Directorate of Research Bihar Agricultural University, Sabour-813210

File. No. DR/327/ Letter No. . 34.6

Date. 0.3: 6...2016.

To,

Registrar of Geographical indications Intellectual Propery Building, DST Road, Guinaly, Chennai-600032.

Sub: Regarding statutory fee under Geographical indications at Bihar Agricultural University, Sabour, Bhagalpur.

Sir,

Kindly find enclosed herewith an account payee cheque no. 997733 dated 02.06.2016 amounting to Rs. 20,000=00 (Rupees Twenty thousand) only which is to be given 5,000=00 per variety in registration fee for geographical indications i.e. (1) Zardalu Mango (2) Shahi Litchi (3) Katarni Rice and (4) Magahi Pan. The variety is popular in Bihar.

You are kindly requested to Geographical Indications for registration under GI act.

Thanking you.

Sincerely You

ector Research

Bihar Agricultural Univers

Copy to:

Dr. R. R. Singh, Assoc. Prof. Deptt. of Horti (Fruit)/ Dr. Mankesh Kumar, Asst. Prof. Deptt. 10f PBG/Dr. Ruby Rani, Asstt. Prof. Deptt. of Horti. (Fruit)/Dr. Prabhat Kumar, I/C BRC, Islampur/Dr. Chandan Roy, Asstt. Prof., Deptt. of PBG & Nodal Officer PPV & FR for information and necessary action.

भारतीय स्टेट बैंक (11805) - SABOUR केवल 3 महीने के लिए वैध / VALID FOR 3 MONTHS ONLY State Bank Of India SABOUR BHAGALPUR 020620 D D M M Y Y 6 1 Tel: 641-2451601 IFS Code : SBIN0011805 PAY Registrar of Geographical indications. out RUPEESTwenty thousand only _____ को या उनके आदेश पर OR ORDER ₹ 20,000=00 23-04-2016 अदा करें खा. सं VALID UPTO ₹ 50 LACS AT NON-HOME BRANCH A/c No. 31966078934 CURRENT A/C PREFIX: clul Kunne earch 1516200001 DIRECTOR RE Comptroller MULTI-CITY CHEQUE Payable at Par at Al Branches of OPResearch Bihar Agricultural University PISanoign Bhagalpur (BIHAR) B.A.U., Sabour (Bhagalpur) PIN - 813210 #997733# B12002012: 000138 29

PROPOSAL FOR REGISTRATION OF

SHAHI LITCHI

OF BIHAR UNDER GEOGRAPHICAL INDICATIONS OF GOODS

(Registration and Protection Act., 1999).



E.

Submitted by :

Bihar Agricultural University, Sabour, Bhagalpur

G.I. APPLICATION FOR SHAHI LITCHI FROM BIHAR aluables

Application is made by Bihar Agricultural University, Sabour, Bhagaphier 13210, Bihar, India for Registration in Part A for the registration of "Shahi Litchi" in respect of Horticulture products (Fruits) - Litchi falling in Class -31.

- A) Name of the Applicant : Bihar Agricultural University, Sabour, Bhagalpur, Bihar, India.
- B) Address : Director Research, Bihar Agricultural
 University, Sabour, Bhagalpur- 813 210,
 Bihar, Phone No.-(0641)- 2451056 & 2451058,

Email: drbau1908@gmail.com

C) Type of Goods

Class 31-Horticulture Products (Fruits) - Litchi

Received Rs. 5000 in cash/ Cheque/DD/MO on 20-6-2016

vide entry no. 3046 in the

D Specification:

Litchi (*Litchi chinensis* Sonn.) is one of the popular fruits of the world belongs to the family Sapindaceae and genus *Litchi*. It occupies unique position due to attractive appearance, deliciously flavoured, sweet, juicy and pearly white aril. Bihar is fortunate enough to have a salubrious climate of this crop. In Bihar litchi is mainly grown in the districts like Bhagalpur, Muzaffarpur, Samastipur, Vaishali, Darbhanga, Sitamarhi, Begusarai, Purnea, Khagaria and other adjoining areas. "Shahi "is one of the choicest varieties of litchi in the state. The plant is semi vigorous, dense, round-topped, slow-growing, 6-10 m high and equally broad. This regular bearer early maturing variety is known for its very attractive fruits of crimson red colour, pleasant aroma, juiciness, good sugar acid blend and high pulp to seed ratio.

Shahi is an early variety starts maturing in 2nd week of May and continued till 1st week of June in different areas.

E) Name of the Geographical Indication:

Shahi Litchi of Bihar



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F) Description of the Goods:

Family: Sapindaceae Genus: Litchi

> Botanical Name: Litchi chinensisSonn Division: Magnoliophyta Class: Magnoliopsida Order: Sapindales Family: Sapindaceae Sub family:Nepheleae

"Shahi "is one of the choicest varieties of litchi in the state. The plant is semi vigorous, dense, round-topped, slow-growing, usually5-9 m high and 5- 6.5 m canopy spread.

