

G.I. APPLICATION NUMBER – 499

Application Date: 30-09-2014

Application is made by **Mango Growers Association**, Ajay Engineering Company, Premises, 5-14-42, Adalat Road, Aurangabad - 431005, Maharashtra, India for Registration in Part A of the Register of **MARATHWADA KESAR MANGO** under Application No: 499 in respect of Mango falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) **Name of the Applicant** : Mango Growers Association
- B) **Address** : Mango Growers Association,
Ajay Engineering Company, Premises,
5-14-42, Adalat Road, Aurangabad - 431005,
Maharashtra, India
- C) **Types of Goods** : **Class 31 – Mango**
- D) **Specification:**

Kesar Mango cultivation takes place in Marathwada division of Maharashtra. Kesar Mango in Marathwada contains higher amount of total soluble solids i.e. 240Brix which is highest among all mango varieties in India. An increase in sugars is accompanied by an increase in TSS hence the sweetness of Kesar Mango in Marathwada is highest. Kesar Mango in Marathwada possesses color and taste similar to Saffron hence the variety is known as Kesar mango which is the unique for Marathwada division. Ample amount of Kesar mango fruit yield which is about 3 to 4 times higher than Alphonso Mango. Marathwada Kesar mango is large size mango fruit. Under normal circumstances, the ripening period of Marathwada Kesar Mango is 8 days with the Shelf life of 14 days.

- E) **Name of the Geographical Indication:**

MARATHWADA KESAR MANGO



- F) **Description of the Goods:**

Kesar is one of the finest varieties of Indian mangoes and is rated to be the best at the home and abroad. The fruits are very attractive, large sized and oval in shape. The

taste is superb with an excellent sugar/acid blend. It is favorite fruit of the processing industries since; it retains its characteristics flavour even after processing

Himayat Bagh is a 17th-century garden that now houses the Fruit Research Station and Nursery. Fruit Research Station was established in Himayat Bagh, Aurangabad district under Marathwada Agricultural University.

Israel is a world leader in advanced agriculture technologies. Israel's success lies in the determination and ingenuity of farmers and scientists, and in the close cooperation between R&D and industry. Amongst the many fields in which Israel and India collaborate, agriculture has always been front and centre.

Due to suitable climatic conditions, rainfall and soil 'Centre for Excellence for Kesar Mango' started in 'Fruit Research Station, Aurangabad' under Indo-Israel agriculture cooperation project for Kesar Mango in Marathwada division. Following points are describing the Marathwada Kesar Mango in particular. Shape: Long and Oval

Color: Saffron

Taste: Sweet

Overall acceptability: Very Good

The reducing sugar content in Marathwada Kesar Mango was estimated by the procedure recommended by Oser (1979) and was found to be 9.9 gm/100gm pulp.

In a study conducted by Dept. of Chemical Technology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (MS, India), Kesar Mango fruit of defined physiological maturity were harvested and subjected to analysis for parameters such as Physiological Loss in Weight (PLW), Respiration Rate, Total Soluble Solids (TSS), Titrable Acidity, Fruit Sugars, β -Carotene Content, Ascorbic Acid etc.

The results of the study are summarized below:

S1. No	Parameter	Day 4	Day 8	Day 12	Day 16
1	Changes in PLW during storage	3.8	8.2	13.3	16.0
2	Effect on Respiration Rate (mgCO ₂ /kg/hr) during storage	35.65	85.66	120.00	160.00
3	Changes in TSS during Storage	15.1	19.0	19.5	19.4
4	Changes in % Titrable Acidity	1.40	0.75	0.26	0.18
5	Effect on Total Sugars During Storage	8.60	12.26	12.30	12.35
6	Effect on β -Carotene Content (μ g/100g pulp)	775	1160	1470	1520
7	Ascorbic Acid (mg/100g)	55.1	46.0	28.0	22.0
8	Effect on Organoleptic Score for Color	5.60	6.62	9.20	9.32
9	Effect on Organoleptic Score	6.72	7.93	9.16	8.87

	for Taste				
10	Effect on Organoleptic Score for flavor	5.30	6.45	9.50	9.35
11	Overall Acceptability during Storage	5.80	8.42	9.60	9.42

G) Geographical area of Production and Map as shown in page no: 78

The name Marathwada (Marathi: मराठवाडा) identifies one of the five regions in Maharashtra state of India. The region coincides with the Aurangabad Division. Aurangabad is the headquarters of Marathwada. It derived its name from Aurangzeb, who ruled it for a brief period.

