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Prospective Adaptation of the Mediterranean Crop Olive in India

Thangamani Dhandapani, K.B. Sridhar and S. Vimala Devi

Abstract

The market for the Mediterranean crop Olive is ever increasing in the Indian Sub-continent. Apart from import, exploring the local possibilities of cultivating Olive in this country is being explored. Adaption and acclimatization of the new crop is always a challenge. Though the country has large areas with similar agro-nomic regions as that of the native Mediterranean regions, ecological adjustment of the crop to the micro-climate of the new area needs modification of cultural practices. The success of olive cultivation, the challenges encountered, the prospective of making this cultivation a sustainable one by innovative alternate usage is explored in this chapter.

Keywords: olive cultivation, Indian climate

1. Introduction

Olives are one of the world class premium oil producing groups of evergreen trees and shrubs, largely found in warm temperate and tropical regions of the world. It is a unique fruit crop which can withstand high temperatures and drought, but requires chilling temperature for fruiting [1, 2]. Olives can grow in wide range of soils like heavy, light, clayey or sandy soils. It belongs family Oleaceae [2, 3]. All the cultivated varieties of olive are diploid ($2n = 46$). It is a crucial oil yielding crops of the Mediterranean countries and in sector with similar climate alike Cuba, California, New Zealand and South-East Australia. Its nativity in apparently the eastern region of the Mediterranean Sea, deriving out of position it has circulated about the basin [4, 5]. Olives are grown mainly for two purposes: fruits for pickling and oil extraction. Apart from this, the fine yellow or light greenish brown hard wood is used for furniture making and the leaves have medicinal value. Earlier olives are confined largely to high end consumers, but now it is gaining popularity world over because of its numerous health benefits.

India has observed olives in consideration of the Buddhist periods as per the mention in the Tripitaka include numerous resources of spoiling jaitavans (Olives) by monks afterwards purchasing lands [6]. In 1885, the beginning olive plantation practice was started towards Kashmir, in an Indo-Italian merger. There is also a mention of other experiments included the Indo-Spanish venture for Himachal Pradesh olive plantations. Neither was successful to cultivate large scale olive production.

2. Indian scenario for olives

It is important to note that olive oil is not as costly as recognized in consideration of it is used in 1/3rd the volume of other oils. Also including expands international disclosure, Indians awareness of the assistance of olive oil as edible oil has made consumption of olives and olive oil as a fashion among the middle and the wealthy classes. The During 1970's, olive oil got great boost due to the health benefits and today olive is an important international trade commodity. Between 2009 and 2010, consumption of olive oil in India grew by 52%. Since 2006, it has shown a cumulative growth rate of 30%. The olive has a high content of monounsaturated fat (mainly oleic acid) and polyphenols which are beneficial for health. It is a prosperous source of polyunsaturated fatty acid (PUFA) and is exactly free come out of cholesterol. The consumption of olive oil has been chemically advocated to people suffering from hypertension and coronary disease. The fruit has bitter component (oleuropen), a low sugar content (2.6–6%) compare with other drupes (12% or more) and high oil content (12–30%) depending on time of the year and variety. Moreover, it is also rich in minerals like iron, calcium and phosphorus.

The imports of olive oil are ever growing and India meets 100 percent demand of olive oil through introduction, mainly from Europe. According to Indian olive oil association, the demand of olive oil is growing 20 percent annually. Olive oil is finally creating a niche in India's edible oil market. Due to campaigns like "Olive it Up" and many international companies investing money to develop their brands, the market is widening and Indians are becoming more educated for the quality and use of oils. The 60 percent of the national market is controlled by three companies in India. And 90% of the import is accounted from Spain and Italy. This suggests the potential for cultivation and production of olive oil in the country. Acknowledging the import value of Olive oil, in 2006, the first attempt to cultivate the olives in India was initiated in one district of Rajasthan, but after 15 years, it has spread to five more states. The varieties grown in India are mainly the ones introduced from Egypt, Italy and USA.