Leaf is dark green, medium size and lamina curved upward (boat shaped). Its evergreen leaves are 5-8 cm long, pinnate, having 5 to 8 alternate, elliptic-oblong to lanceolate, abruptly pointed leaflets somewhat leathery, smooth, glossy, dark-green on the upper surface and greyish-green beneath.

Shahi is an early variety starts maturingin 2nd week of May and continued till 1st week of June in different growing areas of Bihar.

Fruits are of large size having length of 3.2-.3.9cm and width of 3.2-3.5cm nearly round in shape, crimson red in colour. Peel is thin and stone is of medium size (3-3.9g). Juicy aril is of cream colour with juice percent of 58-67. The extent of chicken tongue seeds are about 8-18 percent i.e fruits with very small seed having seed weight of less than 2 g with high pulp percentage. This variety is prone to fruit cracking.

Tree height	6-10m	Time of anthesis	26th Feb to 10th March
Spread	6.5-9.5m	Fruit set period	14 th March to 23 rd March
Leaflet shape	Elliptical	Maturity time	3 rd week of May
Leaflet length	10cm-12.5cm	Harvesting period	21 st May to 5 th June
Leaflet width	3.25-3.5cm	Fruit cracking (%)	8-18%
Time of Panicle emergence	28 th January to 10 th February	Yield per plant	80-120kg

Morphological traits*

Fruit Traits.

Characters	Traits	Characters
Elliptical rollingtica	al Pouhdveight	3-3.40 g
Smooth	Stone weight	3.0-3.9g.
Round	Percent of chicken tongue seeds/aborted seeds	8-12 % (Seed weight is less than 2.g)
Moderately sharp (obtuse)	Pulp percent	62-67 %
Medium	Juice percent	56-62 %of pulp
3.2-3.9cm	TSS	19.5-21.6 ° Briv
2.9-3.6cm	Acidity	0.3-0.5 %
20-24.5g	Ascorbic acid	34-46 mg/100g of
13-15g		puip
	Characters Elliptical rdElhiptica Smooth Round Moderately sharp (obtuse) Medium 3.2-3.9cm 2.9-3.6cm 20-24.5g 13-15g	CharactersTraitsElliptical rdithiptical Peenhol/eightSmoothStone weightRoundPercent of chicken tongue seeds/aborted seedsModerately sharp (obtuse)Pulp percentMediumJuice percent3.2-3.9cmTSS2.9-3.6cmAcidity20-24.5gAscorbic acid13-15g

* Annual Report, ICAR- AICRP, (Sub tropical fruits), Ray and Sharma (1984)

G. Geographical area of production and map:

"Shahi" litchi is a unique variety of litchi in the state mainly grown in Muzaffarpur, Samastipur, Vaishali, Sitamrhi, East Champaran, Siwan,Darbhanga, Sheohar, Begusarai and adjoining areas mainly in agro-climatic Zone I of Bihar. The production area lies between 26 ⁰39' and 25⁰ 07' North latitude to 84⁰50' and87⁰ 24' East longitude.



3

H) Proof of Origin (Historical Records)

Litchi is considered to reach eastern India through Mynamar by the end of 17th century or shortly thereafter (Hayes, 1945). It was first introduced in Bengal though Assam. From Bengal it spread to other parts of India like Bihar, Uttar Pradesh, Punjab and other parts of India. But it was well adapted in agro climate of Bihar especially in Muzaffarpur, Darbhanga and nearby areas probably due to the humid climatic condition, alluvial soil with fairly good amount of calcium content. Probably seedlings of these varieties created variations and developed fruits of excellent quality and named "Muzaffarpur" in the name of the area where it developed. Owing to beauty and edible quality of some seedling plants of litchi grown in this area the eco type named as "Shahi" in due course of time. The layers of this plant gradually spread in the area suitable to growing conditions and now this is one of the important varieties of Bihar. Litchi was the important fruit crop of Darbhnga and Muzaffarpur for trade after mango during 1907 (Bihar District Gazetteers, Darbhanga, 1964) .It has been reported that Pusa estate and certain other villages viz. Malinagar and Saidpur produced litchis of excellent quality. For about 20years from 1910-30 there was a factory of Shri Basanti Charan Sinha in Muzaffarpur for preservation of fruits particularly mango and litchi. For couple of years litchi used to be air lifted to Calcutta during 2nd decade of 20th century.Darbhanga and Muzaffarpur were the main districts growing litchi and the total area under litchi in the state during 1961-62 was about 11440 hectares (Wealth of India, 1974, Part VII). The main varieties in Bihar were China, Purbi, Deshi, Muzaffarpur, Bedana and Dehra Rose