Districts in Marathwada Division:

• **Aurangabad**

The Aurangabad district's North Longitude is 190 and 200 and East Longitude is 740 to 760. The Aurangabad District's total area is 10,100 Sq. Kilo Mtrs. Out of which 141.1 Sq. Km is urban area and 99,587 Sq. Km is Rural Area. Aurangabad District is bordered by the districts of Nashik to the west, Jalgaon to the north, Jalna to the east, and Ahmednagar to the south. Aurangabad is the headquarters and principal city. The district covers an area of 10,100 km², out of which 141.1 km² is urban area and 9,958.9 km² is rural.

• **Nanded**

The District of Nanded lies between 18 015 ' to 19 055' North latitudes and 770 to 78025' East longitudes. It covers area of above 10,332 per Sq. Km. It is located in the south eastern part of the state. The area presents undulating topography with uneven hills, plateau, gentle slopes and valley planes. Physio-graphically, the district can be divided in to 2 major parts, the hilly region on the North and North East and low lying area on the banks of the rivers Godavari, Manjra, Manyad, Penganga etc.

• **Parbhani**

Parbhani, earlier also known as "Prabhavatinagar", is one of the Eight districts in the Marathawada region of Marashtra State. Parbhani district lies between 18045' and 20010' North Latitudes and 76013' and 77039' East Longitude. The district is bounded on the north by Hingoli district on the east by Nanded district, on the South by Latur and on the West by Beed and Jalna districts.

• **Latur**

The Latur district is in the south-eastern part of the Maharashtra state. Latur town is situated on the 1807 Latitude and 73025 Longitude. The district is situated on the Maharashtra- Karnataka boundary. On the eastern side of the Latur is Bidar district of Karnataka, whereas Nanded is on the northeast, Parbhani on the northern side, Beed on the Northwest and Osmanabad on the western and southern side. The entire district of Latur is situated on the Balaghat plateau, 540 to 630m from mean sea level.

• **Beed**

Beed is situated on the 18.3-19.30 North Latitude and 74.5-76.60 East Longitude. Beed district is an administrative district in the state of Maharashtra in India. The district occupies an area of 10,693 km.

➤ **Hingoli**

Hingoli is situated at the northern part of Marathwada in Maharashtra. Borders of Hingoli are surrounded by Akola and Yevotmal in northern side, Parbhani in western side and Nanded at south-eastern side. The district came into existence by division of Parbhani district on 1st may 1999. Latitude of Hingoli District is 19.430 North and Longitude is 77.110East.

➤ **Jalna**

Jalna district is approximately situated at the center part of the Maharashtra state of Republic of India and in the northern direction of Marathwada region. Specifically district lies between 1901 North to 2103 North Latitudes and 7504 East to 7604 East Longitude. The boundaries of Jalna district are adjacent to Parbhani and Buldhana on east, Aurangabad on west Jalgaon on North and Beed on South. Jalna district covers an area 7,612 Sq.Kms, which is 2.47% of the total state area. The city is situated on the banks of Kundalika river.

➤ **Osmanabad**

Osmanabad district lies in the southern part of the state. The height of the district is 600mm above sea level. The district is located on the east side of Marathwada region within North latitude 17.35-18.400 and East latitude 75.16-76.400.

Kesar Mango cultivation in districts of Marathwada division (in hectares):

- Nanded -29,329
- Aurangabad -21,098
- Osmanabad -19,065
- Latur -17,473
- Beads -16,771
- Parbhani – 16,456
- Jalna – 14,824
- Hingoli - 5,451

H) Proof of Origin (Historical records):

Mango (*Mangifera indica* L.) originated in South – East Asia, one of the most important fruit crop grown in India. Mango is indigenous to India. It is as old as Indian civilization and mango has been cultivated in India since antiquity and records show that Huien-Tsang (606 – 647 AD) has testified its cultivation during the time of his visit to India. India occupies a prominent place in the cultivation of mango. Its cultivation is distributed throughout the warmer countries and is confined regions between 30 N and 30 S of the equator.

