

## Beneficial Consequence of Neem and Neem Derivatives in Organic Farming

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### Introduction:

Neem (*Azadirachita indica*), commonly known as Neem or Indian lilac. It is known as traditional plant in India. Neem has multiple pesticidal, medicinal, antifungal, antibacterial and immunomodulatory properties. It has been extensively used in ayurved, unani and homeopathic medicines. Neem and its derivatives have great relevance in organic farming practices. This remarkable tree has been identified as a renewable resource for home grown agro-chemical and nutrients which are bio-degradable, non-toxic and effective. Neem cakes and neem leaves can be used as organic manure, bio-pesticide, fertilizer coating agent soil conditioner in organic. Long before synthetic and commercial insecticides and fertilizers were available, neem derivatives were used in Indian villages to protect and nourish crops. Neem plant has more therapeutic properties, which are further to be tapped.

Organic farming encourages those practices which are less harmful to the environment and mammal's health.

Neem is attracting worldwide attention in recent decades mainly due to its bioactive ingredients that find increasing use in modern crop and grain production.

In traditional India, the entire agriculture was practiced using organic techniques, where the fertilizers, pesticides etc were obtained from plant and animal products. Land was fertile and it was cultivated using all natural methods and components. Only organic manure were used instead of inorganic chemical fertilizers.

Organic farming is a method of farming system which primarily aimed to cultivating the land and raising crop in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and biological materials along with beneficial microbes to release nutrients to crop for increased sustainable production in an eco friendly pollution free environment. Organic farming protecting the long-term fertility of soil by maintaining organic matter level and biological activity.

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Neem is extremely beneficial to save the environment from pollution. Neem is a veritable 'kalpataru' for giving healthy environment. It exhale out Oxygen and keep the oxygen level in the environment balanced. Neem helps in restoring and maintaining soil fertility which makes it highly suitable in agro-forestry. Neem has powerful pest controlling activities. Pesticides made from neem are products of natural plant origin. They are biodegradable and non toxic. Neem oil from neem tree contains Azadirachtin active ingredient which is used as bio-pesticide. Urea is highly soluble in water as result nitrification and denitrification reduces its efficiency if urea is coated with Neem the loss can be minimized as coating of urea makes it a slow release fertilizer, making available to plant for a longer duration. The action of neem derivatives fulfills all priorities among environmental objectives.

The derivatives of neem contribute in sustainable development and resolve pest control problems in agriculture. This unique tree is most significant example of how nature can combine diverse functions Ex- the action of Deoiled neem cake as a pesticide cum fertilizer.

Neem derivatives are used as neem insecticide, neem pesticide, neem pest fumigant, neem fertilizer, neem manure, neem urea coating agent and Neem soil conditioner. Neem derivatives are effective in insect growth regulators. It inhibits insect growth and development. Neem plant as do all plant, contain several hundred chemical of special interest are terpenoids. Most active and well studied compound is Azadirachtin. Neem terpenoids are present in almost all parts of the plant in the living tissue. Neem leaves might be used in a green leaf manuring, mulching, and composted and also in storage of grains.



**Fig. 1:** Neem (*Azadirachta indica*)

Neem extract is beneficial against leaf eating caterpillar, grubs, locust and grasshopper. Neem tree is now gaining importance due to its commercialization in agriculture, cosmetics, medicine, toiletries and various industries. Some companies are now using Neem product (neem oil and leaves) for production of cosmetic like facial creams, nail polish, nail oils, shampoos, conditioner etc.

### **Application of neem derivatives in sustainable farming or organic farming**

#### **Neem as manure:**

Manure is animal or plant waste which is used in land for improving soil fertility and crop productivity. They release nutrients after their decomposition. Neem as manure is gaining popularity now a days because it is eco-friendly and also increase nutrient content in soil like as nitrogen, phosphorus, sulphur, potassium, calcium etc. its use basically ensures a high yield of crop.

#### **Neem as urea coating agent:**

Urea is major fertilizer used broadly as a nitrogen supplier for crop growth. Urea contains highest nitrogen content of all solid nitrogenous fertilizer. Neem is used as urea coating agent because it inhibit nitrification properties of urea. This way it slow down the process of nitrogen release from urea. Neem coated urea enhance the yield about 48%. Decreases urea requirement, hence save

money. Neem coated urea also act as pesticide and antifeedent for insects and mammals.

