Vanilla Master

Vanilla....the most popular flavour in the world
History of Vanilla

- Indigenous to Southeastern Mexico
- Discovered by the Totonaco Indians in Mexico
- Following Cortez's conquest in 1519 of the Aztecs, Vanilla became known in Europe
- 1604 introduced in France – Used to soften taste of coffee and as an ingredient in chocolate drink
- 1836 – Botanist Charles Morren identified the Melipone Bee responsible for pollination
- 1841 – Hand pollination technique discovered by Edmund Albius
- 1866 – First Vanilla grown outside of Mexico
  - Island of Reunion, East of Madagascar
  - Island of Bourbon
Three Varieties of Vanilla Beans

**Vanilla Fragrans**  
(Vanilla Planifolia) - Bourbon varieties from Madagascar, Comoros, Mexico, Indonesia, Uganda, Seychelles, Maturities, Tonga

**Vanilla Pompona** - Guadeloupe

**Vanilla Tahitensis** - Tahiti
**Growing Conditions**

- 10 to 20 degrees north or south of the Equator
- 600 meters above sea level
- Hot, moist tropical climate
- Temperature 24-30°C all year round
- Little wind, high humidity
- Rich soil, on gently sloping land
- Grows 10-15 meters tall, supported by a host tree
- For cultivation of vanilla, vines are kept at a height of 1.75 meters
Cultivation

- Flowers in 3\textsuperscript{rd} year of growth
- Flowers must be hand pollinated at precisely the right time
- Pollination occurs over a 2 month time frame
- Grows 15-23 cm tall in 6 weeks
- 6-9 months after pollination – tips yellow and are ready to be harvested
- Conditions: Rain, wind, early pick, disease
# Harvesting Time Line

<table>
<thead>
<tr>
<th>December to March</th>
<th>May to August</th>
<th>June to September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>Tahiti</td>
<td>Madagascar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reunion &amp; Comoros</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indonesia</td>
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</tbody>
</table>

## Harvest

*Too early: Poor or weak flavor, low vanillin, brittle beans, moldy.*

*Too late: The bean may split and lose its commercial value.*
Vanilla Curing

- Freshly harvested Vanilla Beans have no aroma or flavor
- Moisture – 90%
- Biochemical transformation due to natural enzymatic reactions during curing, develop aroma and flavour in cured vanilla beans.
- Vanillin and other aromatic compounds like P-Hydroxy Benzaldehyde, P-Hydroxy benzoic acid, and vanillic acid are formed due to the hydrolysis of glucosidic complexes
- 5 kilo – 1 kilo
The Curing Process

- Immersion
- Fermentation
- Drying
- Conditioning

Improper curing – off-flavour, smoky, moldy, earthy, low vanillin, mold growth
Immersion

- The beans are immersed for approximately 3 minutes in 60°C water.

This destroys chlorophyll, terminates ripening, ruptures inner walls, and triggers an enzymatic reaction.
Fermentation

- The dried and warmed beans are packed into wool lined crates and covered with blankets. The crates are sealed for 24 hours, during which time the vanilla fruit loses moisture, and the beans develop their chocolate brown color.
Slow Drying

• This takes about 4 to 8 days. During this period, the beans are subjected to daily drying & nightly sweating, i.e. they are spread on blankets during the day and stacked nightly in store rooms to create as favourable a temperature as possible for enzyme action. The beans take on a darker colour, produces different fragrances, shrink and become suppler.
 Conditioning

- For good preservation, grading and packaging. This final drying phase lasts 2 to 3 months on wooden racks in airy shelters.
Bean Quality

After curing, the beans are graded by quality parameters such as:
- bean length
- appearance
- colour
- moisture content

Grading standards differ among producing countries.

