

## **VETIVER OIL (KHUS)**

*(Vetiveria zizanioides)*

Vetiver Oil is the most important Oil but its production is now limited. There are two commercial varieties of Vetiver, they are

1. Cultivated Vetiver : Normally found in South India.
2. Wild Vetiver : Found in North India, in Rajasthan, Uttar Pradesh (near of Ganga & Yamuna Rivers) & also at Madhya Pradesh but in less quantity.

As the time passed, it is becoming very difficult to collect the Wild Crafted Vetiver. Presently the production of Vetiver is few hundred kilos whereas in the past it was in Tons & if the situation like this will continue, needless to say that this production will get reduce to few kilos only.

Not only in India but also in the World Market, the demand for Vetiver Oil is increasing day by day. The main reason for this increasing demand is its unique odor, for which it is used in both Flavour & Fragrance Industry. One more reason for increase in demand is that this oil can not be substituted with reconstituted Oil & can not be made synthetically. It is used for BASE-NOTE in flavour & fragrance & the % usage varies from 20-50% to 60-70%. That means to say that there is enough market for this Oil & there is no doubt on its consumption.

In today's date, this oil is imported from Indonesia, China & Haiti @ US\$ 60- 70 per Kilo but since this oil is sold in market @ Rs. 3000-4000 per Kilo, it is used only in flavored SUPARI, PAN-MASALA & other eatables. Its consumption in fragrance industry is still limited but if this oil will be readily available in quantity, then its usage in fragrance industry will also increase.

Wild crafted Vetiver is readily found in Rajasthan particularly in the areas of Bharatpur (for which it is famous) & the bank of Ganga river, but as the time is passed, this plant is getting destroyed & the quantity is decreasing day by day. Vetiver is also produced at Kannauj & near by areas, but here also the quantity is decreasing. The specialty of Wild Crafted Vetiver is that if once it is planted, after the matured root is removed & if some part of same remains in the soil, it gives rise to a fresh Vetiver Plant & once again the matured root is ready for collection in next two years. But due to lack of knowledge, improper way of cultivating the plant & removing the matured root is taking place & the specialty of its own growing capability is damaged. "UNAV" is the place where the Vetiver is produced every after two years in the same way & this type of Vetiver is sold by the Forest Conservation Dept through Auctions. It is very easy to obtain Vetiver by this Wild Crafted way but it need to follow the correct procedure whether it is removing the root from the soil or getting the oil from the roots. For example, in rural village area, Vetiver Oil is still distilled using Old traditional method & the average yield of oil is apprx. 0.08% i.e. 80 Gms of oil per 1 Tons but if the same root is distilled using Steam Distillation Units, this average yield is increased from 0.08% to 0.15% i.e. 150 Gms of oil per 1 Tons. It shows that by using proper Distillation methods & instruments, we can increase the yield of Oil and it is must at present because the resources are less so we need to have maximum utilization of all available resources.

If we will go through the average yield of Vetiver grown in South India, we will see that the yield is 1.0- 1.5%. Through recently performed experiments, it was concluded that 1.5% oil i.e. 1.5 Kgs of oil per 1 Tons can be easily obtained through distillation. Here we can understand that if the right variety of Vetiver is cultivated in the land which is suitable for Wild crafted Vetiver, we can increase its production 10 Times & the way this cultivation lands are destroyed, it can also be preserved & increased.

The method of cultivation of Vetiver plays very important role in quality criteria of Vetiver Oil. It is found that the oil produced by using modern Synthetic fertilizers & pesticides is inferior in quality when compared with oil produced from plant cultivated using natural manure. Use of modern Synthetic fertilizers & pesticides is harmful for cultivation of both Vetiver & all other Aromatics & medicinal plants. Vetiver Oil is obtained from the matured roots. When these roots are in the soil, many minute microbes & bacteria present in the soil get collected around these roots & perform

chemical reaction on the oil present in it. Vetiver Oil contains many sesquiterpenes & their Ketones, Aldehydes & Alcohols which react with these microbes & undergo Bio-conversion giving rise to Oxygenated Sesquiterpenes. These Oxygenated Sesquiterpenes are most important for the specific unique note of Vetiver. But when synthetic Fertilizers & Pesticides are used during cultivation, the microbes present in the soil die & thus the process of Bio-conversion of Sesquiterpenes stops. Also there are many Glycosides present in the roots of Vetiver which when react with Microbes, give rise to these primary Sesquiterpenes. Overall use of synthetic manure, fertilizers & pesticides decreases the quality of Vetiver Oil & at the same time, due to prolonged use of such chemical, the production decreases turning the fertile land to unfertile land. For this reason, if we want to increase the production of Vetiver Oil, we need to do the cultivation only through Organic method or we should select such places where till now, no cultivation has taken place or any synthetic fertilizers are not used like FOREST LAND.

