

COFFEE; Trends on Trade and Processing-A Review

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Abstract:- Coffee is the most popular beverages consumed all over the world. *Coffea arabica* belongs to the family Rubiaceae. The adventure of Indian espresso started on a modest note, with planting of 'Seven seeds' of 'Mocha' during 1600 AD. Espresso development requires a lot of modest and gifted work for different activities including planting, relocating, pruning, culling, drying, reviewing and pressing of espresso. Espresso in India is become under a shelter of thick normal shade in biologically touchy districts of the Western and Eastern Ghats. This is one of the 25 biodiversity hotspots of the world. India is the solitary nation on the planet where the whole espresso development is developed under shade, hand-picked and sun dried. Tamil Nadu is the third biggest maker where India's 6 percent of the espresso is created. India is the third-biggest maker and exporter of espresso in Asia, and the 6th biggest maker and fifth-biggest exporter of espresso on the planet. How coffee is processed plays a tremendous role in determining the final taste, and choosing a particular processing method.

Keywords: - Coffee, production, Processing, Coffee Polishing, Grinding.

I. INTRODUCTION

The adventure of Indian espresso started on a modest note, with planting of 'Seven seeds' of 'Mocha' during 1600 AD by the incredible blessed holy person Baba Budan, in the yard of his withdrawal on 'Baba Budan Giris' in Karnataka [1]. For a significant extensive period, the plants stayed as a nursery interest and spread gradually as back yard plantings. It was during eighteenth century that

the business manors of espresso were begun, on account of the achievement of British business visionaries in overcoming the threatening woodland landscape in south India. Since at that point, Indian espresso industry has made quick walks and procured a particular personality in the espresso guide of the world.

II. GROWING CONDITIONS FOR COFFEE

- Espresso plant requires hot and sticky atmosphere with temperature changing somewhere in the range of 15°C and 28 °C and precipitation from 150 to 250 cm.
- It doesn't endure ice, snowfall, high temperature above 30°C and solid sun sparkle and is for the most part developed under obscure trees.
- Drawn out dry spell is additionally damaging to espresso. Dry climate is essential at the hour of aging of the berries.
- Stale water is destructive and this harvest is developed on slope inclines at heights from 600 to 1,600 meters above ocean level [2].
- Northern and eastern parts of inclines are favored as they are less presented to solid evening sun and the south-west storm winds.
- Very much depleted, rich friable soils containing great arrangement of humus and minerals like iron and calcium are ideal for espresso development.
- The dirt should be appropriately manured to hold and renew ripeness and to build efficiency.
- Espresso development requires a lot of modest and gifted work for different activities including planting, relocating, pruning, culling, drying, reviewing and pressing of espresso.

1. Coffee Plant



Fig. 1(a) Coffee Plant

Family: Rubiaceae

Botanical Name: *Coffea arabica*, *Coffea robusta*

Anatomy of a Coffee Bean

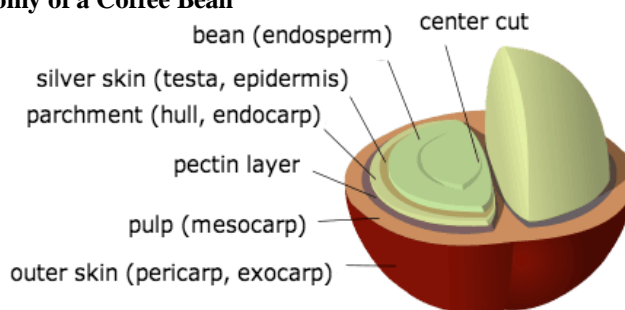


Fig. 1(b) Anatomy of a Coffee Bean

(Source: <https://www.craftcoffee guru.com/coffee-bean-anatomy/>) [18]

III. COFFEE PRODUCTION IN INDIA

- Espresso in India has become under a shelter of thick normal shade in biologically touchy districts of the Western and Eastern Ghats. This is one of the 25 biodiversity hotspots of the world.
- Espresso contributes altogether to support the special bio-variety of the district and is likewise liable for the financial improvement in the far off, bumpy regions.
- In India, espresso is developed in about 4.54 lakh hectares by 3.66 lakh espresso ranchers of which 98% are little ranchers.
- Espresso is generally filled in the Western Ghats spread over Karnataka, Kerala and Tamil Nadu, wherein Karnataka is the biggest maker representing around 70% of the all out espresso creation [3].
- Kerala is the second biggest maker of espresso yet lingers a long ways behind, book keeping just for about 23per penny of the complete creation of the nation.
- Tamil Nadu is the third biggest maker where India's 6 percent of the espresso is created.

