

Flavour trends in Tlilxochitl(tea-so-shill)



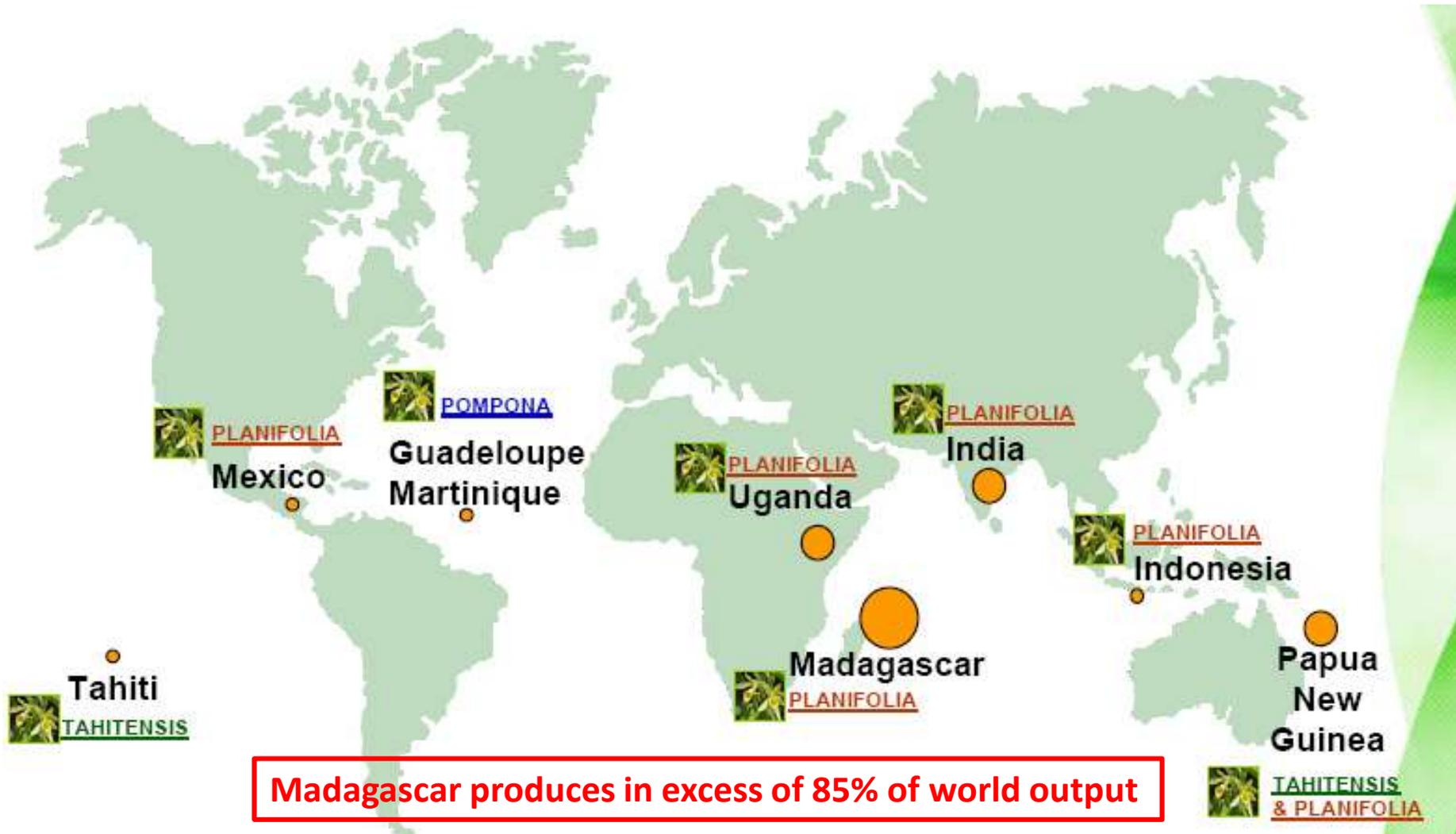
Macbeth: Act IV. Scene I

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Vanilla Consultant**

The agenda: A personalised perspective

- **The current position on curing in the vanilla area**
- **Developments in our understanding of vanilla curing**
- **Control and management of vanilla curing**
- **The status of vanilla aroma in *Vanilla* species**
- **The status of vanilla taste**
- **Opportunities for aroma and taste in both vanilla curing and in natural based flavours**