I) Method of Production:

Climate and soil

Litchi requires a subtropical climate having 2-3 months dry cool autumn and winter before flowering in March. Frost in winter in injurious for plant and normal flowering is affected below 5^oC.A temperature range of 15-20 ^oC favours flowering and above 20 ^oC for fruit set. A high temperature range of 30-40 ^oC during April and May requires for fruit development and maturity.. A fairy deep well drained sandy loam or clayey loam soil rich in organic matter content with pH ranging between 5.5 and 7 is ideal soil for litchi cultivation. Water-table should be at least 1.5 to 2 m deep.

Planting and plant multiplications:

The plant of shahi litchi is propagated through vegetative means by air layering. Air-layering or 'gootee' is widely accepted method of propagation in India. It is done after completion of fruiting and with onset of monsoon i.e. in the month of June. In this method a healthy and vigorous, upright twig of about one year old and 1.5 to 2 cm in diameter is selected. A circular strip of bark about 3-4 cm wide just below a bud is completely removed around the selected branch. Care should be taken to remove all the cambium tissue surrounding the white central wood while removing the bark Application of IBA@100ppm with lanolin paste on upper end of girdle improves rooting and survival percentage. About two handful of moist

tied at both ends, which prevents the loss of moisture. When the thinner roots are visible through the polythene wrap, the rooted branch is detached from the parent plant and potted in the nursery. Rooting occurs in about 6-8 weeks. The rooted shoots are separated from the mother plant in the month of September and immediately planted in nursery beds or pots. The layers are fit for planting after hardening in nursery for 8-9 months.

Land Preparation:

Before planting, the land is thoroughly ploughed and levelled. Therefore suitable wind break trees like silver oak, sesbania, drumstick, etc. should be planted along the boundary of litchi plantation to protect the young plants from hot winds and cold waves. Young plants can also be covered with thatch by the end of November to protect them from frost injury. Planting is normally done during July -September after the monsoon has set in.

Method of Planting and early care:Litchi trees are usually planted in a square system at 8 x 8 m or 10m X 10 m. Pits of size 1mX1mX1m are dug at the desired points a few weeks before planting and kept exposed in scorching sun during April -May for 4-6 weeks. These are then refilled with top-soil mixed with well rotten FYM 20-25 kg, neem and castor cake 1kg each, urea 225g, SSP150g, 150g sulphate of potash and 50g furadon 3G. After refilling the pits are immediately watered to set this mixture and remove the air gaps. Only 9-12 months old healthy plants with fine roots should be selected for planting. The new plants should be inoculated with mycorrhiza. The soil around the plant is pressed gently. Planting should be immediately followed by irrigation. Frequent irrigation, weed and nutritional management is required for faster growth and early fruiting. Proper fencing and wind break should be provided to protect the plants from high wind, speed, hot wind and frost.

Nutritional management

Fertilization starts from 2nd year continued and till complete life cycle. During initial 2-4 years fertilizers are applied in 3-4 splitsat 3-4 months interval i.e. in July, October, January and April. Once it comes in bearing frequency of manorial application is reduced and 75 % of total requirement is applied in the month of July and remaining 25 % in the month of April after fruit set. In two years old plant dose of fertilizers is compost 50 kg, nitrogen 100 g, phosphorus 40g, potash 80 g.These dose is increased every year by the same amount and in 10 years old mature plants and afterwards annual dose of plant nutrition is compost 50 kg, nitrogen 1000 g, nitrogen 1000 g, phosphorus 400 g and potash 800 g per year per plant

Apart from the requirement of N, P and K, micronutrients such as Calcium, Magnesium, Zinc, Boron and Copper play an important role in flowering and fruiting. Thus application of micronutrient should be given if the soil is deficient in these nutrients.

Training & Pruning:

The young, litchi trees are trained to develop strong frame work of scaffold branches well distributed around the trees and it should have single robust trunk up to a height of 1.5 m or more at full maturity. Annual pruning during juvenile stage to remove the extra branches to

maintain the stature up to two initial primary branch and again two or three secondary branch in each of the primary branch is very essential.

Light annual pruning after harvest should be done to remove diseased and damaged twigs and branches. Sniffing of old branches to promote fresh growth is therefore desirable to promote flowering shoots. Usually fruits are harvested along with 40-50cm fruiting twigs that serves the purpose of pruning. If the tree is making too vegetative growth, both root and shoot pruning is recommended. If crown becomes dense, few thick branches from the top is removed for penetration of light into interiors of canopy.

