 450, Tauranga 3143, New Zealand

ph: +64 7 572 2662
freephone: 0800 220002
email: info@grosafe.co.nz
www.grosafe.co.nz

Toxicological Information

Acute oral toxicity (Rat):	> 8680 mg/kg body weight (physically non-toxic)
Acute oral toxicity (Mice):	> 8680 mg/kg body weight (slightly toxic)
Acute dermal toxicity (Rat):	> 2000 mg/kg
Eye contact (Rabbit):	> Slightly irritating
Skin contact (Rabbit):	> Slightly irritating

Ecological Information

Totally biodegradable in nature
Do not apply on water bodies

AZADIRACHTIN & NEEM OIL - *Dr Raymond A. Cloyd*

The term "neem" is sometimes used to refer to azadirachtin and Neem oil. However, this isn't the correct use of the term. Neem is derived from the neem tree, Azadirachtin indica, but it isn't a single substance. The seed kernels contain the highest concentrations of active compounds.

Seeds are soaked in water and ethanol to extract any pesticidal constituents. After removal of the natural neem oil from the seeds, the subsequent neem oil goes through a process causing the azadirachtin and related substances to separate from the neem oil. Therefore, the two main active ingredients derived from the neem tree are; azadirachtin and clarified hydrophobic extract of neem oil (also referred to as "neem oil").

BioNeem® contains 10,000 ppm (1%) of pure azadirachtin and 30% clarified hydrophobic extract of neem oil to produce a high efficacy "Super Neem".

Azadirachtin

Azadirachtin isn't a single substance but has a very complex structure being a mixture of related substances extracted from neem seed kernels. The seeds are the only source of azadirachtin.

Azadirachtin affects insects in many different ways, including acting as an insect growth regulator, repellant, anti-feedent, sterilant and/or oviposition inhibitor. Azadirachtin, as an insect growth regulator, is an antagonist (a substance that acts against and blocks a physiological action) that inhibits the synthesis or metabolism of the insect molting hormone, ecdysone. Consequently, inhibition of the molting process and thus metamorphosis, causes insects to die when transitioning into the next life stage or instar (insect stage between molts). Disruption of the insect life cycle prevents the production of future generations.

Azadirachtin is only effective on the immature/young life stages of insects. Moreover, azadirachtin is slower-acting than conventional insecticides, which is primarily due to azadirachtin altering or

modifying the behaviour of insects. The material works as a stomach poison in which insects must ingest the active ingredients during feeding in order to be negatively affected. Activity is better on chewing than sucking insects, which is why azadirachtin is effective against caterpillars.

Azadirachtin has minimal contact activity and is most effective at warmer temperatures (>21°C) with reduced efficacy at lower temperatures. Azadirachtin may have systemic properties with activity against certain insect pests, although this depends on plant type and pH of the growing medium, with less systemic activity at pH >7.0 (alkaline).

Although azadirachtin may have systemic properties, water solubility is very low (0.05 ppm), which means azadirachtin takes time to be distributed/translocated throughout the plant vascular tissues (e.g. xylem and phloem). Some studies have reported that foliar applications of azadirachtin are effective in suppressing populations of the two-spotted spider mite (*Tetranychus urticae)*. BioNeem® is labelled for use against many different insect pests, including aphids, caterpillars, leafminers, mealy bugs, scales, thrips and whitefly.

Clarified hydrophobic extract of neem oil

Clarified hydrophobic extract of neem oil works by suffocating (blocking breathing pores) of insect and mite pests. Neem oil is active on a wide range of soft-bodied insect and mite pests.

Neem oil may kill eggs, immatures (larvae or nymphs) and adults; however neem oil only has contact activity, so it is important to obtain thorough coverage of all plant parts and make repeat applications based on label recommendations.

Raymond A. Cloyd is a State Extension Leader for Entomology and Professor and Extension Specialist in Horticultural Entomology/Plant Protection for Kansas State University.

In Summary

BioNeem® is a unique new generation formulation. It is formulated by using technical grade azadirachtin at a rate of 10g/litre and neem oil at a rate of 300g/litre. Azadirachtin technical is the true insecticide and is extracted from the neem seed while neem oil is added back to the formulation as a compatible "carrier" that provides additional insecticidal properties.

This clarified hydrophobic extract of neem oil supports the active ingredient, azadirachtin technical, by suffocating insect and mite pests.

While neem oil is active on a wide range of soft bodied insect and mite pests, the real insecticidal activity in BioNeem® comes from the azadirachtin technical.

BioNeem® also displays insect growth regulator properties involving anti-feeding and behaviour modification of insects (insects will stop feeding on treated plants and will not lay eggs).

In addition BioNeem® is generally safe to predators and is suitable for use in IPM programmes. Any direct effects of BioNeem® on predators could vary depending on the life stage of the predator, but it is recognised as safe to beneficial insects.

GROSAFE CHEMICALS LTD
20 Jean Batten Drive, Mt Maunganui, 3116
PO Box 14 450, Tauranga 3143, New Zealand

ph: +64 7 572 2662
freephone: 0800 220002
email: info@grosafe.co.nz
www.grosafe.co.nz