3. Olive Research and Development in India

The olive cultivation in India is still in its infancy stage apart from Rajasthan, and restricted to a few pockets in the states of Jammu and Kashmir, Himachal Pradesh and Uttarakhand. Olive is a tree endures oil-seed crops appropriate toward subtropical climatic surroundings, is mostly mature for its oval shape fruit and that is commonly used for extricate non-drying edible oil and along with eaten basic in soups, salads, pickles etc. The National Bureau of Plant Genetic Resources (NBPGR), New Delhi has popularized frequent enhanced olive variation beginning at other region that is healthy well beneath Indian environment. India is importing around 68% of cooking oil each year. There is need to abate the import of cooking oil. Olive oil utilization has risen five times arising out of recent ten years. India has an ample capability for olive planting which needs to be explored. The Regions olive oil imports are developing starting of around 14,000 MT in 2013, imports are estimated to develop up to 42,000 MT by 2025. Olives are high in oleic acid, which can help prevent heart diseases. The major deterrent to greater consumption is its price. One liter of extra virgin can cost between Rs 800 and Rs 1000. Presently, Rajasthan is the dominant state for Olive cultivation in India. Subsequent to, 2013 towards 2016, the state has produced in bulk 11574.09 kilograms of olive oil. At the beginning, the state had initiated the olive cultivation on a total range of 182 hectares on

government plantation. The olive cultivation has besides attained up to 425.18 ha on farmer's fields. Seven olive plantation areas are enhancing in different regions of the state. The state had got seven distinct olive category namely Barnea (Origin Israel; purpose: Oil), Arbequina (Origin: Spain; Purpose: Oil), Cortina (Origin Italy; Purpose: Oil), Picholine (Origin France; Purpose: Dual), Picual (Origin Spain; Purpose: Oil), Koroneiki (Origin Greece; Purpose: Oil) & Frantoio (Origin Tuscany, Italy; Purpose: Oil) were imported from Israel. The government is encouraging farmers to plant olives and providing subsidies.

4. The first olive experiments which took off from Rajasthan

The India's tryst along with olive cultivation was established during former Rajasthan Chief Minister Vasundhara Raje visited Israel in 2006. She was wonder struck by the olive trees in Negev desert, an arid landscape much like Rajasthan. She took initiative to green the Indian dessert state Rajasthan and immediately, the Mediterranean trees were imported and planted over 180 hectares of state government land with the help of Israeli technology. Unlike in Mediterranean countries such as Spain and Italy where the trees are old and the farming traditional, the Israeli technique is based on intensive plantation. 1, 12, 339 Saplings of 7 olives varieties *viz* Barnea, Arbequina, Cortina, Koronoiki, Picual, Frontio and Picholine were imported from Israel in 2007. Their rooted cuttings were then hardened at hi-tech nursery in Rajasthan. The plants were irrigated by the latest method i.e., "drip-ferti" irrigation techniques, the method of direct injection, water and nutrients added simultaneously. By 2014–2015, the plants started fruiting in about 13 of the 33 districts of the state. 1300 tones of fruits were harvested in the first season.

After the success of the pilot project, and study of the technical feasibility and economic viability, commercial cultivation of olives started in Rajasthan. Government of Rajasthan determined to encourage the Olive cultivation under public-private partnership in the state and Rajasthan Olive Cultivation Limited (ROCL). For thus commercialism challenge Rajasthan government had united organization along Pune placed inundation tools Finolex Plasjon Industries and Indolive an Israel firm with knowledge in olive cultivation in dessert countries. This includes setting up an oil extraction unit, sale and supply of saplings and equipment, and buying back the fruit. The company also set up an olive press in different districts to extract oil. The oil produced from the olive fruits grown at Rajasthan, is as good as international standards. Though there were some bottlenecks of low production, the next phase was initiated giving importance to the positive results (**Figure 1**).

Around 200 hectares under the National Mission on Oilseeds and Oil Palm (NMOOP) and 5000 hectares under the Rashtriya Krishi Vikas Yojana (RKVY) were brought under the olive cultivation. Farmers are being renewed to cultivate olive trees by offering these free plants and mechanical support.

