ECOCLEAN-50 PLUS
(PHARMA GRADE)

PRODUCT DESCRIPTION

Ecoclean-50 Plus (Pharma Grade) is a nano-emulsion of Neem concentrate, derived from the bitter element of cold-pressed neem oil. Neem (*Azadirachta indica*) is recognized as a medicinal plant well known for its antibacterial, anti-malarial, anti-viral, and anti-fungal properties. Neem nano-emulsion (NE) is formulated using neem oil, Tween 20, and water by high-energy ultrasonication. The formulated neem NE showed a high level of anti-bacterial activity against the bacterial pathogens like *Vibrio vulnificus, Escherichia coli, Legionella* and *Salmonella* strains by disrupting the integrity of the bacterial cell membrane.

STUDIES HIGHLIGHTING THE ANTI-BACTERIAL ACTIVITY OF NEEM

Werner Fabry (Fabry et al 1998) in his study tested the extracts of *Azadirachta indica* (stem bark and leaves) against 105 strains of bacteria from seven genera (*Staphylococcus, Enterococcus, Pseudomonas, Escherichia, Klebsiella, Salmonella, Mycobacterium*). The minimum inhibitory concentration reached by 50% (MIC50%) and 90% (MIC90%) of the strains for the extracts of *A. indica* (stem bark) ranged from 0.25–2 mg/ml and from 0.5 to 2 mg/ml, respectively. Moreover extracts of the edible part (flowers) of *A. indica* also showed antibacterial activity against *Bacillus cereus, Staphylococcus aureus, Listeria monocytogenes, Escherichia coli* and *Salmonella infantis* (Alzoreky and Nakahara 2003).

From a preliminary study it has been found that β-sitosterol, a phytochemical found in *A. indica* has a role in strengthening the immune system (Bumrela and Naik 2011). Hence, many people apply it on skin for treating wounds, burns and for curing skin diseases (Pandey et al. 2014). The phyto-constituents, β-sitosterol along with β carotene in the methanol extract are also a well-known antibacterial agents functioning against a broad spectrum of both Gram negative and Gram positive bacteria, including *S. aureus* (Bumrela and Naik 2011).

A clinical treatment study using formulation of muco-adhesive dental gel containing *Azadirachta indica* leaf extract (25 mg/g) showed microbial evaluation of *Streptococcus mutans* and *Lactobacilli* species which was carried out to determine the total decrease in the salivary bacterial count (Pai *et al,* 2004). *Enterococcus faecalis* is the most commonly found bacteria in failed root canal. Sodium hypochlorite (NaOCl) and 2% chlorhexidine (CHX) are used as the root canals irrigants (Bazvand *et al*, 2014), whereas, constant increase in antibiotic resistant strains and side effects of chemical irrigants has led to the search for alternative herbal medicaments.

Thus, Gonmode *et al,* Bazvand *et al (*2014), Hegde *et al* (2013), and Damre (2015) in their studies observed higher inhibition zone of *E. faecalis* culture by neem leaves extract compared to that of NaOCl. Further studies showed that the antibacterial activity of neem could be due to the presence of several active constituents like nimbidin, nimbin, nimbolide, gedunin, azadirachtin, mahmoodin, margolone and cyclictrisulphide (Biswas *et al* 2002).

Antibacterial activity along with anti-secretory and anti-hemorrhagic activity was found against the multi-drug-resistant *Vibrio cholera* (serotypes O1, O139 and non-O1, non- O139), a causative agent of watery diarrhea such as cholera, from the methanol extract of neem leaf (Thakurta *et al* 2007).

Methanolic extract of **neem** leaves has shown virucidal **activity** against coxsackievirus virus B-4 (27) . The **antiviral activity of neem** leaves has been found to be **due** to the presence of flavonoids, triterpenoids and their glycosides.

Some bioactive compounds from neem (Biswas et al 2002):

Neem compound	Source	Biological activity
Nimbidin	Seed oil	Anti-inflammatory, Antiarthritic, Antipyretic, Hypoglycaemic, Antigastric ulcer, Spermicidal, Antifungal, Antibacterial, Diuretic
Nimbin	Seed oil	Spermicidal
Azadirachtin	Seed	Antimalarial
Mahmoodin	Seed oil	Antibacterial
Gallic acid, (–) epicatechin and catechin	Bark	Anti-inflammatory,Immunomodulatory
Polysaccharides GIa , GIb	Bark	Antitumour
Cyclic trisulphide and cyclic tetrasulphide	Leaf	Antifungal

Long before the advent of vaccines, Neem has been traditionally used in India for combating the spread of viral infections such as measles, small-pox and chicken-pox. Experiments with small-pox, chicken-pox and fowl-pox have shown that neem is very effective for preventing the spread, if not for curing, these conditions. The neem extracts absorb the viruses, preventing them from spreading to unaffected cells. Neem has also been shown to be effective against herpes virus and the viral DNA polymers of the hepatitis B virus.

In 1993, in a preliminary study, the National Institute of Health reported positive results from *in-vitro* tests where neem bark extracts killed the AIDS virus. Using extracts made by soaking neem bark in water, Dr Van Der Nat of the Netherlands found that the extract produced a strong immune stimulating reaction. Neem contains immune modulating polysaccharide compounds; the polysaccharide may be responsible for increasing antibody production. Other elements of neem may stimulate immune function by enhancing cellular mediated response. This dual action can help the body ward off the frequent infections that generally accompany AIDS.

Ecoclean-50 Plus, thanks to its effective anti-microbial action, even against very stubborn strains of bacteria, algae and even viruses, is recommended for use not only in fermented organic effluents, which give out a foul odour, post treatment, but also as a disinfectant cum sanitizer to prevent the spread of viral infections. A dosing of 15 to 20 ppm is recommended. **Ecoclean-50 Plus** is also recommended for use in AC cooling towers and chilling plants where slimy algal growth and proliferation of disease-causing bacterial strains like *Legionella* (pneumonia causing bacteria) are common. 15 to 20 ppm dosing for a week to 10 days would be sufficient to totally control the infection. A maintenance dosing of 15 ppm once a month is recommended to prevent re-infection.

Incubation time/Hours	Product ml/litre	Bacterial Concentration							
		10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}
0	0.25	+++	+++	+++	+++	+++	+++	+++	+++
	0.5	+++	+++	+++	+++	+++	+++	+++	+++
2	0.25	+++	+++	+++	+++	+++	+++	+++	+++
	0.5	++	++	++	++	++	++	++	++
4	0.25	++	++	++	++	++	++	++	++
	0.5	+	+	+	+	+	+	+	+
5	0.25	+	+	+	+	+	+	+	+
	0.5	--	--	--	--	--	--	--	--
24	0.25	--	--	--	--	--	--	--	--
	0.5	--	--	--	--	--	--	--	--

+++ : heavy growth; ++ : moderate growth; -- : no growth

Results : *100% bacterial growth was arrested in 5 hours at 0.5% concentration.*

EcoHealth

Ecoclean-50 Plus mixed into aerosol sprays (1 ml of concentrate for 10 litres of spray) or floor swabbing water (2 ml of concentrate for 5 litres of water) can be used in hospitals, airports, passenger flights, etc to prevent the unchecked spread of viral infections like Zikka fever, Bird flu, Swine flu and even the currently talked about Corona Virus. It can also be added to swimming pools or drinking water storage tanks (1 ml concentrate for 100 litres of water), as both preventive and curative aid in the case of pandemics.