Fruiting and maturity

Shahi litchi starts flowering at 3-4 years of age. Flowering at early stage is removed and fruiting is generally taken after five years. But commercial bearing comes at an age of 10 years onwards. Flowering in Shahi litchi in Bihar starts fromlast week of February to 2ndweek of March and fruit set completed within next 10-15 days. Initial fruit set may vary from 12 to as high as up to 70 per panicle and hardly 15 to 25 percent of initial fruit set reach to maturity. Shahi litchi takes about 8-9 weeksfrom fruit set to attain maturity. It matures by 3rd week of May. Maturity is marked by the full colour development on peel of the fruit and tubercles become somewhat flattened.

Fruit cracking;

Shahi litchi is known to prone heavy fruitcracking. The percent of cracked fruits usually ranges between 8-18 per cent. But sometimes it may go up to more than 40 % in adverse climatic conditions. But fruit cracking can be minimised by adopting proper precautionary measures

Harvesting, Yield and post harvest handling:

Litchi is harvested at peak maturity. Unripe fruit do not develop proper flavour. Harvesting is done at cool early morning and kept under shad. The fruits are not harvested immediately after rain. Post harvest of litchi is very short i.e. of 2-3 days. Pericarp browning is the main problem which occurs due to rapid desiccation of pericarp and secondary fungal infection. Yield of shahi litchi varies from 70 to 125 kg/plant/year depending on age of the tree, climatic condition and maintenance of orchard.

Harvested fruits are first separated from bunch, graded and then packed in CFB board of different acceptable sizes. During grading poor quality fruit in terms of size, appearance, degree of damage, blemishes, bruising etc are discarded. It is done manually by visual appearance. The fruits are then graded in to different standard class according to their sizes.

Sulphur fumigation @ 250ppm followed by acid treatment by dipping the fruits in 4% dilute HCl of pH0.5 is alsopracticed to increase post harvest life of litchi fruits. After sulphur treatment fruits are subjected to pre cooling before packing to remove the heat from the produce. Hydro cooling or forced air cooling at $8-10^{\circ}$ C is also used for pre cooling. After pre cooling, fruits should be dried properly before packing.

Litchi fruits cannot be kept for more than two days at room temperature. The ideal temperature for storage of litchi is 2-4 °C in perforated poly bags. Fruits can be kept for more than 4-5 weeks at this temperature by maintaining humidity at 85-95 %. Storage at 7°c in perforated poly bags is ideal for nearby market. Litchi fruits are packed in cartons with adequate ventilations. Approximately 5% ventilation in carton is adequate without weakening the package too much. The vent should be arranged properly to allow sufficient air flow through the produce.

J) Uniqueness:

- 1. Regular bearer: Bears heavily regularly with average yield of 80-135 kg/plant/year at normal spacing of 10 x m
- 2. Early maturity: Matures in 3rd week of May.
- 3. Specific globose round shape fruit with very attractive bright crimson red colour peel.
- 4. Less prominent tubercles
- 5. Distinct specificmouth-watering flavour, juicy pulp and pleasant aroma with very good sugar acid blend. Fruits have small seed weighing 3-3.9 g.
- 6. Creamish v hite translucent juicy aril
- 7. Fruits with 8-18 %chicken tongue seeds of less than 2g.

K) Inspection Body:

Internal Watchdog Mechanism

The quality of Shahi litchi will be monitored by internal watchdog mechanism in order to maintain the original physical and chemical characteristics as per GI registration by the following committee members.

- Director Research, Bihar Agricultural University, Sabour, Bhagalpur-813210. I. II.
- Chairman, Department of Horticulture (F&FT), Bihar Agricultural University, Sabour, Bhagalpur-813210. III.
- Scientists, Litchi Research Team, Department of Horticulture (Fruit & Fruit Technology), Bihar Agricultural University, Sabour, Bhagalpur-813210.

The 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 GI registered Shahi litchi by any of the marketing agency. The logo of Shahi litchi will be used to create brand image of GI registered produce.

Regulation of GI in the territory

To regulate the use of GI in the territory, the Inspection Structure is proposed to consist the following members:

- I. Director, NRC, Litchi, Mushahri, Muzaffarpur, Bihar
- II. Directorate of Hrticulture, Patna, Govt. of Bihar
- III. President, Litchi Growers Association, Muzaffarpur, Bihar.

Shahi litchi in the geographical production area will be identified and will be allotted an identification number to ensure traceability and quality.

References:

Hayes, W.B. 1945. Fruit Growing in India. Kitabistan, Allahabad, pp. 180-6

Menzel, C.M. and Waite , G.K. 2005. Litchi and Longan: Botany, Production and Uses. CABI publishing .pp.9-11

P.C.Roy Choudhary, 1957. Bihar District Gazetteers. Muzaffarpur .pp. 50 and 75

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