



A REVIEW ON LEMON GRASS: AGRICULTURAL AND MEDICINAL ASPECT

Vaibhav Srivastava^{1*}, Subodh Dubey², Ashish Mishra³¹Nagaji Institute of Pharmaceutical Sciences, Gwalior, India²IPS College of Pharmacy, Shivpuri Link road, Gwalior, India³Advance Institute of Biotech and Paramedical Sciences, Kanpur, India

*Corresponding Author Email: pharmav_84@sify.com

Article Received on: 10/06/13 Revised on: 01/07/13 Approved for publication: 17/08/13

DOI: 10.7897/2230-8407.04807

IRJP is an official publication of Moksha Publishing House. Website: www.mokshaph.com

© All rights reserved.

ABSTRACT

Lemongrass (*Cymbopogon flexuosus* and *Cymbopogon Citraus*) is regarded as one of the grass which is commonly available in India and abroad. It is widely used in different conditions of pain and discomfort. The oil (Lemongrass oil) obtained from the grass has diverse medicinal value. It also produces semi-synthetic Vitamin A that reduces the risk of Xerophthalmia and Night blindness. The grass has great benefits to mankind as it revitalizes the body and mind, helps with infections and act as muscle and skin toner. This review will explore the plant / grass and also suggest for more cultivation of the grass because of its medicinal importance.

Keywords: *Cymbopogon flexuosus*, *Cymbopogon citraus*, Lemongrass oil, Vitamin A, cultivation.

INTRODUCTION

Lemon grass (*Cymbopogon Flexuosus*) and (*Cymbopogon Citraus*) is a native aromatic tall sedge / grass.¹ Family- (Poaceae / Gramineae) with diverse medicinal value and grows in many parts of tropical and subtropical south East Asia and Africa.^{1,2} It was grown In India a century back and is now commercially cultivated in different parts of India. This review will try to put the forth an overall idea about the plant as well as given an insight about the future prospects of the plant in the treatment of disease.² The main objective of this review is to promote the cultivations and make the useful herbal medicinal products and provide in effective cost. Most of the species of lemon grass are native to South Asia, South East Asia and Australia. The lemon grass also known as East India lemon grass, West Indian lemon grass and Malabar or Cochin grass is native to India, Sri lanka, Burma and Thailand.¹ In India, it is cultivated along western Ghats, Karnataka and Tamil Nadu States besides foot –hills of Arunachal Pradesh and Sikkim.² Both the species are cultivated throughout tropical Asia.

Botanical Description

Lemon grass is tall, perennial grass about 1 m in height.¹ The culm is stout, erect, up to 1.8 m height. Leaves are long, glaucous, green, linear tapering upwards and along the margins; ligule very short, sheaths terete, those of the barren shoots widened and tightly elapsing at the base, other narrow and separating.² It is a short day plant and produce profuse flowering in South India. The inflorescence is a long spike about one meter in length.

Area and Production

India grows lemon grass in about 3,000 hectare area. Largely in states of Kerala, Karnataka, Uttar Pradesh and Assam, India and the annual production ranges between 300-350 t / annum.⁶

Economic Importance

The oil is obtained by steam distillation of the fresh leaves and flowering tops of lemon grass which take about 2-3 h.³

The oil has strong lemon like odour due to high percentage (over 75 %) of citral in the oil.⁴ The characteristic smell of oil makes its use in scenting of soaps, detergents, insect repellent preparation. However, the major use of oil is as a source of citral, which goes in perfumery, cosmetics, beverages and is a starting material for manufacture of ionone's, which produces vitamin-A.^{1,3,5}

Production Technology**Agro-climatic Requirements**

The crop can grow practically on all type of soil under variety of geographic.¹ The crop grows well in both tropical and subtropical climates at an elevation up to 900 m (above mean sea level). However, ideal conditions for growing lemon grass are warm and humid climate with sufficient sunshine and 250-330 cm rainfall per annum evenly distributed over most part of the year.² A temperature ranging from 20-30°C and well sunshine throughout the year is conducive to high crop yield. Lemon grass can also be grown in semi-arid regions receiving low to moderate rainfall.³ Lemon grass can grow well over medium fertile soils and moderate irrigation. Well drained sandy loam is most suitable for the growth of the plant. It can be grown on a variety of soils ranging from loam to poor laterite.⁶ Calcareous and water logged soils should be avoided as they are unsuitable for cultivation.⁵

