

Efficacy of Nske (Neem Seed Kernal Extract) on *Asparagus Racemosus* Willd

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ABSTRACT

Asparagus is famous for its culinary and medicinal uses. Although it is a native to the western European coasts, it has now been widely naturalized in India; Himachal Pradesh is the primary producer. There are three plant diseases that affect the Asparagus plant which can be controlled by the spray of NSKE (Neem Seed Kernel Extract).

Keywords: Asparagus; NSKE; Crown rot disease; Spray; Rust disease; white mold

INTRODUCTION

Organic farming is an agricultural system that uses fertilizers of organic origin such as compost manure, green manure (neem kernel) it originated early in the 20th century in reaction to rapidly changing farming practices.

The concepts of organic agriculture were developed in the early 1900^s by Sir Albert Howard, F.H.

King and Rudolf Steiner who believed that the use of animal manures (often made into compost), cover crops, crop rotation, and biologically based pest controls resulted in a better farming system.

Howard, having worked in India as an agricultural researcher, gained much inspiration from the traditional and sustainable farming practices he encountered there and advocated for their adoption in the West [1].

Asparagus is famous for its culinary and medicinal uses. Although it is a native to the western European coasts, it has now been widely naturalized in India; Himachal Pradesh is the primary producer.

As the vegetable not commonly available in the local markets, it remains in high demand [2].

There are three plant diseases that affect the Asparagus plant

Crown and root rot of asparagus, caused by two species of *Fusarium* (*Fusarium oxysporum* f. sp. *asparagi* and *Fusarium proliferatum*) (Figure 1).



Figure 1: Asparagus showing crown rot /asparagus treated by neem seed kernels extract (nske).

Asparagus rust, caused by *Puccinia asparagi*, is an extremely complex fungal disease that threatens crops throughout the world. (Figure 2).

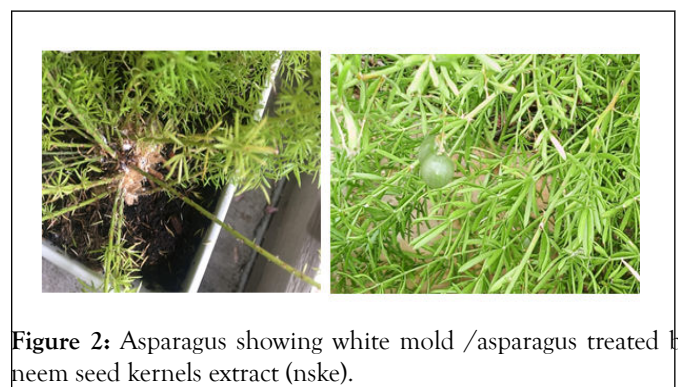


Figure 2: Asparagus showing white mold /asparagus treated by neem seed kernels extract (nske).

White mold infests Asparagus infected by *Sclerotinia sclerotiorum* (Figure 3).

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Figure 3: Asparagus showing rust /asparagus treated by neem seed kernels extract (nske).

Crown and root rot, caused by *Fusarium oxysporum* f. sp. asparagi and *Fusarium proliferatum*, crown and root rot because the fleshy roots will have lesions and may have almost entirely rotted away if the infection is severe. You may also be able to see reddish-brown lesions on the lower stems and/or crowns. Keeping the pH at 6.0 or higher can also help to keep your plants safe. Research suggests that treating the soil with salt (sodium chloride) can help restrain infections.

Symptoms of *Fusarium* include decline in growth, stunting, yellowing, wilting, dry rot of the crowns, and plant death. Reddish-brown elliptical lesions often form on stems. Asparagus rust, caused by *Puccinia asparagi*, occurs in the summer and produce rust-colored aeciospores, new infections are spread by the next kind of spores – urediniospores – which damage the foliage .

White Mold-Asparagus is among the hundreds of different kinds of plants that can be infected by *Sclerotinia sclerotiorum*. Active when conditions are hot and moist. The most distinctive symptom is a white discoloration of the main stem or lateral stems, the fungus produces resting structures called sclerotia in the white mycelia later the affected stem parts will die. Since the sclerotia produced in the stems enable the fungus to survive for up to 10 years, it is imperative that you remove and destroy infected plant tissue.

The control measures involve treatment of the seeds with hot water or disinfectants to produce disease-free seedlings. The plant vigour is maintained by proper fertilization and proper weeding. Management of *Fusarium* crown and root rot is difficult as the plant propagates from both seeds and crowns. But to grow from crowns would take around three years, and to grow the plants from roots, it takes two years only. Usage of fungicide is of little value as it is less effective.

MATERIALS AND METHOD

Neem plant

Azadirachta indica. A. Juss (*Meliaceae*) commonly known as neem or vembu in tamil, nimba in hindi in India. (Figure 4) The plant is widely distributed throughout India. Plant was collected from college campus, Guru Nanak College, Chennai, and identified, authenticated by CSMDRIA, Chennai where a voucher specimen is maintained. A neem tree normally begins bearing fruit after 3-5 years, and fully productive in 10 years, later can produce up to 50 kg of fruits annually. Fruit is a smooth,

ellipsoidal drupe, up to almost 2 cm long. When ripe, it is yellow or greenish yellow and comprises a sweet pulp enclosing a seed. The seed is composed of a shell and a kernel (sometimes two or three kernels), each about half of the seed's weight. (Figure 5) It is the kernel that is used most in pest control.