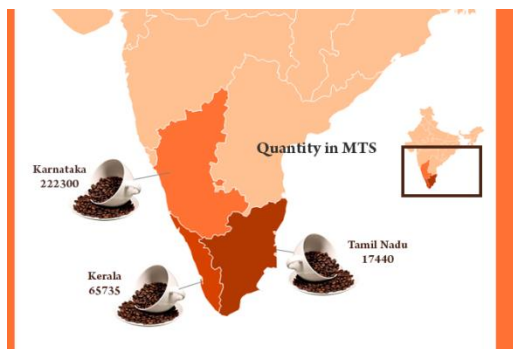


Fig. 2 Coffee producing states in India

(<https://www.ethiopianimporter.com/contentimageexport/cof-g2.png>) [19]

- Espresso is additionally filled in non-customary regions like Andhra Pradesh and Odisha and North East States.

➤ GI Tag accorded to coffee varieties

India is the solitary nation on the planet where the whole espresso development is developed under shade, hand-picked and sun dried. India creates the absolute best espresso on the planet, developed by ancestral ranchers in the Western and Eastern Ghats, which are the two significant bio-variety hotspots on the planet. Indian coffees profoundly esteemed on the planet market and sold as superior espresso in Europe. The Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India has as of late granted Geographical Indication (GI) to five assortments of Indian espresso.



Fig. 3 GI Tag to 5 Coffee varieties GI Tag granted to Coffee varieties are as follows:

- **Coorg Arabica** espresso is filled explicitly in the area of Kodagu locale in Karnataka.
- **Wayanaad Robusta** espresso is filled explicitly in the locale of Wayanad area which is arranged on the eastern segment of Kerala.
- **Chikmagalur Arabica** espresso is filled explicitly in the locale of Chikmagalur region and it is arranged in the Deccan level, has a place with the Malnad district of Karnataka.
- **Araku Valley Arabica** espresso can be portrayed as espresso from the sloping tracks of Visakhapatnam area of Andhra Pradesh and Odisha district at a height of 900-1100 Mt MSL. The espresso produce of Araku, by the tribals, follows a natural methodology wherein they underline the board works on including significant utilization of natural composts, green manuring and natural irritation the executives rehearses.
- **Bababudangiris Arabica** espresso is filled explicitly in the origination of espresso in India and the locale is arranged in the focal bit of Chikmagalur area. Specifically hand-picked and handled by regular aging, the cup shows full body, acidity, mellow flavor and broadcasting smell with a vibe of chocolate. This espresso is likewise called high developed espresso which gradually matures in the gentle atmosphere and consequently the bean obtains an extraordinary taste and fragrance.

The **Monsooned Malabar Robusta Coffee**, an interesting forte espresso from India, was given GI accreditation before. The acknowledgment and insurance that accompanies GI accreditation will permit the espresso makers of India to put resources into keeping up the particular characteristics of the espresso filled in that specific district. It will likewise upgrade the perceivability of Indian espresso on the planet and permit cultivators to get greatest cost for their exceptional espresso [4].

➤ Indian Coffee in great demand overseas

Indian Coffee is viewed as perhaps the best espresso on the planet because of its high caliber and gets high premium in the worldwide business sectors. India's espresso exports arrived at an unequaled high of 3.95 lakh Metric Tons (MT) during 2017-18. The interest of Indian espresso has expanded in Germany, Indonesia, USA, Poland, Libya, Spain, Tunisia, Ukraine, Italy and Belgium [5]. The quantum and estimation of espresso exported from the

nation during the most recent three years alongside the income created are as under:

Espresso is essentially a export commodity for India. The interest and utilization in homegrown market is about 25% to 30% of nation's espresso creation and thusly, doesn't radically affect the costs of espresso in the homegrown market.

➤ *Coffee exports of India:*

India's Coffee Exports: Quantity information was accounted for at 299,073.000 Metric Ton in 2019. This records a reduction from the past number of 392,205.000 Metric Ton for 2018. The information arrived at a record-breaking high of 392,205.000 Metric Ton in 2018 and a record low of 196,003.000 Metric Ton in 2010.