The global vanilla growing regions



Two species of the Genus of commercial significance:

- *Vanilla planifolia*
- *Vanilla tahitensis*

Recent background in vanilla curing

- Over the last few years there has been a gradual decline in the quality of cured vanilla beans and recently a big price hike
- This is reflected primarily in reduced levels of vanillin; a good indicator of curing performance
- Best practices of vanilla curing have been relaxed in Madagascar as indicated in part by, uncontrolled curing by farmers combined with vacuum packing of these beans followed by subsequent final curing without the bean processing history known or considered



Ripe beans



Vacuum packed beans

- There is a need to refocus the curing operation and take control/manage the process from start to finish

Traditional curing of whole vanilla beans



Green beans



Blanching
or
Killing



Sweating



Sorting and conditioning



Rack drying



Sun drying/boxed at night

(Takes >100 days. Lack of process management wrt temperature/time and optimisation)

Traditional vs controlled curing: An appraisal

Traditional curing

Advantages

- **Produces a “traditional”, recognised, flavour from whole beans**
- **Limited capital equipment requirements**

Disadvantages

- **Generally low vanillin yield related to poor gluco-vanillin conversion**
- **Lack of control of temperature/time for key process stages**
- **Lacks process flexibility in terms of flavour control & direction**
- **Labour intensive operation**
- **Dependent on local weather conditions for key curing stages**
- **Variability in final product quality**

Controlled/alternative curing

This is an operation where each of the process stages are defined in terms of product state with temperature/time optimisation and monitoring. Provides opportunities for flexibility in flavour formation

Schematic of a controlled curing process for vanilla beans

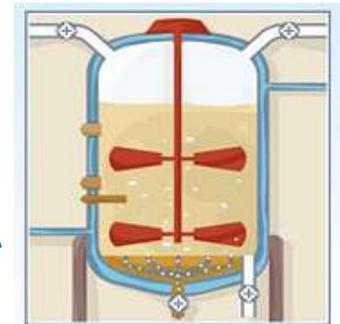


Pre-treatment:

- Hot water blanch; Freeze/thaw
- Temperature/time control

Tissue state:

- Whole, cuts, puree
- Aqueous extract



**Moisture content
ca.80%**



Oven drying



Sun drying



Conditioning:

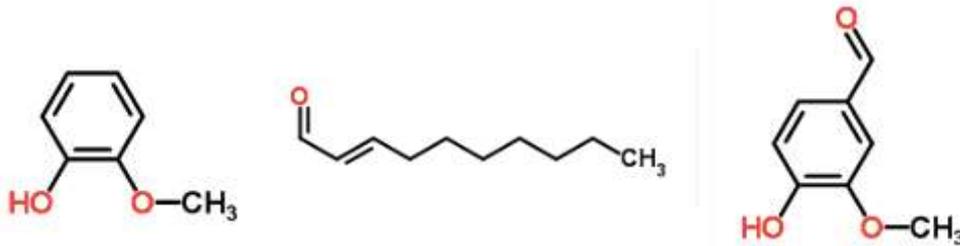
**Boxed at ambient:
Moisture content
20-25%**



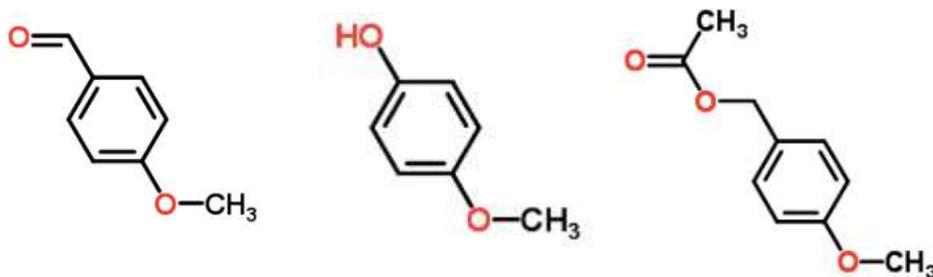
[Controlled curing has realised >50%increase in vanillin content and greater product uniformity]

Status of vanilla aroma in cured vanilla species

In *Vanilla planifolia* there are 25+ compounds describing aroma. The ratios vary depending on growing conditions and processing