Kesar is one of the finest varieties of Indian mangoes and is rated to be the best at the home and abroad. The fruits are very attractive, large sized and oval in shape. The taste is superb with an excellent sugar / acid blend. It is favorite fruit of the processing industries since it retains its characteristics flavour even after processing.

Kesar variety was released from Balashad district of Gujarat. Origin of Kesar Mango is Junagadh in Gujrat which came in Marathwada and became King of export. Marathwada is one of the important mango growing regions of Maharashtra. There are two types of fruit plants, first fruit plants which grow and develop on rainwater only and second types of fruit plants which are known as dry land fruit plants which

grow on artificial irrigated water system. Dryland fruit plants possess tap root which goes deep in land and absorb the lowest ground water. Such fruit plants can survive in drought years. Such trees, our ancestors had thought too. So Mahanubhav sect founder Chakradhar Swami in Twelfth centuries preached his followers that they should be planted in Marathwada throughout Kesar Mango stones. Kesar Mango orchards should create. Followers obeyed the Preceptor's order and planted Kesar mango stones in Marathwada . These orchards have been hundreds of years to survive and they worked because it persists mango tree roots absorb moisture and distribute deeply in soil.

Latur is an important kesar mango growing district. This district accounts about 15 per cent of total area of Marathwada region under kesar mango. The long, warm to hot, dry summer and medium cool winter prevailing in this district are most suited for best the quality mango production. Very recently, the state government has also developed facilities for pre-cooling, grading, packaging of mango fruits at Latur. This situation has favored for export of mango . First time 5 tonnes of Kesar mango from Marathwada exported to England in 1998. Afterwards, for next three years Kesar Mango was exported to England and Hongkong and then Japan. The export of mango is increasing day by day on account of higher price realized by the farmers and export facilities developed.

D) Method of Production:

Soil for Kesar Mango cultivation should be a meter deep drain well, and then down to the soft black. Soil pH should be 6.5 to 8.0. However, percentage of limestone should not be more than 10. According to the texture of land, pits of 1 X 1 X 1 should be dug at a distance of 8 X 8m or 10 X 10 m. Bottom of the pits should be covered with 20-25cm layer of dry leaves or hay. While doing this, spread 50gm Carbaril powder. Afterwards add mixture of 3 buckets of dung, 1Kg Super Phosphate, black fertile soil and 100gm Carbaril powder in the pits.

Solid Planting Method of Kesar Mango:

Kesar Mango cultivation is recommended at a distance of 10 X 10 meters. But now the Kesar mango plantations in Marathwada is taken at a distance of 5 x 5 and 5 x 6 meters which has been shown to be more beneficial as there is more production of Kesar Mango fruits per tree. 10 X 10 plantation method posses 100 plants in each hectare while 5 X 5 posses 400 plants per hectares hence the production is higher and beneficial. These methods keep circumference and height of the trees limited. In the last five years, 2 x 4 m, 3 x 5 m Kesar mango is grown in Latur.

Advantages of Solid Planting method of Kesar Mango in Marathwada:

- High production in the specific sector.
- Small height trees hence spraying, harvesting of the fruits become easier.
- Harvesting of Kesar mangoes from 5-10 years old Kesar mango trees are with hand without using Zhela. (A tool called 'Zhela' in the local language. It is a loose nylon-net basket held by metal ring, and attached to a bamboo pole which has a sharp V-shaped cutting tool at the front of the ring)
- Various measures to improve fruit quality and brand are easily possible.
- Mango plantation modern In-situ method in Jalna, Marathwada:
- In-situ method means first sowing of the Kesar Mango stone in the land followed by grafting. Advantages of this method are:

- Stones of Kesar mango are sowed directly in the land hence without any obstacles tap root of the Kesar Mango plant goes deep in the land.
- Kesar Mango tree growth is higher due to in-situ method.
- By adopting this innovative method, in Jirwad area of Ghanasawangi tehsil from Jalna district, highest plantation of kesar mango is possible.