Example:
Bourbon Vanilla is classified in Madagascar into 5 main grades of whole and split beans.
Vanilla Production

Annual Market for Vanilla Beans

- Worldwide = 2000mt
- North America = 1400mt
- Europe = 450mt
- Japan = 70mt

Source: Trade Estimates
Vanilla Consumption -1999

Total: approx 2,000mt

- North America: 69%
- Europe: 23%
- Japan: 4%
- Rest of the World: 4%

Source: Trade Estimates
Vanilla Extraction Process

- Vanilla Beans – alcohol and water
- Solid liquid extraction
- Equals attract meaning that polar molecules or compounds are best dissolved by polar solvents, while non-polar compounds like triglycerides are dissolved by non-polar solvents.
- Solubility can be optimized by increasing the solvent or decreasing the solute.
- Traditional percolation
- Cold extraction
Clarification

- Vanilla Extract contains about 1 to 1.4% by weight of sediment and bacterial spores
- Sediment is usually slimy, gelatinous, and colloidal matter in suspension
- Chill proof filter
- Chill proof centrifuge
- Clarified Vanilla stays clear for about 6 months without any sedimentation
Ageing

- Good vanilla extract needs to be aged for 60 days
- Alcohol in the extract accelerates the formation of esters from organic acids
- The higher alcohols oxidize slowly to yield aldehydes
- Esters and aldehydes give vanilla extract sophisticated flavour
Hundreds of Components Complicate the Picture

- 250 flavor components make vanilla one of the most complex flavors
- The major component is vanillin
- Vanillin is not vanilla
- Other flavor components like guaiacol & anisic aldehyde has a much lower threshold than vanilla since they are 100 to 10,000 times stronger
- Danisco Cultor had identified over 150 flavor compounds
Flavor Characteristics of Different Natural Vanilla Extracts

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure vanilla</td>
<td>has a distinctive bouquet and a very complex flavour. Natural Vanilla is sweet, intoxicatingly rich, and romantic.</td>
</tr>
<tr>
<td>Madagascar vanilla</td>
<td>Full, rich, woody, smooth and unassuming. Some might call it subtle, others might call it bland.</td>
</tr>
<tr>
<td>Comoros vanilla</td>
<td>Very similar to Madagascar Vanilla but slightly sweeter than Madagascar.</td>
</tr>
<tr>
<td>Mexican vanilla</td>
<td>More mild and smooth, creamy. Classic, flavourful, sweet aroma.</td>
</tr>
<tr>
<td>Tahitian</td>
<td>Musky, aromatic flavor due to arisyl derivatives.</td>
</tr>
<tr>
<td>Indonesian Early Picks</td>
<td>Woody, smoky and sharp.</td>
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</tbody>
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Sensory

- Quality is a subjective thing. Chemical analysis does not always correlate to the quality. Humans are more sensitive than any instrument, that is why sensory evaluation by humans is absolutely essential.
What Goes Into Maintaining Consistent Vanilla Quality

Factors Influence the Quality

• In nature, two vanilla beans in the same pod are not necessarily alike, nor are two vanilla pods in the same plant.
• Curing process in tropical countries
• Customers expect same vanilla flavour
• Danisco Cultor’s commitment to consistency.

• Program:
  – Long term planning - new technologies
  – Man power - extraction
  – Vanilla bean samples as soon as cured
  – Analysis - larger samples
  – Quality control - plant production
  – Ageing - blending
What Goes Into Maintaining Consistent Vanilla Quality

- Nature can be unpredictable, but food manufacturers need vanilla suppliers that are not.
- Maintaining consistency in constantly varying products like vanilla is one of the "quiet" factors that go into the price of vanillas. You never see it on an invoice, but it is part of what you pay for when dealing with Danisco Cultor.
From our expert understanding of how to produce vanilla extracts, we can create a wealth of other vanilla products, for example:

- Vanilla extracts
- Natural vanilla flavourings
- Nature-identical flavourings
- Vanilla Sensations (chewy, creamy, etc.)
- Vanilla Plus (honey, golden syrup, etc.)
- Vanilla Value