Seven Olive farms had been developed on state owned land in various agro climate zones with a total area of 182-hectare under intensive farming system. Olive Plantation are arrange beneath almost novel and promote methods based on most recent experience – how and action. The methodological know – how is being attained from different authorities which regularly visit, inspect and monitor the progress of farms. Watering is being complete by computer supervised drop watering method. Provinces are well implemented along composed fertigation and climate depot. Different plantation methods likewise – super intensive plantations, fertigation, plant protection, agronomical practices, leaves diagnosis were undertaken.

Figure 1.
Olive plantations in Rajasthan, source; ROCL.

5. The olive cultivation at Kashmir, Himachal Pradesh and other states

With the success of Olive cultivation in Rajasthan, Italian companies explored the possibilities at Ramban in Jammu and Kashmir, Kullu in Himachal Pradesh, Punjab, Haryana and Odisha. Some of these attempts failed, as a result, there was a dire need for importing suitable varieties from different olive producing countries and testing for its establishment and large scale cultivation in suitable agro-climatic zones of the country.

All over, for the olive tree, two Olive worlds Germplasm Banks (OWGB) are shortly initiated, in Co'rdoba (Spain) in 1970 and Marrakech (Morocco) in 2003. The olive germplasm bank of Spain has over 350 cultivars collected from different countries. The olives include about 1250 cultivars from over 50 countries. A large number of the olive collection exists in the gene bank of Albania, Algeria, Argentina, Australia, Azerbaijan, Brazil, China, Cyprus, Egypt, France, Greece, India, Iran, Israel, Italy, Japan, Jordan, Montenegro, Morocco, Nepal, Portugal, Slovenia, South Africa, Spain, Tunisia, Turkey and USA [2]. A core collection on olive genetic resources has been developed from 561 accessions from 14 Mediterranean countries [7]. Existence of a good amount of diversity in world olive collection has been reported by several authors [4].

In an effort to import suitable olive varieties for research purposes in the country from various sources, a total of 108 olive varieties were introduced into India by Indian Council for agricultural research- National Bureau of Plant Genetic Resources, New Delhi from USA and Egypt during 2000–2011. The material was provided to the Central Institute of Temperate Horticulture (CITH), Srinagar, Kashmir one of the National Active Germplasm Sites (NAGS) of the ICAR-NBPGR. A low success rate was observed in its establishment and only nine varieties viz.,

Coratina, Frontoio from Egypt and Bouteillon, Dole 0090, Frontoio, Grossa Di Spagna, Leccino, Mission Leiva and Piconia introduced from USA and Egypt survived. Fruiting was observed in three varieties viz., Coratina, Frontoio and Leccino [8].

The Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, India gave permission for bulk import of seed/planting material for cultivation purposes. Therefore, several olive varieties were also introduced into India, by various government and private agencies for cultivation purposes. These varieties were reported to be maintained by the State Horticultural agencies of Himachal Pradesh, Uttarakhand and Jammu and Kashmir. An Indian corporation, in a concerted deal along a Spanish corporation, has declared a project over 300 hectares in Himachal. The Kashmir State is measuring with the 60 varieties attained from the U.S., Egypt and Italy.

Olive is not a native of this country, there is certain dependence for diverse germplasm from major olive producing countries. Olives thrive well in Mediterranean like climate, therefore a certain location in Jammu and Kashmir, Himachal Pradesh, Uttarakhand in India are suited for growing olives in India. A good amount of diversity is present in the olive varieties from Spain, Italy Greece and other countries and there is a potential for growing those varieties in India under suitable agro-climatic region. The systematic germplasm screening and evaluation of olives in India will have significant impact on Indian olive cultivation. In other areas, use of optimum agricultural practices such as drip irrigation is also being attempted for the large scale cultivation. The diverse agro-climatic conditions in India, including the poor and marginal soil can be efficiently utilized for olive production using modern agronomic practices.