Growing and Potential Belts

Lemon grass is widely cultivated in the states of Kerala, Karnataka, Tamil Nadu in the southern region, parts of Uttar Pradesh and Uttaranchal in the northern region and Assam in the north-eastern region. At present, East Indian lemon grass (*cymbopogon flexuosus*) is mainly cultivated in western part of India. It grows well in wastelands and alkaline soils having pH 9.6²

Propagation

The crop is best propagated through seed raised in nurseries. It is also vegetatively propagated by splitting the clumps in to slips. These are planted at a spacing of 60 x 80 cm about 55000 slips are required for one hectare of planting.¹

Seed Production

The crop flowers during November-December and seeds mature in next two months viz; February-March. For collection of seeds, the plants are maintained in good health as the yield of seeds from plants subjected to regular harvest is low. On an average, a healthy plant gives about 100-200 g of seeds.⁴ At the time of seed collection, the whole inflorescence is cut in to sun dried for 2-3 days. These are then threshed and seeds are again dried in the sun and the seed remain attached with fluffy mass which is removed by beating of seed bag at sowing. These dry seed lots are stored in gunny bags lined with polythane.⁵

Nursery Raising

The transplanting of nursery raised seedlings is found to be superior to direct sowing of seeds. The seeds are sown by hand on well prepared raised beds of 1 m to 1.5 m width at the onset of the monsoon and are covered with a thin layer of soil although 2.5 kg of seed produced enough seedling, the seed rate is 4 to 5 kg. The bed should be watered immediately after sowing and care should be taken to maintain adequate moisture in the soil. Seed germinates in 5-6 days and the seedlings are ready for transplanting after the period of 60 days.³

Planting

Seedlings are planted at a distance of 40 x 40 cm, 40 x 30 cm, 40 x 60 cm a part depending upon fertility of land and inter culture implements used. It is better to plant on ridges in areas receiving high rainfall. In case of rooted slips one or two slips are placed in to each hole, about 15 cm deep.²

Irrigation

The newly breed variety of lemon grass have water requirement for optimum yield. In northern India, 4 to 6 irrigations are given during summer months (February to June). If rains are erratic, the field is irrigated at the interval of three days during the first month and 7 to 10 days interval subsequently.⁴ After the establishment of plants, irrigation schedule is adjusted depending on water holding capacity of the soil and weather condition.

Nutrition

The crop is nourished with 30 kg nitrogen, 30 kg phosphorous penta oxide and 30 kg potassium oxide per ha basal dose at the time of planting.⁷ Remaining nitrogen (60 to 90 kg) can be applied as top dressing in 3 to 4 split doses during the growing season. In soil having low fertility level, the dose of nitrogen is increased. Lemon grass crop is free from most pest or diseases but require micronutrients over marginal lands.⁶

Intercultural Operation

The field is kept weed free for the first 3 to 4 months after planting. Generally, 2 to 3 weeding are necessary during a year. Distillation of this crop is applied as organic at three tons per hectare and this is found effective for controlling weeds in crop.⁴

Harvesting and Yield

The first harvest is generally obtains after 4 to 6 months of transplanting seedlings. Subsequent harvest is done at the intervals of 60 to 70 days depending upon the fertility of the soil and other seasonal factors.⁶ Under normal condition, 3 harvests are possible during the first yield and 3 to 4 in

subsequent years, depending on the management practices followed. Harvesting is done with the help of sickles and the plants are cut 10 cm above ground level and allowed to wilt in the field, before transporting to the distillation site³; depending upon soil and climate condition, plantation last on an average, 3 to 4 years only. The yield of oil is less during the first year but it increases in the second year and reaches a maximum in the third year; after this the yield declines. On an average, 25 to 30 tons of fresh herb is harvested per hectare per annum from 4 to 6 cuttings which yields about 80 kg of oil.⁶ Under irrigated conditions from newly breed varieties an oil yield of 100- 150 kg is obtained. The fresh herb contains on average 0.3 % oil and thick stems are removed before distillation as they do not contain oil.