India's Coffee Exports: Unit Price information was accounted for at 167.083 INR/kg in 2019. This records an expansion from the past number of 157.198 INR/kg for 2018. The information arrived at an untouched high of 178.177 INR/kg in 2015 and a record low of 80.629 INR/kg in 2007 [6].

India's Coffee Exports: Value information was accounted for at 49,970.100 INR mn in 2019. This records a decline from the past number of 61,653.800 INR mn for 2018. The information arrived at an unsurpassed high of 61,653.800 INR mn in 2018 and a record low of 20,076.000 INR mn in 2007.

As per the Coffee Board, India sent out 3.26 lakh tones espresso in 2020 contrasted with 3.50 lakh tons and 3.48 lakh ton in 2019 and 2018 respectively.

Italy, Germany and Russia arose as the top destinations for Indian espresso, by send out destinations [7].

Italy-India's top espresso send out destination represented 63605 ton of Indian espresso trades, trailed by Germany (34099 ton) and Russia (26862 ton) in 2020.

➤ *Coffee exports of India to Italy*

India's Coffee Exports: Quantity: Italy information was accounted for at 63,800.000 Metric Ton in 2019. This

records a reduction from the past number of 79,279.000 Metric Ton for 2018. The information arrived at an unequaled high of 84,744.000 Metric Ton in 2017 and a record low of 47,065.000 Metric Ton in 2010.

India's Coffee Exports: Unit Price: Italy information was accounted for at 154.734 INR/kg in 2019. This records an expansion from the past number of 141.793 INR/kg for 2018. The information arrived at an unsurpassed high of 167.429 INR/kg in 2015 and a record low of 74.750 INR/kg in 2007 [8].

India's Coffee Exports: Value: Italy information was accounted for at 9,872.000 INR mn in 2019. This records a decline from the past number of 11,241.200 INR mn for 2018. The information arrived at a record-breaking high of 11,678.200 INR mn in 2017 and a record low of 4,389.800 INR mn in 2010 [9].

➤ *Major export destinations*

- India is the third-biggest maker and exporter of espresso in Asia, and the 6th biggest maker and fifth-biggest exporter of espresso on the planet.
- The nation represents 3.14% (2019–20) of the worldwide espresso creation.
- The espresso creation remained at 299,300 million tons (MT) during 2019–20.
- The espresso sent out from India remained at US\$ 738.90 million during 2019–20 and US\$ 120.83 million during April–May 2020.
- The absolute espresso send out represented US\$ 315.08 million from April to August 2020 and for August 2020 it was US\$ 53.90 million*.
- Of the absolute espresso created in India, 70% is sent out and 30% is consumed locally.

➤ *Coffee Board of India*

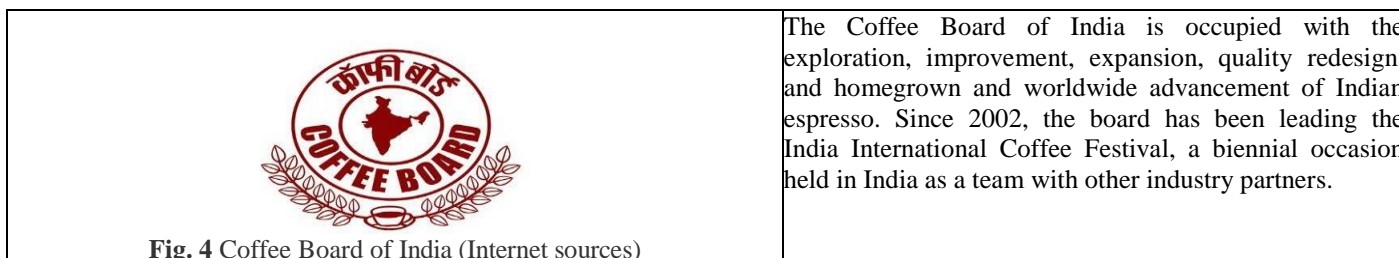


Fig. 4 Coffee Board of India (Internet sources)

➤ *Coffee export incentive scheme*

The Coffee Board of India has dispatched the Export Incentive Scheme for Coffee to offer financial incentives and improve the capability of the espresso business. Under the Export Promotion scheme, espresso exporters are

boosted to counterbalance the exchange expenses and furthermore to empower the development of India's export market [10]

The goal of the plan is to boost the pay of espresso

exporters by improving the market share of Value Added Coffees in retail packs and export of espresso to high value far away worldwide business sectors. All exporters who are enrolled with the Coffee Board and holding the substantial enlistment endorsement are qualified to profit the advantages under the plan.