6. Cultivation in new areas

With the success of ROCL in Rajasthan, Olives have now caught the fancy of other states. ROCL has distributed 4.5 lakhs saplings to Punjab, Himachal Pradesh, Jammu and Kashmir, and Uttar Pradesh and North-Eastern states. It is also helping states such as Haryana, Punjab, and Jammu and Kashmir to set up pilot olive plantations. As per the Indian Olive Association, a federation of olive importers and traders estimates a 40% growth in olive consumption annually. Gujarat, more, is experimentation along 84,000 plants at its cultivation educational institution. Those states need to take benefits of the commotion in appeal for table olives and olive oil. The Nashik Valley in Maharashtra and the Nandi Hills near Bangalore has similar climate as that of Mediterranean region, hence these pockets also is being explored for olive cultivation.

Under a \$300 million project called 'Promotion of Olive Cultivation for Economic Development and Poverty Alleviation,' Italy would help Punjab, Khyber-Pakhtunkhwa, FATA and Baluchistan to grow olive plants.

With the Government of Rajasthan declaring Olive as "Plantation Crop", the Government of India allowed 100% foreign direct investment (FDI) through automatic route. Demonstration of 4D Aqua technology by the ROCL allowed the crop to grow under high salinity. Under these developments, the Government of India has included olive as a crop under National Mission on Oil Seeds and Oil Palm, with these many other states like Arunachal Pradesh, Karnataka, Andhra Pradesh are also coming up to study the feasibility of Olive cultivation in India.

Many companies like Oliva International, is identifying possible land area for olive plantation across India (Rajasthan, Ooty, Himachal Pradesh, Kashmir, Punjab) and are actively exploring new possible areas. It is also providing Indian

hardened olive plants with subsidy, design for olive grove and complete end to end value chain consultation.

7. Package and practices for olive cultivation in India

Major Olive producing states: Rajasthan, Uttar Pradesh, Himachal Pradesh and Jammu and Kashmir.

Local Names: Jaitun (Hindi), Aliv/Olipe (Kannada).

Climate: Olive requires warm to subtropical climate. This can be cultivated at an altitude of 1500 m above sea level. The optimum temperature range is 15 to 30 degrees. It requires 100 hours of chilling environment. Mild to cool winters with a chilling period of about 2 months, with average temperatures varying between 1.5–10°C required for flower bud differentiation. It requires long, hot and dry summers to properly mature the fruit. A few olive category, Similar those grown in Egypt, Tunisia or Israel, blossom and fruit with certain slight winter chilling, whilst other categories expect more chilling for a common flower contrast. Areas receiving a mean annual rainfall of 400 to 700 mm are most suitable for olive growing.

Soil: Olives can be cultivated in wide range of soils. Requires well drained loamy or clay loam soils for best growth. The soil pH range 6–7.5 is ideal for its growth.

Propagation: Olive propagation is made today mainly through semi-hard wood cuttings (60% of the total) and by grafting the desired cv. on olive seedlings (40%). Nowadays micro propagation is also used in olive.

Seeds: very common, however the resulting propagule is of not true to type.

Grafting/Budding: The seedlings can, nonetheless, be grafted or chip-budded along material coming out of favorable cultivars.

Suckers: Another method of propagation is transplanting suckers that grow at the base of mature trees.

Cuttings: Shoot tips.

Irrigation: Watering is supported specifically in table olive variation where large fruit size is sought. It is further essential in intensive cultivation along massively planted trees for maximum blossoming. Irrigation also enhances the effectiveness of fertilization and pruning. Certainly, it may minimize the incident of substitute bearing. Olive trees are very sensitive to over irrigation and will not perform well in waterlogged soils.

Tree Spacing: the tree spacing ranges from 5 m x 5 m to 6 m x 6 m and 7 m x 7 m. In areas where the climate is especially suitable, more areas are needed because tree development is higher than common.

Choosing the varieties: For early bearing- 'Koroneiki', 'Arbequina', 'Maurino', 'Picual', 'Manzanilla' and for oil quality: 'Frantoio', 'Arbequina', 'Moraiolo', 'Picual' for cold resistance: 'Nostrale di Rigali', 'Leccino', 'Orbetana', 'Dolce Agogia', for Lime tolerance: 'Picudo', 'Cobrançosa', 'Galego', 'Lechín de Sevilla', 'Lechín de Granada', 'Hojiblanca', for salinity tolerance: 'Picual', 'Arbequina', 'Lechín de Sevilla', 'Canivano', 'Nevadillo'.