Figure 4: Neem plant



NEEM SEED KERNEL



NEEM SEEDS

Figure 5: Neem seeds and neem seed kernels (nsk).

Preparation of neem kernel extract

5 kilogram of the kernel is pounded in a mortar and pestle and soaked in 10 litres of distilled water for one day. After 24 hours the solution becomes milky white then detergent soap from Khadi 200 g is added stirred with a wooden planck. Filter through double layer of muslin cloth and make the volume to 100 litre. Finally filtered and stored for further use. The shelf life of this Neem Kernel Extract is one week or seven days. (Figure 6)

The precautions are the Neem fruits are collected during bearing season and shade dried, the seeds over eight months of age are not used. The seeds stored over and above this age lose their activity and hence not fit for NSKE preparation. Always use freshly prepared neem seed kernel extract (NSKE). The solution is sprayed after 3.30 pm to get effective results [6].



Figure 6: Ingredients of neem seed kernels extract (nske).

Extract preparation

NSKE was stirred with the solvent water, 2:1 v/v.

Experimental plant *asparagus racemosus* willd

Asparagus commonly called as sparrow grass, scientific name *Asparagus officinalis*, *Asparagaceae* is a perennial flowering plant, young shoots are used as a spring vegetable grows upto 100-150 cm tall, [4] with stout stems with much-branched, feathery foliage.

The "leaves" are needle-like cladodes. The root system, often referred to as a "crown," is adventitious and the root type is fasciculate.

The flowers are bell-shaped, greenish-white to yellowish, it is usually dioeciously, with male and female flowers on separate plants, but sometimes hermaphrodite flowers are found. The fruit is a small red berry 6-10 mm in diameter, which is toxic to humans. (Figure 8).

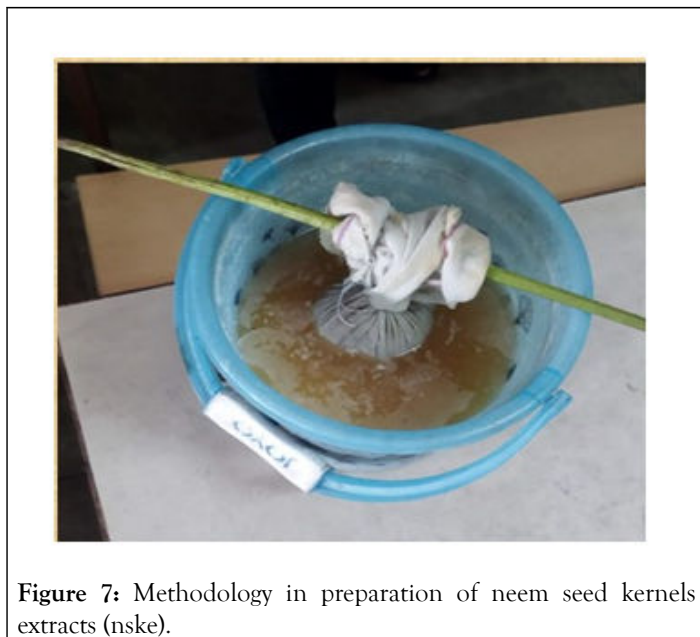


Figure 7: Methodology in preparation of neem seed kernels extracts (nske).



Figure 8: Asparagus showing edible tubers.

APPLICATION METHOD

It is applied as a foliar spray on the plant. Various concentrations such as 1,10,100,1000 µg/L with the stock solution having NSKE: water, 2:1 v/v.

RESULTS AND DISCUSSION

The spray of NSKE on Asparagus at time intervals of 24 hours, 48 hours and 72 hours showed effective results. The results are shown in Table-1. All the three diseases infecting the plant were controlled by the Neem seed kernel extract within 24 hours interval and at 10 µL.

Table 1: Efficacy of nske on asparagus plant.

Serial number	Name of the disease	Concentration of the extract (nske) μ l	Time interval	Efficacy%		
1	Asparagus crown and root rot	HOURS				
		1	24	85		
		10	24	95		
		100	24	100		
		1000	24	100		
		1	48	100		
		10	48	100		
		100	48	100		
		1000	48	100		
		1	72	100		
		10	72	100		
		100	72	100		
		1000	72	100		
		2	Asparagus rust	1	24	80
				10	24	85
				100	24	100
1000	24			100		
1	48			100		
10	48			100		
100	48			100		
1000	48			100		
1	72			100		
10	72			100		
100	72			100		
1000	72			100		
1	24			75		
10	24			80		
100	24			95		
1000	24			100		
3	White mold of asparagus	1	48	100		
		10	48	100		

100	48	100
1000	48	100
1	72	100
10	72	100
100	72	100
1000	72	100

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