Scale of incentive:

1. Rs. 3/- per Kg. for export of Value Added Coffees in retail customer packs sent out as 'India Brand', determined on the Green Coffee used for its production/readiness at the greatest pace of 2.6 kg for instant/solvent espresso and 1.19 kgs for Roasted espresso seeds and R and G Coffees.
2. An export incentive of Rs.2/- per kg. for the export of High Value Green Coffees to distant high worth business sectors viz., USA., Canada, Japan, Australia, New Zealand, South Korea, Finland and Norway [11].

The determination of high worth business sectors will be liable to audit on export execution on consummation of two years at Board level in meeting with partners and nations would be added/erased dependent on the requirement.

➤ *Coffees of India logo for export incentive scheme*



Fig. 5 Coffees of India Logo for Export Incentive Scheme (Internet sources)

2. Major Indian coffee Exporters:

<p>CCL Products (India) Ltd Allanasons Limited NKG INDIA COFFEE Tata Coffee Ltd. Olam Agro India Pvt. Ltd Coffee Day Global Ltd</p>	<p>Vidya Herbs Private Limited Nestle India Ltd. SLN Coffee Pvt. Ltd. ITC Limited Agri Business Division Indus Coffee Private Limited</p>
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Fig. 6 Major Coffee Exporters of India (internet sources)

➤ *Market share loss of Indian coffee in Italy due to Wuhan virus pandemic*

Indian espressos confronting firm rivalry from ease maker Uganda in the Italian market, which they have been overwhelming for over recent many years now. Italy represents about a fifth of India's espresso exports. Indian espressos in Italy are to a great extent sold in the premium fragment, namely in bistros and cafe bars.

Brazil, the biggest espresso generator, rules the Italian market with a large portion of the piece of the overall industry, trailed by India, which has a portion of around 20%, and other significant generator, for example, Vietnam and Uganda. The Ugandans are attempting to get however much as could be expected in the Italian market in the current situation [12].

The Ugandan robustas, which are equivalent to the Indian assortment in wording or quality, are evaluated less expensive by in any event \$200 per ton or around 20%, which Fascinates purchasers' likes in Italy.

During ordinary conditions, customers need quality and are eager to pay more. As the Italian economy is confronting a difficult stretches because of the pandemic, buyers are beginning to search for better-esteem espresso. They presently observe Uganda, which is 20% less expensive than India, as a decent offer. Vietnam is much less expensive but since of taste and different components, it is particularly vended commercial packed coffee fragment and not in premium section of Italy. The premium section got more influenced during the pandemic than the commercial espressos and is hurting the exporters extremely.

• *Impact on Shipment*

Espresso shipments to Italy in the primary portion of schedule 2020 have dropped 27 percent at 36,547 tons, contrasted with 50,513 tons in a similar period a year ago. The arabica shipment to Italy was 14 percent lower at 4,774 tons (5,577 tons), while robusta trades accepting a significant beating as shipments were lower by 27 percent at 31,134 tons (42,658 tons). During a similar period, absolute espresso send out from India were down 16 % in volume terms and value at 1.78 lakh tons (2.11 l t) and \$404 million (\$482 m) respectively [13].

For the unwashed robustas, India is confronting rivalry from lower-valued roots like Uganda. In spite of the fact that the Indian quality is pursued, merchants do consider more cost effective espressos. This is more clear under the current pandemic conditions, where more competitively valued espressos are convenient to discover complaisance with purchasers.

Indeed, the Ugandans are attempting to recover their piece of the pie in Italy from the India exporters, to whom they had lost market share around thirty years sooner. We took the market 30 years prior, and they are attempting to return now.

• *Logistical challenges for the Rivals*

Indian exporters had dislodged the Ugandans in Italy as the land-bolted African maker had confronted strategic difficulties in transportation out its espressos. Our exporters never attempted to undermine others when we picked up the market in Italy. Our selling recommendation was sensible cost and solid supplies consistently and our espressos more ready and have less defects. We gave better items and began getting premiums. As the clients began becoming accustomed to our espressos, charges fired going up. Thus, it is these charges that are ending up being a test for the exporters in holding their business sectors. Despite the fact that the quantum of premium has descended, the Indian robustas still draw in a greater cost over the London terminal (LIFFE). As of now, the Indian robusta cherry is fascinating a premium of \$500-\$600 per ton over the LIFFE, while a purchaser in Italy can get Ugandan espresso at \$250-

300 over the terminal cost. Indian exporters are viewed as problematic now as their premiums are excessively high. Losing the market to Ugandans will have a prolonged effect.