In *V. tahitensis* there are additionally to the above anisaldehyde, anisyl alcohol and acetate



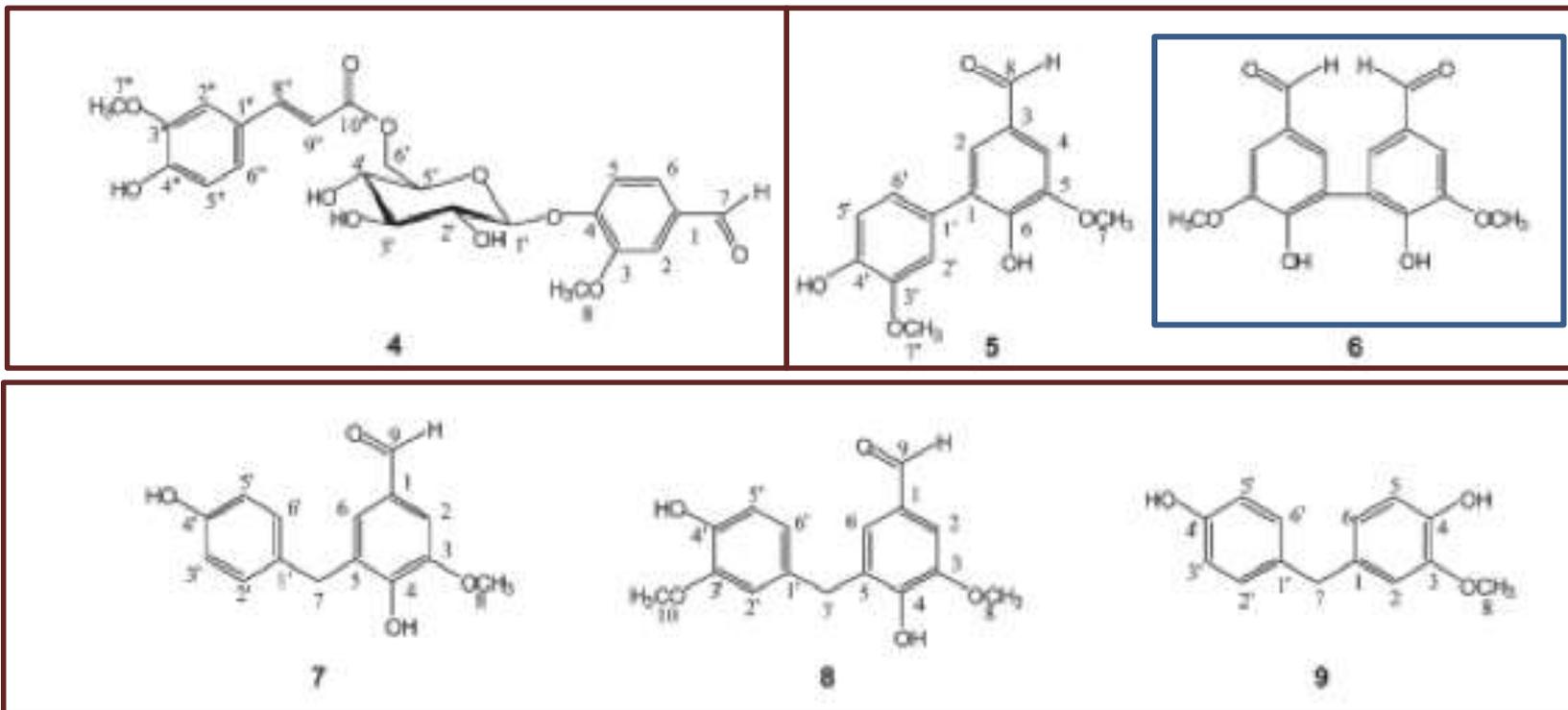
Compound (ppm)	Odor quality
Phenolics	
Guaiacol 9.3	Chemical, sweet spicy
4-Methyl guaiacol 3.8	Sweet, woody
4-Vinyl guaiacol 1.2	Chemical, phenolic
<i>p</i> -Cresol 2.6	Balsamic, woody, spicy
4-Vinyl phenol 1.8	Sweet, woody
Vanillin 19118.0	Vanilla, sweet
Acetovanillone 13.7	Vanilla, sweet, honey
Vanillyl alcohol 83.8	Vanillalike
<i>p</i> -Hydroxybenzaldehyde 873.0	Vanillalike, biscuit
<i>p</i> -Hydroxybenzyl alcohol 65.1	Vanillalike, sweet
Methyl salicylate < 1.0	Chalk
Methyl cinnamate 1.1	Sweet
Aliphatic acids	
Acetic acid 124.0	Sour, vinegar
Isobutyric acid 1.7	Buttery
Butyric acid < 1.0	Buttery, oily
Isovaleric acid 3.8	Buttery, oily
Valeric acid 1.5	Cheese
C4 Alcohols & Ketones	
2, 3-Butandiol 8.0	Floral, oily
3-Hydroxy-2-butanone 14.6	Buttery
Aldehydes	
2-Heptenal 2.1	Green, oily
(E)-2-Decenal 1.8	Herblike, floral
(E,Z)-2, 4-Decadienal 1.4	Herblike, fresh
(E,E)-2, 4-Decadienal 1.2	Fatty, wood