8. Flowerings and pollination

Flowerings and pollination are especially crucial phase in the olive cultivation. Affluence about flower is the essential of a welfare yield. The appearance of flower in June based on bud appearance that starts on developing shoot tips in April–May of the year back. Flower differentiations appear later. This crucial movement is complicated and introduce along flower bud selection, i.e. the formation of the

physiologic action known as nutrient and hormone capability as the bud tips to coming out of the inflorescence axis and flowers. Flower configuration along with organ improvement occurs from March until May–June, though blossom appears. The fruit is produce through fertilization of the egg cell in the flower pistil.

9. Floral and fruit biology

Flower bud inflorescence is endured in the axil of each leaf. Commonly, the bud is produced on the present season's arises and commit conspicuous develop in the coming season. The 300 of flowers each branch. All inflorescence consist of 15 to 30 flower buds, that are short, round and white yellow in color. The flowers are white or whitish; the calyx is small along with four - toothed; the corolla is minute-tubed along four valvate petals; the stamens are two, all bearing 10.000 to 15.000 small also airy pollen grains. The ovary is two- loculed, carry a small style also a capitate stigma. The pistil endures two carpels, all fruit consist of two ovules but one is fertilized also thus formed one-seeded drupe.

10. Fertilization

The dependents total of fertilizers are suggested 1000–1500 kg/ha 0–20-0 and 500–800 kg/ha 0–0-50. These quantity of fertilizers are enough to make up for the need in phosphate also potash as the afterwards 5–8 years. In the later year, next the birth of the new vegetation, 3–4 fertilizations alongside ammonium nitrate (20–30 g/tree every time) are essential followed through watering. The constant is practiced in consecutive years as far as the trees enter the producing point, developing constantly the amount of fertilizer.

11. Intercropping

Olive can be intercropped with wheat and other cereal crops, vegetables such as watermelons, tomatoes and potatoes etc.

12. Prunning and type of cuts

Olive trees should be pruned in preference in wintertime, amidst collecting and sprouting. Pruning should be afterwards in field where wintertime temperature is bottom in that it has a unfavorable event on cool defiance and less temperatures stop damage from curative hurriedly. The cuts made to the branches and shoots should not be too deep to avert notching branches bottom. To aid curative, they should not drop stub.

13. Training

In the meanwhile training, the main purpose of an action is to attain the actual shape as instantly as achievable in regulation to prompt consequent Olive productions. During initiative, accelerated improvement, container developed nursery plants should be used that have mature to acceptable height and have bit side way axis. The soil should implement the developing plants with the greatest attain able

environment to mature when they are planted out and consequently. All along this point pruning should be maintained to a minimal to augment developments.

14. Pests

The important pests of crops are the olive fruit fly (*Bactrocera oleae*), the olive-kernel borer or olive moth (*Prays oleae*) and the black scale (*Saissetia oleae*). Even though *B. oleae* is mentioned the common deliberate insect, all three are broadly founded in the Mediterranean countries and appears on olives at population massiveness initiating great economic losses.

15. Diseases

The greatest decisive olive tree diseases are verticillium wilt, olive knot, leaf spot and fruit mummification.

16. Fruit harvest

The fruits can be harvested manually and mechanically. Sometimes fruit may drop naturally.

17. Uses

Ripe olive fruits are pressed for rich oil. The fruit has approximately 20% oil and contains certainly low amount of cholesterol. Olive consists of 80% unsaturated fatty acid in contrast 20% saturated ones. Thus consists of oleic acid in great percentage and that is greatly important as our body. The oil is used as cooking, salad dressing, food preparation, massage, and for the manufacture of cosmetics, Pharmaceuticals, toilet preparation, etc. Matured fruit are also eaten afterwards being treated and dehydrated in vinegar or salt mixture substance. The juicy residue from leaves, bark and fruits contains medicinal components. Its wood is used as carvings, to endow houses, to make vessels and equip for the kitchen as well as for the field benefit and is good firewood. Leaves are food for animals as fodder; oil cake is fed to livestock or is applying for manure. The olive extracts soon afterwards extraction of oil is perfect for manures.