Further, Indian exporters are thinking that it is hard to coordinate with Ugandan costs as that would mean sourcing modest and decrease the costs, which would hurt the growers' acknowledge at the back-end. This, is when growers are so far reeling under the effect of multi-year low costs [14].

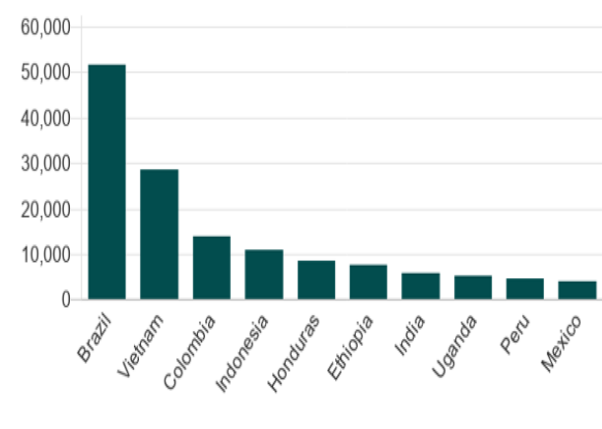
The Government should step in and quickly uphold the exporters to guard their business sectors, either by expanding the incentive under the Merchandise Exports from India Scheme (MEIS), or actualizing the Remission of Duties and Taxes on Exported Products (RoDTEP) scheme at the most punctual, while assuring credit vantage at decreased financing costs.

➤ *World's top coffee producers*

Espresso is one of the world's most mainstream beverages, and it is delivered in excess of 50 nations. Brazil is the world's biggest espresso maker. In 2017-18, the nation created in excess of 51 million packs of beans. The world's second biggest maker is Vietnam [15].

Top 10 coffee producers

By thousand 60kg bags, crop year 2017-18



Source: International Coffee Organization



Fig. 7 World's top Coffee Producers

India, which is additionally one of the world's biggest tea generator, delivered 5.8 million 60kg packs of espresso in 2017-18, with neighboring Sri Lanka creating 33,000. Some a lot more modest nations are key generator. Honduras, for instance, created more than 8.3 million packs of espresso a year ago, and it is one of the nation's top fares.

As indicated by the **Fairtrade Foundation**, in excess of 125 million individuals around the globe rely upon espresso for their vocations, with around 25 million smallholder ranches creating 80% of the world's espresso.

Despite the fact that there are in excess of 100 distinctive espresso species, the most broadly delivered and sold are Arabica and Robusta.

➤ *World's top coffee consuming Countries*

With regards to espresso utilization, just two countries top more than 10kg per individual every year - Finland and Sweden, as indicated by insights from the International Coffee Organization.

The Finnish beverage the most coffee consistently, at 12.5kg each.

The world's best 10 espresso devouring countries are in Europe, while the greater part of the biggest espresso makers are in non-industrial nations with the correct climate to develop espresso.

The ideal conditions for developing espresso plants is found in the "bean belt" either side of the equator - between the Tropics of Capricorn and Cancer (23 degrees North to 23 degrees South).

IV. STEPS IN COFFEE PRODUCTION TO CONSUMPTION:

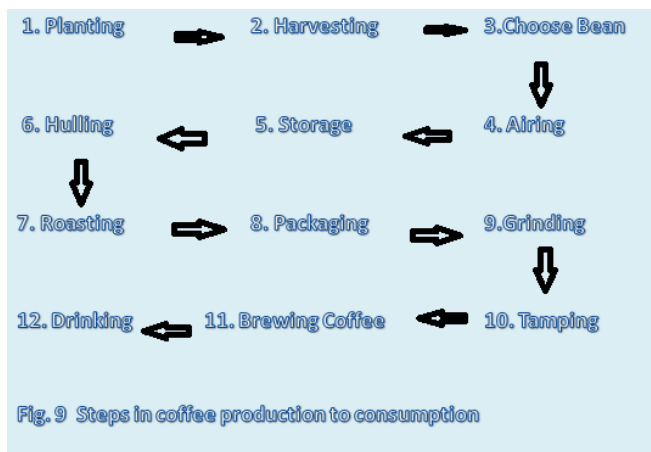


Fig. 8 Step in Coffee production to consumption

1 *Harvesting the cherries*



Fig. 9 Coffee Cherry (Internet sources)

- Contingent upon the assortment, it will take roughly 3-4 years for the recently planted espresso trees to start to prove to be fruitful.
- The organic product, called the espresso cherry, turns a brilliant, dark red when it is ready constantly to be gathered.