#### **Neem as fertilizer:**

Neem can be used as organic fertilizer. Neem cake is a bio fertilizer that can be used for organic farm, agriculture, gardens and lawns. Neem leaves also can be used for green manuring in situ in organic farming. When it is ploughed into the soil it protects plant roots from nematodes and white ants. Neem cake has adequate quantity of nitrogen, phosphorus, potassium in organic form for plant growth and development. When neem cake is thoroughly mixed with urea, it forms a fine coating on it and protects from the nitrogen losses by denitrification and reduces leaching losses and ensures availability for a longer time. It can be used as fertilizer for different crops like cereals, pulses and cash crops, particularly rice, wheat, maize, cotton, sugarcane etc.

#### **Neem cake:**

Neem cake is a bio fertilizer which has beneficial effect on soil, soil organisms and plants. Neem is obtained from neem seed kernel and consists of natural nutrients with Nitrogen, Phosphorus and Potassium. It improves soil organic content, helping Improve soil texture and soil aeration for better root development. Studies show that garden yield can be 15 to 25% higher when neem cake is used. Neem is cost effective to other types

of fertilizer. Neem can reduce alkalinity in soil by producing organic acid when mixed with soil. Being natural it is compatible with soil microbes and rhizosphere microflora and ensures the fertility of soil.

### **Neem as soil conditioner:**

Soil conditioner, also referred to as soil amendments; help improve soil structure by increasing aeration, water holding capacity and nutrients. For best result, it is essential to mix the soil and soil conditioner before planting. Soil conditioner improves this soil fertility and enhances the crop productivity. It not only the plant grows but also prevent them from being destroyed by certain pest and insects.

Neem soil conditioner by neem seed kernel or powdered seed. It can be applied before or after sowing. After this irrigation is essential for reaching of nutrients in the root zone of plant. It can be used in horticulture, floriculture, vegetables, and cash crops in organic farming. It is a rich source of naturally occurring nitrogen, phosphorus and potassium. It also contains secondary nutrients like calcium, magnesium in addition to micro nutrients like zinc, iron and boron etc. It optimizes soil microflora. It helps to control root-knot nematodes, termite population, root grubs, pupae of insect and suppress the growth of soil borne fungi.

### **For protecting stored grain:**

Stored food grain is prone to attack by insects, pathogens and other rodents. Storing food grains along with Neem leaves repels the insects attacking the food grains. Neem leaves act as insecticide during storage. Dried neem leaves are used for storing food grains because they absorb moisture from them. Neem leaves, oil or extract act as repellent against several insects such as weevils, floor Beetles, bean seed beetles, flies and potato moths. A mixture of neem leaves with clay and cow dung develops pest resistant property so it can be used to make bins for storage of grains.

### **Neem as fumigants:**

Fumigation is the process of introducing a pesticide into a enclosed space in such a manner that it disperses quickly and act in a gaseous state on the target organism. Neem fumigants help to protect the stored grain and hibernating insects in creaks. It is organic fumigant. It provides effective and economical control where other forms of pest control are not feasible. Neem leaves and neem oil and neem bark also can be used at fumigant. Neem fumigant are toxic to all forms of life, therefore it is possible to control all life stages of pest. The main advantage of this fumigant is that pest does not develop resistance to it. It is cheaper, natural product and do not have any harmful effect on plants and living organism.

### **Neem as organic pesticide:**

Now a day's neem and neem based products are being used as bio-pesticide it has not any harmful effect on plants, soil and mammals. It is used in integrated pest management. Neem based products don't leave any toxic residue on plants and safe for beneficial insects like honey bee natural Predators and parasites etc. It is 100% biodegradable and eco-friendly. It can be mixed with other synthetic pesticide and enhances their action. It is broad spectrum pesticide.

### **Conclusion:**

Having all above qualities we can say that neem is a "Miracle" tree for agriculture. Neem and neem derivatives are eco-friendly and better than chemical pesticides, fungicide and fertilizers. Due to its excellent medicinal properties this tree is called as 'Wonder Tree'.

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