

Scientific Cultivation of Lemon Grass: A Profitable Farming

(Sardar Singh Kakraliya¹, Sabha Jeet², Amit Kumar¹, Shyam Prakash Singh¹, Shazia Paswal¹ and Indrapal Verma³)

¹Project Associate, CSIR-Indian Institute of Integrative Medicine, Jammu, India

²Genetic Resources and Agro-technology Division, CSIR-Indian Institute of Integrative Medicine, Jammu, India

³Project Assistant, CSIR-Indian Institute of Integrative Medicine, Jammu, India

* sardarchoudhary70@gmail.com

Lemongrass belongs to poaceae family is a restorative plant with mixes equipped for controlling pathogens and expanding natural protection from pathogenic sicknesses. The fragrant tropical plant lemongrass originates in India. Lemon grass cultivation is commercially done for its aromatic oil. Oil contains citral which has odour like lemon, that's why the grass is also known as Lemon grass. It is perennial crop, cultivated in variety of soil, different climate, high foliage yield in a short period of time. Oil content in lemongrass was average 0.29% and 0.63% on fresh and dry weight basis, respectively. Scientific methods of cultivation give good yield and the appropriate time of harvest gives good quality of oil. Oil of lemon grass is of superior quality. Aromatic oil obtained by the method of steam distillation is useful in cosmetic industry, perfumes, soaps and detergents; also it is used for medicinal purpose as herbal tea. Thus farmers can get good income by cultivation of aromatic grasses.

Introduction

Lemongrass also called Cochin Grass or Malabar Grass is native to India and tropical Asia. It is grown and found in different parts of India and is used in perfumes business and also for medicinal purposes. Lemon is also used as a pesticide and preservative. Research shows that lemon grass has anti-fungal properties. Because of Lemon Grass wide spread use in different industries, Indian farmers have started cultivating it in huge amount. In the coming years, you can surmise that farmers involved in Pharmaceutical and Perfumes industry, Lemon Grass plantation will be pre-ferred because of its widespread demand.



Lemongrass plants

Usage

1. Lemon Grass Oil Uses:

This form of Lemon Grass is the most popular and beneficial way to use in Industries. The oil is extracted from the leaves and stem of lemon grass plant. Lemon Grass oil is used in the making of soaps, and also in perfumes, scents, attar and incense sticks (agarbatti). Lemon Grass oil is also used as medicinal herbs.

- ❖ Oil is used in relaxation and massage therapy
- ❖ Lemongrass oil has anti-inflammatory properties.
- ❖ Lemongrass Essential oil may help reduce the symptoms of rheumatoid arthritis.
- ❖ Essential oil is helpful for treating headache.
- ❖ Lemongrass oil is used in fungal infection treatment.
- ❖ Lemongrass oil contains strong antioxidant properties.



2. Lemon Grass Leaves Uses:

Dry Lemon grass leaves are widely used in Herbal tea, Lemon tea and various other types and varieties of Herbal tea. Herbal Tea producing companies use Lemon Grass leaves in great quantity. In India, Lemon grass leaves (especially grown in Madhya Pra-desh) are exported to major Herbal Tea Companies based in Eng- land and France. Apart from the above mentioned uses, Lemon Grass oil has various other uses. It is used in Kadaa (Concentrated liquid) to recover from illness. Lemon grass oil gives a cooling effect which is extremely helpful in curing cold and other respiratory problems. When com-bined with Black Pepper in the form of Concentrated liquid (Kadaa) it helps in kidney related diseases. It is also used for reliving muscles pains and joint pain.



Lemon Grass Herbal Tea



Lemon Grass Leaves

- ❖ It may help decreasing your bad cholesterol.
- ❖ Lemongrass is helpful to maintain blood pressure.
- ❖ Lemongrass tree help to reduce weight.
- ❖ Lemongrass tea has an antioxidant properties.
- ❖ It has antimicrobial properties.
- ❖ Lemongrass tea has anti-inflammatory properties.
- ❖ It may help in digestion

Cultivation and production

Climate and soil

The plants are hardy and grow under a variety of conditions. The most ideal conditions are a warm and humid climate with plenty of sunshine and rainfall of 250-280 cm per annum, uniformly distributed. Regarding the soil, it can be grown from poor soils, in the hill slopes. Soil pH ranging from 4.5 to 7.5 is ideal. As it has good soil binding nature, they can be grown as vegetative cover over naked eroded slopes.

Varieties

Recently the CSIR-IIIM, Jammu has two developed hybrid strain CKP-25 and CPK-F2-38 (Kalam) by crossing *Cymbopogon khasianus* × *C. pendulus* and *Cymbopogon pendulus* × *C. khasianus* which is capable of yielding 50% and 140% more oil yield than RRL-16 and OD-19 respectively.

CKP-25: · A hybrid between *C. khasianum* X *C. pendulus*. · Gives 60 t/ha herbage in North Indian plains under irrigation. The oil contains 82.85 % citral.