When North & South Indian Vetiver Oil is compared by fragrance, it is found that South Indian Vetiver oil is inferior in quality due to maximum use for synthetic fertilizers & pesticides. Also due to many other reasons leading to unavailability of right quality of material, these oil is sold @ Rs. 800- 7000.00 per Kilo in the market whereas the North Indian Vetiver Oil is although less in quantity but due to no use of Chemicals & fertilizers, the oils quality is best in terms of flavour & fragrance & thus 100% pure oil is sold @ Rs. 13000-17000 per Kilo.

#### USE OF VETIVER OIL

1. Vetiver Oil is used in flavour & fragrance industry for making flavored Supari, Pan-masala, Sharbat & making Zarda.
2. Vetiver Oil taken along with food products helps & improves our digestive system.

#### Use of BI-PRODUCTS produced along with VETIVER OIL :-

During recent visit to South India & communication with many local farmers on the economy of the bi-products, it was concluded that it is totally unfair to call these products as BI-PRODUCTS because if these products (oil-less roots & water) are utilized in the correct way, the total cost of oil can be recovered from the same & from the details given below, every one will agree to same.

##### 1. Roots left after removal of Vetiver Oil :

Roots left after removal of Vetiver Oil is used for making Cartons. In Uttar Pradesh & other hot climatic places, these Cartons made from above oil-less roots are used over the windows & on coolers. When the water is sprinkled on same, it emits pleasant mild smell in the atmosphere & at the same time, gives cooling effect with freshness. Since its use is limited in home & on Cars & that also only in Summer season, its maintenance becomes difficult. Due to continuous sprinkling of water on it, slowly fungus develops on it & that's why its storage, maintenance & reuse becomes very difficult which is not possible. Also in cities, due to easy availability of Air-Conditioners, people are directly using Vetiver Oil as an Air-Freshener & not using the Cartons made from Oil-less Vetiver Root. But during South India visit, it was seen that these oil-less roots can not be used only for making Cartons but also for making many handicraft items like Mats, *Aasan (for sitting)*, Pen-Stand, Face of Lord Ganesha. These items are not only best for health purpose but at the same time, it will give life to our traditional art of Handicraft, which is slowly disappearing. And if these handicraft items are dipped in fragrance mixture, other than beautification, it will also make the whole atmosphere smelling pleasant.



2. Vetiver water obtained during distillation :

A simple Sharbat (Syrup) can be prepared by using Vetiver Water. 100 Gms of Khus water mixed with 1 Kgs of Sugar, will give Sharbat (Syrup). On analyzing it, we found that this syrup is tasty & best for health also. This way if such Sharbat is prepared properly by using Vetiver water then there will be enough income from these water that the total distillation cost will be recovered from it & there will be so much profit that the VETIVER OIL will become a BI-PRODUCT & Vetiver Water will be the main product. The places where it is not possible to carry Vetiver Water, 1 Gms of Vetiver Oil mixed with 2 Kgs of Sugar will make the same tasty & healthy Vetiver Syrup. This way many small scale business will be promoted as well.

**Soil & Climate :** Vetiver can grow in a wide variety of soils including poor, marginal alkaline soils (pH 9-10), wasteland and temporarily waterlogged soils. However sandy loam soil is best suited for its cultivation.

Vetiver is a tropical grass, which grows luxuriantly where annual rainfall is 100-200 cm, temperature ranges from 21 to 43.5°C and where there is a fair amount of humidity. It is not suited to temperature climated.

**Planting :** There are two varieties of vetiver, namely, north Indian and south Indian. The north Indian Variety yields superior quality oil; while the south Indian variety gives higher yields of oil. CIMAP KS-1, CIMAP KS-2, Sugandha, Dharani, Gulabi and Kesari are improved varieties of vetiver.

**Irrigation and Weeding :** During non-rainy periods, 2-3 irrigations are given per month. The field is kept weed free until the plant canopy develops. After this weeds do not grow in vetiver fields.

**Plant Protection:** Vetiver needs to be protected from grazing animals during early growth. In south India pests and diseases do not attack Vetiver.

**Harvesting:** Harvesting is taken 15-18 months after planting to get high yield of good quality oil. The above ground herb is first cut and the field is irrigated. The field is ploughed as deep as possible and all the roots including the small rootlets are collected. In heavy soils roots may have to be dug out.

**Yield:** Depending on the soil, climate and management, vetiver gives 4 to 5 tonnes of roots per hectare. The roots are chopped and steam distilled. Alternatively, the dried roots are soaked in water for 12 to 15 hrs. and then steam distilled for 16 to 24 hrs. South Indian varieties yield 0.6 to 1% oil whereas improved varieties of North Indian varieties yield 0.5 to 0.8% oil. Thus, a minimum of 20kg oil is obtained per hectare.

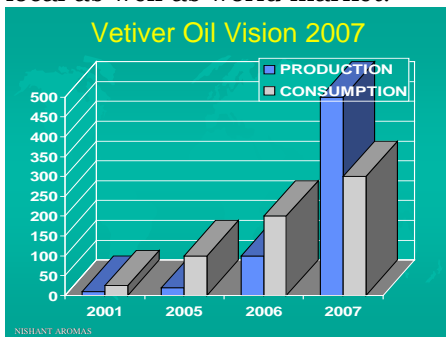
**Economic:** Vetiver gives a net profit of Rs.40,000/hectare.