18. Promotion of olive based agroforestry systems

In Greece olive tree AF systems have been considered in intercropping with wheat, barley, maize, and chickpea [9, 10]. In Italy, the imitation of alfalfa (*Medicago sativa* L.) or *Asparagus acutifolius* L. in olive rows provides profitable market niche [11–13]. Durum wheat and chickpeas are common Mediterranean plants, part of the Mediterranean diet and grown under the same environmental conditions as olive trees, they represent interesting candidates to be the associated crops. In Morocco, olive- (*Olea europaea* L.) agroforestry is widespread [14] and applied to conventional agriculture condition and proven its resilience over millennia. Several species of trees (e.g., fig, carob, quince), cereals (e.g., wheat, barley), grain legumes (e.g., faba bean, chickpea) grow with/under olive trees [15–17] evaluated

two annual crops (durum wheat and faba bean) in olive agroforestry in northern Morocco. Agroforestry improved individual grain weight by 39% for wheat and 17% for faba bean, and enhanced the protein content of wheat grains and straw by 4% and 9%. Olive agroforestry systems can have great LERs and produce high-quality grains, even beneath more arid circumstances than last appraisal in Europe [18].

19. Value addition

To make the olive cultivation remunerative in Indian condition and to fetch good economic returns, new uses were need to explore for the fruitless olive trees. ROCL experimented with olive leaves and has come up with 'Olive tea', which has antioxidant properties and is creating awareness for its health benefits. The olive tea from Rajasthan has found market in UK with a price tag of Rs. 10,000 per kg, which shows the returns are high.

ROCL has also ventured into yet another herbal concoction, i.e., olive wine. Research is being conducted at Vidhyasagar University, West Bengal, Tripura University and Jiwaji University in Indore.

Another alternative, ROCL ventures were initiated was in agro-tourism. Olive tree landscaping is the latest fixation among the affluent. In the vast stretch of sandy terrain of the desert land, Rajasthan, the green stretches of olive plantations are welcomed as resort, based on the theme of olive agri-tourism.

Also another attraction with wood from the tree delicately carved into statuettes is making way in agro-tourism. Most of the demands come from farm houses, hotels, residential societies and high-end bungalows. That's how India, especially Rajasthan, has become an unlikely innovation hub for olives. Today about 150 farmers are growing it on over 900 hectares. Three industrial have come up to formulate the tea.

20. Incentives for olive cultivation

Farmers reach 75 per cent appropriation on plants, 90 per cent appropriation on drop watering also Rs 3000 per hectare as fertilizers along with chemicals. Additionally, we get mechanical assistance of one experienced per 50 ha. Presently, Rajasthan farmers reach one olive plant as Rs 115, although farmers starting with other states buy it at the cost of Rs 150. The government of Rajasthan has declared Olive has plantation crop. Olive cultivation is expected to fetch about 5 times the profit that the farmers of Rajasthan currently fetch from wheat on a hectare land (Figures 2 and 3).

Figure 2.
Olive boundary plantation established at farmers field, Deligaon, Jhansi, India.

Figure 3.
Farmer Sahab ram with olives, photo courtesy ROCL.

21. Quality planting material production

An attempt was made to multiply Olives through clonal techniques. The shoot tips collected from one and half year old plantation was used as planting material. The cuttings were quick dipped in IBA 6000 ppm solution and were placed in growing media (vermiculite). The cuttings started rooting after 25 days of planting. Overall cuttings showed 50 percent rooting (**Figure 4**).

Figure 4.
Quality planting material production.