CPK-F2-38 (Kalam): It is an improved F2 derivative of F1 hybrid suitable for cultivation on both under rain fed and irrigated conditions.

Krishna: developed by CIMAP both for irrigated and rainfed and also hill slopes. The citral content of Nima is much higher than Krishna. Oil recovery is in between 0.8-1.0 %

Nursery

The soil should be well pulverized for forming the seedbed and it should be a raised bed one. Leaf mould and farmyard manure is also added to the soil while forming the bed. 15-20 kg of seeds are required for raising seedlings for one hectare. Seeds are sown in lines drawn at 10 cm interval in the beds and covered with cut grass materials. When the seedlings are about 2 months old or about 12 to 15 cm high, they are ready for transplanting.

Field preparation

Land Preparation: It needs a well-pulverized and levelled field for good established of crop. One deep ploughing followed by 3 to 4 harrowing and planking should be done. Field should also be free from weed infestation.



Field preparation

Manures and fertilizers

The Aromatic Plants Research Station Odakkali (Kerala) recommends 100 kg of N/ha. Under North East conditions, application of 60 kg of N, 50 kg P and 35 kg K is recommended per hectare. In North India, Jammu lemon grass (*C. pendulus*) is cultivated under irrigated condition as a source of citral. The cultural practices are almost similar to East India lemon grass. It is propagated exclusively by slips, which are planted on flat beds. A spacing of 50 x 50cm is adopted. A dose of 260 kg N, 80 kg P₂O₅ and 120 kg K₂O per hectare is recommended in 3-4 split doses. The crop responds to irrigation especially during hot summer months.

Plantation Process

Use a small spade to dig about 5-6 centimeters deep and then plant the Lemon Grass sapling. If the hole is dug deep then there is possibility of the roots to rot. Before planting, make sure you remove dry leaves and waste roots from the sapling. Put the sapling straight in to the hole. After planting cover the plant with mud and press it well and also water the plant or field after planting other sapling. Make sure there is no watering logging in the field or

around the sapling. There has to be minimum difference of at least 30-45 centimeters between each sapling. For good yield makes you have a distance of at least, 40 by 40 centimeters between each sapling.



Lemongrass planting in progress

It can be propagated by seeds as well as vegetatively by slips. For better quality and yield of oil it is recommended to be grown only by slips obtained by dividing well grown up clumps.

- Planting is done in the last week of May or in the first week of June
- However, under irrigated conditions planting can be done during any part of the year, except October-November months
- Before planting, the field is thoroughly prepared and laid out into 6 m x 6 m size beds. The soil is incorporated with full dose of phosphorus and potash
- Nitrogen is applied in six equal split doses, the first dose, being at the time of planting, another after one month and the remaining after every harvest.
- Ridges are opened at 60 cms distance. Slips are prepared by clipping all the old roots and removing the leaves completely for planting.
- They are then planted at about half way down the slopes of the ridges at a spacing of 60cm x 60 cm.

Irrigation

Irrigation is given immediately after planting when planting is done in dry days. Thereafter two irrigations are given at 10 days interval to establish the crop. During dry season after each harvest one irrigation and subsequently application of recommended dose of fertilizers are to be followed for optimum herb production. For undulating areas sprinkler irrigation is advisable.



Drip and sprinkler irrigation of lemongrass

Weeding and interculture

Lemongrass has the weed suppression capacity. One hand weeding at 25-30 days followed by one hoeing at 40-60 days after planting is enough to control weeds. After each harvest a nominal weeding and earthing up of plants is beneficial for the next flush.

Mulching

Distillation waste (spent grass) applied as organic mulch @ 3 tons/ha in between the rows has been found very effective in controlling weeds and maintaining soil moisture as well.

Diseases and Pests

There are two important diseases of Lemon grass, which affects the growth of plant and oil production, these are blight leaf and anthracnose.

1. Leaf blight disease is caused by *Curvularia andropogenis*

Symptoms :

The fungus affects the crop in the beginning of monsoon. Small brownish spots appear initially during the month of July, which enlarge into long patches along the tips and margins of the leaves. In case of serious infections, the entire leaves dry up resulting in considerable decrease in leaf and oil production. Black dots in from of sporulation of the fungus have been seen on dead spots of the leaves.

Control: The disease can be controlled by prophylactic spraying Dithane M-45 or Dithane Z-78 @ 20g/10 litres of water at an interval of 10-15 days during the growing period.

2. Anthracnose disease is caused by *Colletotrichum graminicola*

Symptoms : Brown spots with concentric rings in the centre appearing on the lower surface of the leaves. The spots may be formed on leaf sheaths and midrib. Later the spots merge to form bigger patches and the affected leaves dry away.

Control : Two sprays of Bavistin 0.1% just after the appearance of the disease at an interval of 20 days and three sprays of Dithane M-45 (0.2%) at an interval of 10-12 days.