In global level, India is capable of producing Vetiver. In last few decades, other than India, countries like Indonesia, China & Haiti are also doing its commercial production. But in Haiti, due to many problems & reasons, its production is decreasing & the main reason is not unavailability of a stable Government. The quality of Vetiver Oil produced by China can not be compared to that of India. The main reason for this is the unique soil of India due to which many such Chemical components are present in the Indian Vetiver Oil which is responsible for its best fragrance & taste. Although it is cultivated in many countries to lessen the soil-erosion problem but due to excessive manpower required for digging out the roots of Vetiver from the soil, the oil is not distilled from the same right now. This aspect was presented by World's famous Perfumers in Italy during ISEO on October 2004. In such circumstances, India can be projected as a the major role player for production of Vetiver. But it is necessary to proceed with unity in most planned manner & in correct direction.

In last few months survey during search of the right planting material, it was found that in Uttar Pradesh due to lack of knowledge, the Vetiver oil is obtained from the roots obtained from forest land which is not dependent on any scientific base. But although the production is less, it is more effectively used in Masala Business due to its unique fragrance & taste. The demand is much more than the production capacity but since no joint actions & trials are done, this business has not succeeded although it has bright future. This right variety of Vetiver was available with the research Institute but since the same was not commercialized, the people in flavour & fragrance industry shifted more on to Synthetic chemicals.

On evaluation of the sample of Vetiver oil obtained from South India brought the problem of adulteration into picture. In some cases, after getting the proper sample, the material supplied was adulterated.

With respect to Bio-technology park, Vetiver is beneficial for Uttar Pradesh as till now the people of this area are following wild harvesting method where the % yield is less i.e. 0.01% whereas if the same crop is cultivated in waste-land & the right material is cultivated as developed by CIMAP, yield of 0.8- 1.2% can be achieved that means the yield will be 10 times more than the qty produced till now. We need to increase the cultivation of Vetiver. At present it is 12000-13000 Tns, but if the right technology is followed, the same stock of material will yield more oil making India globally most competitive. Regions like Indonesia, China & Haiti are exporting the same oil @ \$ 50-70 per Kilo & if we are able to offer the same @ \$ 30-40 then when can easily capture the local as well as world market.

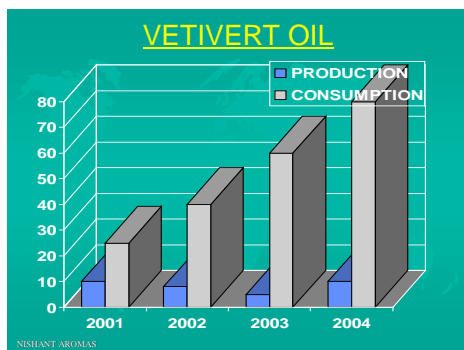


This oil has fixative property so consumption will be more. Due to high price of Vetiver, Sandalwood & Musk, synthetics are ahead but if proper steps are taken then the same price can come down increasing its demand much more.

If this vetiver is planted in few acres of land like river coast, wasteland, Forest then it will prevent the soil erosion & Vetiver will spread in the nature. It has natural propagation characteristic so can be planted in planned manner to make it the most sustainable crop. These plants can be replanted making a win-win situation for everyone. At present, people earn Rs. 3.00 per Kilo from such wild vetiver roots but since it is wild & very hard to dig out from the soil, the quantity is decreasing generating the problem of employment to these tribal people.

In Biotech park, many distillery's can be installed for distillation of oil. Also the water generated after distillation has many uses as already discussed above.

The current predicted market demand for Vetiver Oil is 500MT & its production is less than 500MT but if alongwith Floriculture & Horticulture, Vetiver is taken as a Intercrop then we can easily reach the production capacity of 1000 MT & there is enough market for the same. If at-least 1 lakh acre of land comes under cultivation then India can become the important resource place for Vetiver Production. Mentha distillation units which are utilized only for one month in a year & remains ideal for rest of the year can be easily utilized reducing the cost of installation of distillation units.



Barabanki is the centralized area & people are habitual to cultivation. The local market is increasing by some lumps & bumps due to increase in Pan-Masala & Zarda Industries . There is non-availability of same from China & Indonesia & at the same time, quality is not proper. For Vetiver cultivation, the land should be free from Pesticides & in this part, UP is ahead. The land of Uttar Pradesh is free from Pesticides as the farmers there are not familiar with the use of Pesticides & at the same time, cannot afford the same. So in natural forests of Uttar Pradesh, Vetiver can be easily cultivated. In such soil due to non-presence of Pesticides, the microbes grow more effectively which are mainly responsible for unique fragrance as already discussed earlier.

So all strains are in favor of UP & Bihar. In last 1½ years due to thrust area 400% growth of Essential oil is seen & lot of Vetiver will also come in due course of time & has good future. Its an ideal crop.