22. Olive oil and market in India

Though *Olea europaea* L. (Olive Tree), grows enormously in Mediterranean countries, the output of the tree is surfing whole world as Olive oil, its main derived product, has experienced an increase in its majority due to its organoleptic attribute and its united useful health effects. Olive oil is considered as the premium product in the oil category whose production is the least in India, since it's not native to India and we are not cultivating this species, so as it is entirely imported from countries like Spain & Italy. In Indian continent, Rajasthan is the only place for the production of olive oil. Olive plants need chilling to flower and fruit the temperature should be below five degrees at night time and below 16 to 20 degrees in the morning period. The Indian olive oil market is expected to grow at a CAGR of 9.12% in terms of Value and at a CAGR of 1.05% in terms of volume in coming years.

The India olive oil market size was priced at \$58.6 million in 2017, and is projected to reach \$127.5 million by 2025, growing at a CAGR of 9.9% from 2018 to 2025. When we analyse the characteristic of the crop oil, it is a viscous broth which is dislodged coming out of the fruit of the olive tree by pressing all olives. Olive oils have less smoke point of 240°C and can be consuming natural. This oil utilization is generally investigated healthful for it is united alongside a less difficult of disease of heart and convinced dealings along with colorectal also breast cancer. This oil is also a great origin of monounsaturated fatty acid also antioxidants like polyphenols, vitamins E & K, chlorophyll, also carotenoids. The olive oil corporation in India has endorsed appreciable development in the current years due to acceleration in health-attentive customers. The olive oil market has developed into great competing and expenditure conscious owed to the high capability and constant development of the olive oil marketing. The aspect such as expanding want from end-user companies such as food, personal care, pharmaceuticals, etc. and rising attention about health aspects is expected to drive the India olive oil market growth.

In accord with The Associated Chambers of Commerce and Industry of India (ASSOCHAM), the market size of India's beauty, cosmetic, and grooming production was \$6.5 billion in 2016 also is predicated to reach \$20 billion by 2025. It's growth in utilization of cosmetic also beauty production are likely to contribute lucrative convenience as the improvement to forthcoming of the India market.

23. Raj olive India's indigenous oil brand

The oil contented in the fruit collected ranged from 9 to 14 per cent. The oil content of the olive in other countries varies between 12 and 16 per cent. The state will be launching its olive oil under the brand 'Raj Olive Oil'. One and other extra virgin and virgin oils are built by automated technique and are not chemically considered. The acceptable common of free fatty acids is greater in a virgin olive oil in comparison to the additional virgin variation. The country's olive oil imports are developing at a quick clip - from around 14,000 MT in 2013, implication are projected to shoot up to 42,000 MT by 2025 as progressively Indians favor olive oil for its healthy aspects. It's plenty as oleic acid amount, which can help prevent heart diseases. According to ROCL, India currently imports 14,500 metric tons of olive oil from countries like Spain, Italy and Greece, and the bottled varieties of extra virgin and pomace olive oil charge amount amid of Rs 700 and Rs 1000 a liter. Although the price of olive oil build upon international charges, we can encourage that indigenously-produced oil will be low cost than those transported.

24. Deterrents to greater oil consumption

The studies have been carried out in the west of the Mediterranean, the following oils such as Arbequina, Carrasquena, Cornicabra, Del Pomet, Hojiblanca, Llumero, Picudo, Seniero, Serrana and some Villalonga contains more than 80% of oleic acid. Lipids are important foods provide nutrition, among the total energy 30% has been intake from the lipids, intake of lipid percent has been dependable with age, weight, and possible sensitivities to pathologies of the consumer, hence among the total lipid intake 12 and 20 per cent has to be monounsaturated fats. Therefore, the active component characterization of monovarietal oils is essential at the moment, there is a clear need to replace the current industrial pastries made with different types of oils and fats, with EVOO product and the daily utilization of amidst 5 and 10 fruits or vegetables. Olive oil utilization has seen develops in the last couple of years as customers are becoming attain of the useful of olive oil management and its aftermath on health. There are three main types of olive oil Extra-virgin, Refined and pomace.