Post Harvest Management

Drying

The grass is allowed to wilt for 24 h before distillation as it reduces the moisture content by 30 % and improves oil yield. The crop is chopped into small pieces before filling in the stills.³ It can be distilled in same distilleries as used for Japanese mint in India.

Distillation

Lemon grass oil is obtained through steam distillation. The all has a strong lemon like odour. The oil is yellowish in color having 75 to 85 % citral and small amount of other minor aroma compound. The recovery of oil from the grass ranges from 0.5 to 0.8 %. It takes about 4 h for complete recovery of oil.²

Purification of Oil

The insoluble particles present in the oil removed by simple filtration method after mixing it with anhydrous sodium sulphate and keeping it over night or for 4 to 5 h. In case the color of the oil changes due to rusting than it should be cleaned by steam rectification process.³

Storage and Packing of Oil

The oil can be stored in glass bottles or containers made up of stainless steel or aluminium or galvanized iron, depending upon the quantity of oil to be stored. The oil should be filled up to the brim and the containers should be kept away from heat and sunlight in cool / shaded places.⁷

Chemical Constituents

The major constituents of root stem and leaves are geraniol (30.5 %), citronellol (24.1 %), neral (10.3 %) and geranial (13.6 %). The constituents of oil (lemon grass) are citral (31.52 %), Z-citral (28.82 %), linalool (4.82 %), geranyl acetate (3.57 %) and trans-geraniol (3.66 %). It acts as natural precursor for production of semi synthetic vitamin A.^{8,9}

Medicinal Properties and Uses

The plant has extensive medicinal value as

- Anti-fungal
- Anti-bacterial
- Anti-septic
- Anti-asthmatic
- Urinary tract infections
- Pesticide and preservative.

The leaves are used in the treatment of cough, fever, depression, nervous disorder and skin irritations. Plant decoction is used popularly in digestive complaints, headache

and to promote sweating. It is also used as carminative and insect repellent. Now-a-days it is widely used as cosmeceuticals in the preparation of perfumes and cosmetics.^{10,11}

CONCLUSION

This review paper aimed at putting forth the agricultural and medicinal aspect of Lemongrass and stresses more to cultivate the medicinal grass for utilization of its important phytoconstituents in treatment of various ailments and can be easily available to the common masses.

REFERENCES

1. Rangari Vinod D. Pharmacognosy and phytochemistry, Carrer publication; vol. 1st, 2nd ed; 2009. p. 380-381.
2. Qadry JS. Pharmacognosy, BS Shah prakashan; 14th ed; 2008-2009. p. 121.
3. Handa SS and Kapoor VK. A text book of Pharmacognosy, Vallabh prakashan, 2nd ed revised and enlarged; p. 294.

4. Gupta MK and Sharma PK. A Text book of pharmacognosy, Pragati prakashan, 1st ed; 2009. p. 463.
5. Arumugam Kr and Muruges N. A text book of pharmacognosy, 7th ed; p. 134.
6. Evans WC *et al*, A text book of pharmacognosy; Elsevier publication; 15th ed; p. 58.
7. Ansari SH. Pharmacognosy; Tara Publishers; 6th ed; p. 145.
8. Rao BN, S Pandita and Kaul PN. Gamma radiation is a means of inducing variation in *C. flexuosus* a chemotype for alpha Bisabolol, Indian Perfum 1995; 39: 84-87.
9. Kulkarni RN, RR Mallavarapu, K Baskaran and S Ramesh. Essential oil composition of citronella like variant of lemongrass, J. Essent. Oil. Res 1997; 9: 393-395. <http://dx.doi.org/10.1080/10412905.1997.9700738>
10. Sharma SN, Shahi AK and Srivastava TN. Taxonomic relationship of *Cymbopogon* based on volatile leaf oil chemical constituents, J. Econ. Taxon. Bot 2000; 24: 115-122.
11. Harbone JB. Phytochemical methods, A guide to modern techniques of plant analysis, 3rd ed. Springer (India) pvt. Ltd; 1998, IJPBS 2010; 1(2).

Cite this article as:

Vaibhav Srivastava, Subodh Dubey, Ashish Mishra. A review on lemon grass: Agricultural and medicinal aspect. Int. Res. J. Pharm. 2013; 4(8):42-44 <http://dx.doi.org/10.7897/2230-8407.04807>

Source of support: Nil, Conflict of interest: None Declared