Mexican cured *V. planifolia* beans

Status of vanilla taste in cured vanilla species

Little known in this area until the work of Schwarz & Hofmann
[J. Agric. Food Chem., 57, (2009), 3729-3737]

Isolated 5 new velvety mouth-coating compounds from cured but not
ripe, green, Madagascan vanilla beans

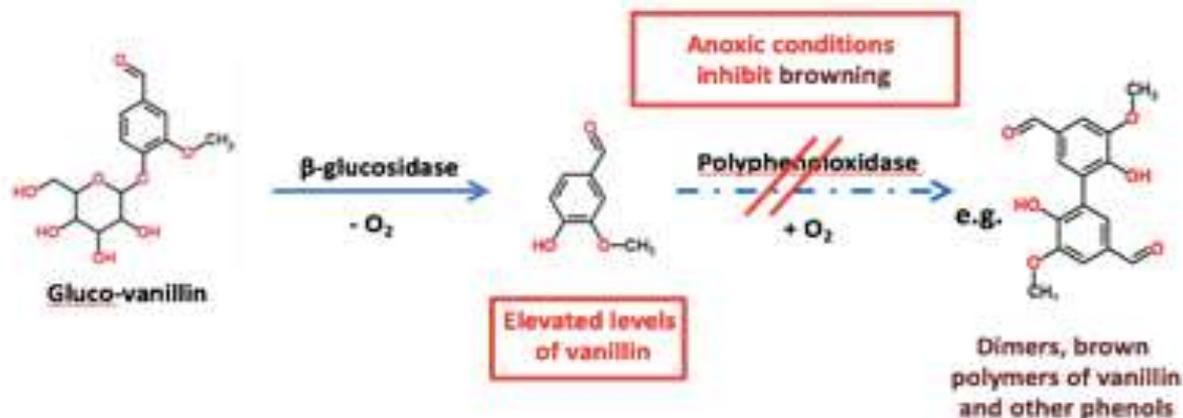


Opportunities for aroma and taste in controlled vanilla curing

By taking control of the curing operation possibilities exist to:

- Produce more uniformity in the final flavour profiles e.g. [vanillin]
- Direct the curing operation towards specific families of compounds e.g. separate phenolic aroma compound formation from taste compounds formation

Effect of anoxia on vanillin content during vanilla bean fermentation



- Exploitation of extraction/separation techniques such as SCFCO₂, other solvents and combinations as alternatives to EtOH/water to provide novel enriched vanilla fractions

Opportunities for aroma and taste in natural based flavours

Current knowledge of aroma and taste compounds in cured vanilla beans can facilitate:

- Natural vanilla flavours, both aroma and taste, to mimic the 7 main geographical origins**
- Aroma and taste flavour groups or blocks providing the flavourist with palates from which to create novel flavour directions**

Summary



Opportunities exist to:

- **Control the curing process to achieve greater efficiency and uniformity as well as the flexibility to direct the process to specific flavour end-points**
- **Exploit further the geographical and species diversity of vanilla to expand the range of extracts available**
- **Use the new range of vanilla taste compounds, and combinations with aroma compounds, to provide new palates for the flavourist**
- **Utilise separation techniques, as adjuncts to EtOH/water, to develop enriched flavour fractions**



The Indian Ocean, Antalaha, Madagascar