3. No serious insects or pest grow on lemon grass

Harvesting

- 3 harvests are possible in the first year of planting a lemon grass plant.
- lemongrass needs 6 to 9 months to reach its first harvest.
- After 1st year 5 to 10 harvests are possible.
- Taller grass has less oil healed so don't allow your plants to grow taller than a certain height.
- Cut the lemon grass 10 to 15 cm from the ground level to avoid the delay regrowth.
- Due to the evaporation effect lemongrass harvesting is preferred in the morning.
- Cutting the lemon plant from the lower portion is not recommended because lemongrass has less oil content in the lower portion and more oil content in the upper portion.
- Harvesting in the winter season is beneficial due to faster regrowth.
- Harvesting can be done mechanically or manually.



Lemongrass plantation ready for cutting

Post harvest management

- Grass may lose its quality, colour and fragrance so, it is advised to apply the drying process quickly.
- You can use a conventional dryer for the drying process of leaves without any loss.
- The harvested lemongrass leaves can be stored in a shady area for 3 days without any effect.
- Fresh lemongrass can be distilled immediately.
- Wilt leaves contain less moisture which helps in completing the drying process in less time.
- Due to the volatile nature of the oil you should handle it with more care
- It should be refrigerated and tightly capped so that the shelf life of the oil can be improved.
- Don't use rubber or plastic containers to store the oil because the oil has an acidic nature and can destroy rubber and plastic.
- Instead of rubber or plastic containers dark airtight glass containers are recommended to store the lemongrass oil.

Economics of one acre lemongrass cultivation:**A. Lemongrass cost per acre**

lemongrass per plant	30 paise to Rs 3
No off grass slips per acre	20,000 to 26,000
Let's take an average price of Rs 1.5 per slip	$1.5 \times 20,000 = 30,000$ (slips)
Total lemongrass plants cost	30,000

B. Other cost

Land preparation cost	8,000
Fertilizers and manures cost	5,000
Labour cost	5000
Plant protection cost	0.0
Irrigation charges	8,000
Harvesting charges	5,000
Distillation charges	12,000
Total cost	43,000
Now add planting material cost	$30,000 + 43,000$
Total cost (for 1 st year)	73,000

Lemongrass profit per acre

Fresh herbage (1st year)	75-80 q
Lemongrass oil production	60-65 Kg
Lemongrass oil price per kg	Rs 1500
If the price is Rs	1500
Average of lemongrass oil (1 st year)	$65 \text{ kg (oil)} \times \text{Rs } 1500 = \text{Rs } 97,500$
(Note: In the first year you might not earn any profit but from next year you will earn profit from lemongrass farming)	
Fresh herbage (2 st year)	225-250 q

Lemongrass oil production	180-200 Kg
Lemongrass oil price per kg	Rs 1500
If the price is Rs	1500
Average of lemongrass oil (2 st Year)	200 kg (oil)×Rs 1500 = Rs 30,0000

Lemongrass profit (3 st Year)	
Fresh herbage (3 st year)	300-320 q
Lemongrass oil production	240-256 Kg
Lemongrass oil price per kg	Rs 1500
If the price is Rs	1500
Average of lemongrass oil (2 st Year)	256 kg (oil)×Rs 1500 = Rs 3,84000

Total cost of lemongrass (2st year) =50,000

Lemongrass profit (2st year) = 30,0000 - 50,000 = Rs 250,000

Total cost of lemongrass (3st year) =57,000

Lemongrass profit (3st year) = 3,84000 - 57,000 = Rs 3,27000

Average profit per year=Rs 2, 00500 from 1 acre

Conclusion

Lemon grass cultivation is done on commercial basis, for obtaining aromatic oil from the leaves. Selection of proper soil, climatic conditions, method of plantation, type of lemon grass species, proper application of fertilizers and manures, harvesting etc consideration is essential. The cultivation methods and the measures taken during cultivation of lemon grass give good yield and better oil recovery from the leaves. The aromatic oil has odour like lemon because of presence of citral in the oil, lemon has about 28% of citral and about 80% in lemon grass. The oil is used in perfumery, detergents and also for medicinal purpose. Thus the cultivation of lemon grass is highly profitable for farmers in rainfed areas and areas with proper irrigation.

References

1. Behura, S., S. Sahoo and N. Pradan (1998). Plantation of *Cymbopogon Pendulus* in amended chromite overburden. *Journal of Medicinal and Aromatic Plant Sciences*, 20(4): 1048-1051.
2. Chandra, V., B. Singh and A. Singh (1970). Observation on growth and yield of oil of *C. winterianus* at Lucknow. *Indian Perfumer*, 14: 32-35.
3. Farooqi , A.A., M.M. Khan and M. Vasundhara (1999). Production Technology of Medicinal and Aromatic crops, Bangalore, Natural Remedies Pvt Ltd.