

A better supplement to goats- *Moringa oleifera*

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Introduction:

Moringa (*Moringa oleifera*), commonly called as “drumstick tree” serves as an ideal tree fodder for ruminants. Moringa is a tree which grows fast and is popular in Indian subcontinent. It is a tree which is easy to be grown and is used for variety of purposes like human food, livestock forage, medicine preparations, dye and water purification. Due to its highly adaptable nature, it can withstand drought, varying temperatures and different soil types. The leaves of Moringa are protein treasure containing various essential amino acids. Apart from amino acids, various essential minerals are also present. Moringa is associated with lots of health benefits and healing properties. These qualities packaged into a single tree may justify Moringa being termed as 'Miracle tree'.

Nutritional profile

In the past decade there has been an increasing trend in the usage of Moringa as a protein source to livestock particularly due to its ease of availability, cost effectiveness and health benefits. The presence of very less quantity of tannins and higher

amount of a sulphur-containing amino acids, make it a better fodder tree for livestock rations. Presence of macro minerals like P, K, Ca, and Mg play vital roles in the physiological, metabolic, and biochemical processes. Moringa leaves contain a good amount of beta-carotene, vitamin C and iron which can fulfil dietary requirements.

Moringa cultivation

Most appropriate climate for Moringa is that of tropical and sub-tropical region. Though temperature ranging from 25^oC-35^oC is most preferable, it can tolerate up to 48^oC. Moringa can be used as a tree fodder and suitability for cultivation is due to its hardiness, drought tolerance attributed by a long taproot system. Direct sunlight under 2000 meters altitude and a minimum annual rainfall requirement of 250 mm with maximum of 3,000 mm is required. Irrigation is needed for leaf production if rainfall is less than 800 mm. Moringa trees can be planted on small hills in areas with heavy rainfall to encourage water run-off.

Moringa has the ability to tolerate a

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wide range of soil conditions, but neutral to slightly acidic (pH. 6.3-7.0), well-drained sandy or loamy soil is preferred for optimal growth. The clay soils and termite-infested soils are avoided as much as possible. The trees can be grown in coastal areas particularly in southern most states of India.

Tamil Nadu Agricultural University developed different varieties for fodder purpose like P.K.M - 1 and P.K.M - 2. Central Institute for Research on Goats (CIRG), Mathura, tried local selections from Chhattisgarh which were suitable for fodder purpose.

Moringa can be propagated either by seed or stem cuttings. Plants produced with cuttings will not have a deep root system and will be more sensitive to wind and drought. Cuttings are also more sensitive to termite attacks. Due to these reasons, propagation by seed is preferred for fodder purpose. Seeds are sown directly or raised in polybags in nursery for further transplantation. A good quality seed should be viable, clean, free from diseases and ectoparasites. Major constraint of storing seeds over longer periods include, loss of viability in one year. There are around 4000 Moringa seeds (with their shell) in a kilo which has to be soaked in water for a minimum of 10 hours before sowing. Direct sowing is preferred for fodder purpose. Availability of quality

planting material is the critical requirement in Moringa cultivation.

Seeds must be sown at a maximum depth of 2 cm because depth of the pit may affect germination rate. Maximum number of seeds which can be sown are two and they are expected to germinate in 12 to 15 days.

Supplementing effects of Moringa in goats

A ratio of 50:50 replacement of concentrate feed with *M. oleifera* in the diet of does can positively affect milk yield and composition. A marked influence of Moringa supplementation reflects in the protein and fat per cent of colostrum and milk, and thus protect the newly born kids from different diseases and thereby enhances their survival rate. A significant increase in the levels of carotenoids in goat milk after Moringa feeding prevent the process of auto-oxidation. Furthermore, this supplementation level also increases kids' growth rate, and reproductive performance of does. The birth weight of kids in Moringa supplemented animals are generally high. Moringa supplementation also enhance the energy status of the body and ensure the early resumption of ovarian cyclical activity and reduces postpartum anoestrus interval.