The pomace olive in 2017 assumed as the best contribution in expressions of profit in the Indian olive oil market and is expected to develop at a constant growth rate amid the predicted timings. These are applying to the pomace olive oil being a more comfortably costing and gladly accessible olive oil variety. Although the pomace olive oil is prepared, it is still investigated aim proved substitute to other oils in the market and hence is in high requirement as in comparison to the other different types of olive oils. However A deterrent to greater consumption has been its price - an imported one liter bottle of extra virgin can cost between Rs 800 and Rs 1000. A domestically produced one can be cheaper.

25. Medical authorities' recommendations

Olive oil possesses lot of medicinal properties. The high amount of monounsaturated fatty acids (MUFAs), particularly oleic acid, it plays vital role in nutrition, and contains high concentrations of polyphenols, tocopherols and phytosterols, it is important antioxidants and olive oil has been used as important nutrients in the Mediterranean diet. Olive oil prevents neurodegenerative disorders (Parkinson's disease and Alzheimer's disease) and also acts as a cardiovascular and cerebral-vascular protector, due to these medicinal properties many nutraceutical industry has been working with olive oil. All these characteristics make EVOO an essential food component for health. EVOO, also vernacularly known as "liquid gold" is a natural product of inarguable value and not only in the financial sense of the term but also for its renowned properties and advantages on health. It is one of the recommended foods for its nutritive and is essentially a required of the MED, given that to the aspects connected with it.

Based on the chemical structures of EVOO, its coming under the lipophilic products since lipids is the main constituents, primarily MUFA, found by PUFA. This lipid fragments is responsible for preventive properties on cardiovascular disease, autoimmune and inflammatory disorders, provide anti-thrombotic and regulation effects of blood pressure although in a smaller quantities, other compounds such as tocopherols or polyphenols are also present, which are combined with the potent antioxidant and inflammatory activity of EVOO, among other features.

Oleic acid is oil that has the capability to reduce the effects of oxidative stress in the human body, the regulation of the levels of LDL-cholesterol without alteration of HDL-cholesterol and it consequently reduces the risk of heart attacks and other cardiac pathologies. Corresponding to the United States Department of Agriculture

(USDA) 1 tbsp, or 13.5 grams (g) of olive oil, contains 119 calories, 13.5 g of fat, among that 1.86 g is saturated fat rest of it unsaturated and also it provide vitamin E 1.9 milligrams (mg) and 8.13 micrograms (mcg) of vitamin K, apart from that it consists calcium and potassium, as well as polyphenols, tocopherols, phytosterols, squalene, and terpenic acids and other antioxidants. In the Spanish pharmacopeia as well as in other European pharmacopeias, a wide assessment is assigned to the treatment with of olive oil, thus it is recommended as in injectables, because of an accurate role in gynecology, in childhood to old ages. The authors of A Practical Guide on Medicinal Plants indicate that olive oil contains very beneficial oleic acid, phitosterina lecithin and enzymes, in addition to a bitter principle and pigments.

26. Conclusion

Government of India is promoting Olive cultivation under the National Mission on Oil seeds and Oil palm. The diverse agro climatic conditions in India, including the poor and marginal soils can be efficiently utilized for olive production. The government of India's ambitious target of doubling farmer's income can be easily achieved by promotion of Olive plantations in the country. Israeli methodology has grant Rajasthan develop into the core for *India's* new-begin love for *olives*. Rajasthan's tryst with olives and its achievement can now motivate further-more states to approve plantation of this tree, particularly on arid regions. ROCL has distributed nearly 4.5 lakh seedlings to Punjab, Himachal Pradesh, Jammu and Kashmir, UP and NE. In 2017–2018 India imported 10914.86 metric tonnes of oil. That could have huge implications on the livelihood of people in the region. *Olea europaea* L. (Olive Tree) oil considered as golden ingredient in the diet by all food and medical expert across the globe, in addition to offering characteristic organoleptic properties, provides substances capable of preventing the appearance or development of diseases of various nature, from heart and circulatory diseases to metabolic disorders, including carcinogenic processes. To add superior plants to the cultivators, the state government, with Israel's help, has set up a centre of greatness at Jaipur's Bassirange.

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