

## Neemcake An Eco-Friendly Input for Sustainable Agriculture

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Neem (*Azadirachta indica*) is an attractive evergreen tree (deciduous in drier areas) native to the Indian subcontinent. It is also cultivated throughout the South East Asia, Australia, east and sub Sahelian Africa, Fiji, Mauritius and many countries in Latin America. Neem is a multipurpose tree species with historical, religious and social uses that have interwoven with the lives of rural and urban people for over 4000 years. In Sanskrit it is called as "ARISHTA" that's means relieving sickness. The earliest Sanskrit writings mention about its medical uses. For centuries, the tree is held in esteem by Indian folk because of its medicinal and insecticidal values. The tree is not only familiar but also very sacred to many Indians. It is renowned for its growth and resistance to harsh conditions. Neem is versatile tree species with variety of uses in Agriculture industry, medicine, energy and timber.

The neem tree and its derivatives have great relevance in ecological agricultural practices. This remarkable tree has been identified as renewable resource for home grown agrochemical and nutrients, which are biodegradable, non-toxic and effective. In ancient time neem derivatives were used in villages to protect and nourish crops mainly due to it extracts influence nearly 400 species of insects.

The active constituents are the tetranortriterpenoids and several other chemical compounds isolated from the seeds, kernels, oil, and leaves. These exert pronounced behavioral and physiological effects on insect pests of 15 orders. Azadirachtin is the major limonoid exerting antifeedant effect. The effect varies with insect species and is dose dependent. The growth-regulating effects are more consistent on insects. Neem is safe to mammals with low toxicity on predators and parasitoids used for biocontrol of pests. Neem combines well with chemical, botanical, and microbial pesticides and is regarded as a "biorational pesticide" for integrated pest management (IPM). Neem oil, neem seed kernels, and neem cake are basic to pesticide production and have a global market. Currently, neem formulations are used to control pests and fungal diseases on several greenhouse crops, cotton, rice, ornamentals, and vegetables. Neem can be developed as a broad-spectrum pesticide by

combining with botanicals, microbial bio-pesticides, synergists, antagonists, and adjuvants to enhance its activity, longevity on plants and contact action, making it comparable with other potent insecticides and mitigating against its overuse and likely pest resistance.

Neem products belong to the category of medium to broad-spectrum pesticides they are effective over a wide range of pests. Neem products work by intervening at several stages of the insect life. They may not kill the pest instantaneously but incapacitate it in several ways. Neem very subtly employ's effects such as repellence, feeding and ovipositional deterrence, growth inhibition, mating disruption, chemosterilization etc. these are now considered for more than a quick knockdown in integrated pest management programmes as they reduce the risk of exposing pest's natural enemies to poisoned food or starvation. This unique tree is perhaps the most significant example of how nature can combine diverse functions that's why the action of de-oiled neem cake as a pesticide cum fertilizer.

Neem cake is residue or product left after extraction of oil from seeds. Indian farmers have traditionally used neem cake as a fertilizer in their fields. The dual activity of neem cake as fertilizer and pest repellent has made it favored input. Application of neem cake to crops provide various nutrients besides it also reduces the number of soil insect pests, fungi, bacteria and nematodes and protects the crop from damage caused by these organisms. It also reduces alkalinity in the soil by producing organic acids when mixed with the soil. The calcium and magnesium present in neem cake also aids in managing the alkalinity. When neem cake is ploughed into the soil, it protects from nematodes and white ants, it's due to its content of the residual limonoides.

- Neemcake has fertilizer cum pesticidal properties
- It enhances the growth, leafage results in blossoming, strengthen the roots and improve the appearance
- It prevents and treats ailments disorders of plants due to lack of imbalance of nutrients and trace elements

- It accelerates root development and overall plant growth and protects the plant from root grub and collar rot
- It is totally organic plant food, which increases productivity and soil fertility

Farmers opined that, due to application of neem cake less menace of pigs and wild boars damage has been observed. After realizing the importance of neem cake, many farmers produced or own prepared and applied neem cake to their fields.

Any agricultural system must be ecologically sound for long term food sufficiency, equitable in providing social justice and ethical in respecting both future generations and other species. The use of the neem tree products may provide key component in more sustainable agricultural system including pest and nutrient management, human health and environmental conservation.

Neem extracts can be applied in many ways including some of the most sophisticated sprays, powders, drenches or dilutants and in irrigation water. In addition, they can be applied to plants through injector either as dust or spray.

Neem extracts are known to act on various insects in the following ways

- Repelling larvae and adults
- Disrupting or inhibiting the development of eggs, larvae and pupae
- Blocking the moulting of larvae or nymphs
- Disrupting mating and several other communications
- Deterring females from laying eggs
- Sterilizing the adults
- Poisoning larvae and adults
- Deterring the feeding

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