Planting Grafts:

As stone can be planted in land, likewise 10-12 months of kesar mango grafts can be planted. During these planting of grafts, around the grafts 3 Kesar mango stones should be planted and afterwards at the correct time period that is in September-October or February, support should be given to the plant so that strength in roots of kesar mango increases.

Growth and Care of Kesar Mango plant:

After rainy season at the mid of September, pits should be covered with hay or sugarcane straws around the grafts of Kesar Mango having height of 5-6 inches. While covering the pit, Linden powder should be added. Water with interval of 20 days should be given one full year after plantation. 10gm of Urea should be added in the soil which helps in the growth of the plant. Support must be given to the grafts. Shed must be created for each Kesar Mango plant in the summer. In the second year of planting, after 1st rain dung and chemical fertilizers should be given and growth of the plants should be checked for next 2-3 years by protecting plants from various pests, insects, birds and animals. Drip irrigation system should be arranged and in each season everyday 7-8 liters of water must be given to each plant. First two years after plantation, water must be given after every 3 days of intervals so those roots become able to go deep in the soil.

Harvesting:

Marathwada Kesar Mango fruit harvests mostly after 70-80% of maturation of the fruit and starts after 15th May. Fruits are harvested by hands when trees are 5-10 years old. The fruit is harvested using a tool called 'Zhela' in the local language of the trees having age more than 15 years. It is a loose nylon-net basket held by metal ring, and attached to a bamboo pole which has a sharp V-shaped cutting tool at the front of the ring. The harvester tugs at the Zhela in a specific and careful manner, which does not disturb other fruits held from the same branch, does not result in any pull for the branch and yet cuts the stem from which the fruit is held, ensuring that a significant part of the fruit stem is still intact with the fruit. The fruits are taken out, and laid into a crate and immediately moved into a cool, shady place so as to shield the fruits from sunlight and heat.

J) Uniqueness

Geographical significance:

➤ Topography:

The location of Marathwada is on 70.5⁰ – 78.5⁰ East longitude and 17.5⁰ – 20.5⁰ North latitude forms the part of the vast Deccan plateau all of India and is one of the six divisions of Maharashtra State. The total area of Marathwada region is of 64,813sq.km. and is bounded by the Vidarbha region on the North, by Andhra Pradesh on the East and Southeast, by Karnataka on the South and by Western Maharashtra on the West. The entire region is situated at an average height of about 300-650 m. above Mean Sea Level gradually sloping from West to East, and is

traversed by hill ranges origination from the Sahyadris in the West and the Satpudas in the North. Different ranges derive their names from local sources, the northern being Ajanta-Satmala ranges and the Southern the Balaghat ranges. In addition to these there are scattered hillocks of varying heights throughout the region, the highest peak, Surpal Nath (960 m. above MSL) being situated near Kannad in Aurangabad district.

➤ **Geology and Soil:**

The geological formations of the regions are characterized by the Deccan traps (Upper cretaceous to lower Eocene). The granitic rocks have given rise to red as well as black cotton soils. Major part of the region has deep black soil derived from the trap rock which is suitable for Kesar mango cultivation. Certain variations occur due to exposure and protection. A mixture of late rite and black soil, for example, is encountered in the eastern parts together with sandy soil along river banks. Most of the hill tops are bare or covered by coarse gravel while the low lying area accumulates clay and loam.

➤ **Climate and Rainfall:**

The weather, in general, can be said to be dry and moderately extreme hence the sweetness is higher in Kesar Mango from Marathwada division. The average day temperature ranges from 27.70C to 380C while it falls from 26.90C to 200C during night. Similarly summer and winter temperature also varies greatly. The highest during summer day being about 43.30C while the lowest during winter nights about 60C. Relative humidity is extremely low for major part of the year (between 35 to 50%) while it is highest (85%) during monsoon. The rainy season is considered from middle of June to the end of September which is followed by a sultry period from about the end of September to the middle of November. The winter season commences from the middle of November and ends by the end of the January followed by a dry hot summer from February to middle of June. Summers are in general full of gusty winds. The normal average rainfall is about 90 cm but is rather variable form year to year. It has decreased considerable in the recent years. The major amount of South West Monsoon precipitation is received on the West Coast of India due to the Sahyadris and only a small amount escapes through high a hill which is received by the Deccan Plateau. The region thus falls in the rain shadow of the Sahyadris.