- Regardless of whether picked by hand or by machine

2 *Processing the cherries*

When the espresso has been picked, preparing should start rapidly to forestall waste. Depending on the spot and neighborhood assets, espresso is handled in one of two different ways.

WET and DRY Process

3 *Dry Processing*

Dry cycle, otherwise called unwashed or common espresso, is the most established strategy for handling espresso. The whole cherry after gather is put in the sun to dry slight layers on porches.

It will take between 10 days and fourteen days for the cherries to totally dry.

When dry the skin, mash and material are eliminated from the bean (hulling) [16].

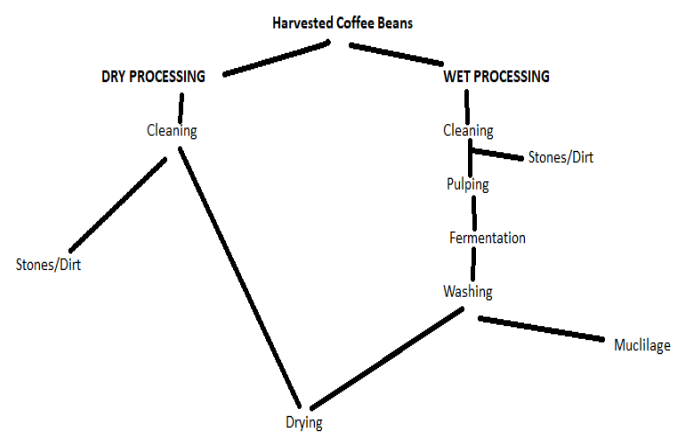


Fig. 11 Coffee Processing

Fig. 10 Coffee Processing

➤ *Wet processing*

Sorting: Separate waste and deficient berries by buoyancy

Green espresso beans and overripe espresso cherries are blended.

- Overripe espresso cherries, green espresso beans, sticks and leaves glide in water.
- Ripe espresso beans and green espresso cherries are thick and sink.
- The floaters are typically sent straightforwardly to be dried and are then scheduled for interior utilization.
- The ready cherries can be shipped off the pulping machines [16].

4 *Pulping (to remove pulp from seed)*



Fig. 11 Coffee Pulping Machine

- The principal phase of pulping is utilized to eliminate the green cherries from the ready cherries.
- In the pulping machine the interior weight is checked to push the espresso bean against a screen with openings just huge espresso bean (not cherry) to go through.
- Since the ready cherries are delicate they break and the seed is delivered through the screen.

5 Coffee Fermentation

- The beans canvassed in the tricky adhesive can be shipped off the yard to dry.
- The aging tanks are utilized to eliminate the adhesive prior to drying.
- The pulped beans are placed into concrete tanks with water and are permitted to mature for 16-36 hours.

6 Drying:

- From the maturation tanks the beans are moved to drying porches/yard and dried to 11-12% dampness content.
- At the point when dried in the sun, espresso bean is spread out in columns where it should be raked each 6 hrs to advance even drying and forestall the development of mold.

7 Milling

A little part of the parcel is hulled and processed by a minihuller.

8 Hulling:



Fig. 12 Coffee Bean Hulling Machine

- It is normally done between milling and polishing.
- The objective of coffee hulling is to eliminate the parchment from the coffee bean.

9 Coffee Polishing:



Fig. 13 Coffee Bean Polishing Machine

Coffee polishing is a optional step that is skipped by certain mill operators. It includes disposing of any silver skin that may have discovered its way through hulling. Polished beans are viewed as better than unpolished ones.

10 Grading:

The beans are then arranged and evaluated dependent on size and weight. The cleaned beans are additionally checked for shading irregularities and different imperfections with human hands being utilized to eliminate any defective beans.

11 Coffee Tasting

The packed coffee is over and over tasted to moreover check and characterize its taste and quality. The cycle is called covering and it happens in an exceptional room intended to upgrade it. Tasting causes individuals to tell where the espresso is from.

Acidity: Acidity portrays the level of acidity of espresso. High acidity espresso is believed to be better. Low acidity espresso is typically called soar.

12 Coffee Roasting

- Unroasted espresso is otherwise called green espresso and such beans have all the flavors secured them. Roasting looks to change the green espresso into the sweet-smelling earthy colored beans you purchase in your number one stores. Roasting is done at temperatures of around 550F during which time the green espresso beans are gone persistently to abstain from burning. Green beans are first dried until they become yellow and create simmering smell.
- When the beans register an inner temperature of 400F, the progression called 'first break' occurs during which the beans twofold in size and begin to turn light brown. From that point onward, as the temperature keeps on rising, the shading changes to medium earthy colored and a fragrant oil (caffeol) begins to arise.
- This broiling stage is called pyrolysis and is the core of roasting. It gives espresso the fragrance and flavor that you witness each time you drink this mystical beverage. At this stage, espresso is light or medium simmered and broiling cycle can be halted or kept on acquiring a darker roast.
- After first break and first pyrolysis, beans are engrossing warmth until they arrive at an inner temperature of

around 440F, so, all in all the 'second break' occurs and the subsequent pyrolysis starts. Beans abandon medium dim to dim earthy colored and you can see a slick sheen. When simmering is finished the beans are normally splashed in immense measures of water to chill them right away.

e. There are various kinds of roasts– light, medium and dark – and inside these roasts each has a couple of levels:

- Light roast don't create any oil on the outside of the espresso beans. Beans are light or a moderate light earthy

colored tone.

- Medium roast beans are a medium light to medium earthy colored tone and are created during the primary break .
- The dark roasts produce dim roasted beans that have a great deal of oil on a superficial level. Dark roasts occur after the subsequent break. Contingent upon the simmering temperature, the shading fluctuates from medium dull earthy colored to almost dark.

13 Coffee Grinding:



Fig. 14 Coffee Grinding (internet sources)

The essential objective of a granulate is to deliver the most flavor in some espresso. The kind of espresso brewer utilized decides how fine or coarse the espresso should be ground. The kind of pounding decides how quick the espresso can deliver its flavors. This is the explanation espresso is so finely ground. On the other hand espresso arranged with channel coffee maker is coarse-grained (coarsely ground).

14 Coffee Packaging



Fig. 15 Packaged Coffee (internet sources)

Coffee processing is significant, as any introduction to air could transform the espresso into a knot. This is particularly the situation for ground espresso, which can rapidly lose its flavor whenever presented to air. This is the motivation behind why espresso is normally stuffed in sealed shut holders and should be resealed cautiously when not being used [17].

15 Storage of Coffee

The espresso stays in go downs until shipment time to help secure the flavor and fragrance of the espresso.

V. CONCLUSION

Espresso has become an integral part of Indian culture.

It has got an expanding consideration at the worldwide level, because of its positive inter linkage with the economic growth and on the GDP for a large portion of the producing nations. Over a 50-year time frame, espresso has made huge commitment to the Indian economy among other estate crops. At present, there are more than 52,000 espresso gardens producing work occasions to 2.5 million people.

The coffee generation has become the standard kind of income to many, and people have benefitted an extraordinary arrangement. However, there is space for certain, progressions like, farmers should to be educated on modern agribusiness that uses insignificant expenses and give exceptional yield. The public authority should in like manner set up exploration organizations that will consistently complete intense research to improve the espresso generation and reduce the issues that cripple the farmers with their activities. The public authority should improve appropriations for our espresso producers and incorporate more services under the sponsorship plot. Subsidies ought to likewise be given to our ranchers who need to make framework for water system or sink borewells or to improve the nature of espresso generated.

Agriculture being a State subject, the State Governments ought to embrace execution of projects/plans for the advancement of the area and Government of India should supplements the endeavors of the State Governments through different plans/programs. These plans/projects of the Government of India are intended for the assistance of ranchers by expanding production, profitable returns and financial boost to our countryman.

Our administration has already set an objective to improve financial condition of our farmers and is committed

to "Double Farmers' income" by 2022. The public authority has adopted several developmental projects and strategies that emphasis on higher salaries for our farmers. Execution techniques to be well-turned at miniature degree need the collaboration among the local communities and the authority, and between, strategy and innovations. How coffee is processed plays a tremendous role in determining the final taste, and choosing a particular processing method that aligns with your expectations is important if you want to get the most out of your coffee.

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