Uniqueness of Marathwada Kesar Mango:

❖ **Highest TSS (Total Soluble Solids)**

Kesar Mango in Marathwada contains higher amount of total soluble solids i.e. 240 Brix which is highest among all mango varieties in India. Total soluble solids constitute about 80 % sugars, 10% acids and 10 % nitrogenous compounds.

Total Soluble Solids (TSS) content in different varieties of Mango in India

Mango Varieties	TSS (⁰Brix)
Marathwada Kesar Mango	24
Gir kesar Mango	18.1

Kutch-Bhuj Mango	18.0
South Gujrat mango	17.25
Laxman Bhog Mango	14.4
Himsagar Mango	16
Malda Fazli Mango	13.52
Mango Malihabadi Dusseheri	20.2

❖ **Sweet Taste**

An increase in sugars is accompanied by an increase in TSS hence the sweetness of Kesar Mango in Marathwada is highest.

❖ **Excellent color and taste**

Kesar Mango in Marathwada possesses color and taste similar to Saffron due to hot and dry climatic conditions and soil. Hence the variety is known as Kesar mango which is the unique for Marathwada division.

❖ **Big size**

Marathwada Kesar mango is largest size mango fruit as compared to other mango varieties which is unique with the Kesar Mango variety in that division.

❖ **Ample fruit yield**

Ample amount of Kesar mango yield which is about 3 to 4 times higher than Alphonso Mango. Hence the cultivation of Kesar mango is economically also beneficial to Marathwada division.

❖ **High content of Vitamins and minerals**

Marathwada Kesar Mango contains high amount of vitamins and minerals which are very important factors for human diet.

K) Inspection Body

Mango Growers Association, Aurangabad has constituted an Inspection structure to oversee the standards and quality assurance system for inspection of every step of production of Marathwada Kesar Mango and statutory compliances thereof.

This Inspection Body consists of President / Vice-President / Secretary / Treasurer of the Applicant Organization, Farmer Members, GI Experts, and Agriculture Experts.

The quality of Marathwada Kesar Mango will be monitored by an Internal Watchdog Mechanism in order to maintain the original physical and chemical characteristics as per GI registration.

The system of internal watchdog mechanism will consist of following committee members:

- i) Representative of Producer group of Marathwada Kesar Mango
- ii) Three (3) farmers from the area under cultivation
- iii) GI Experts

iv) Agriculture Expert.

This committee will also help to regulate the use of Geographical Indications for the welfare of local farming community. The committee will frame the terms and conditions to use brand name of Marathwada Kesar Mango by any of the marketing agency. The logo of Marathwada Kesar Mango GI will be used to create brand image.

L) Others

Uses of Marathwada Kesar Mango

Maximum demand is for consumption of directly the Kesar Mango fruit itself by the consumers. Mango Lassi is popular throughout South Asia prepared by mixing ripe mangoes or mango pulp with buttermilk and sugar. Ripe mangoes are also used to make curries Mango is used to make juices, smoothies, ice cream, fruit bars, Pies.

Delicious and nutritionally enriched soymilk based Kesar mango Ready-To-Serve beverages, as a one of the value added products with better acceptability. Soymilk as a base for production of beverages remained deprived of commercial exploitation because of its low acceptability associated with unpleasant beany flavor, astringent and bitter aftertaste. Fortification of Kesar mango pulp in soymilk improves the nutritional as well as therapeutic value of beverage. Kesar Mango pulp is added to soymilk to enhance its vitamin A, C and mineral contents. It also provides sweetness and masks the beany flavor of soymilk to some extent.

Whey based Ready-To-Serve Beverage from Kesar Mango products are available which are having high nutritive value.

Map of Marathwada Division

