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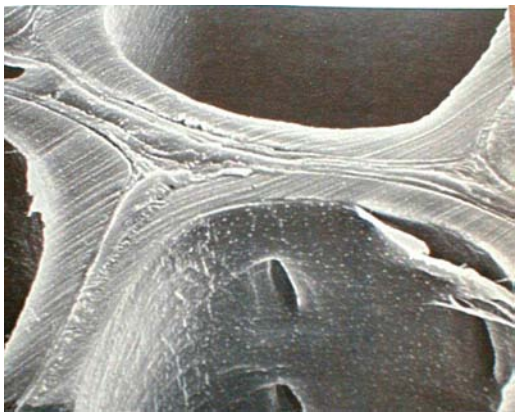
Oak is a complex array of macromolecules with many inter-connecting bonds that require time to modify



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Chemical reactions in Oak are SLOW

Thus the limitations in barrel-making (realistically the maximum toast time is about I hour) are very restrictive in creating desirable flavors

So, when making Oak Alternatives……..

Being limited to the conventional conditions for barrel-making is unnecessary & restricts the coopers ability to obtain the full potential of oak alternatives

New flavors and styles can be created……..

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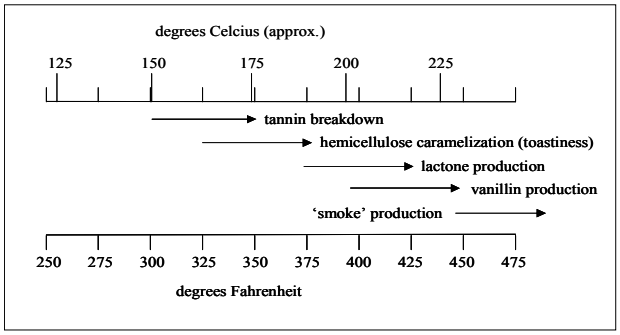
Time-Toasting changes in barrel-making (i.e. 1 hour maximum time)



making alternatives is <u>NOT</u> restricted by the implications of the graph. Thus, for example, we can make products that are rich in vanillin but not toasty; we can make alternatives that are toasty and rich in vanilla but no smoke, and so on

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Creating specific flavors with Oak Alternatives

spice, high vanilla, mocha, 'double toast'

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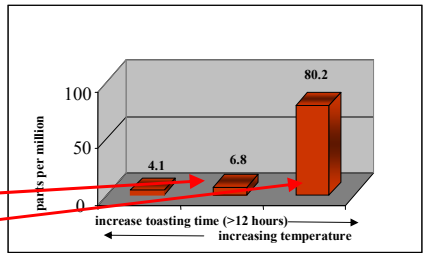
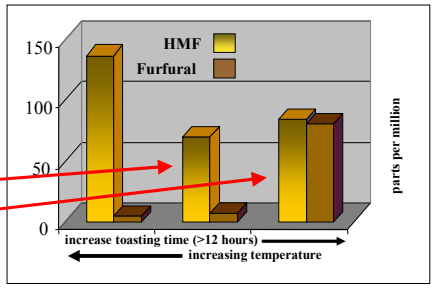
Making vanilla
'key' flavor complexer

barrel toasting
alternatives toasting



making toasty caramelised
sugar flavors

barrel toasting
alternatives toasting



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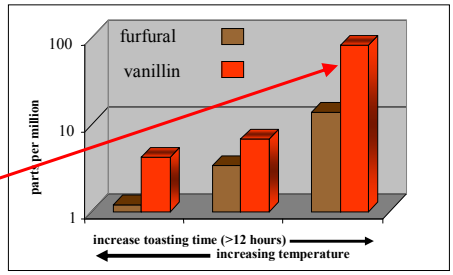
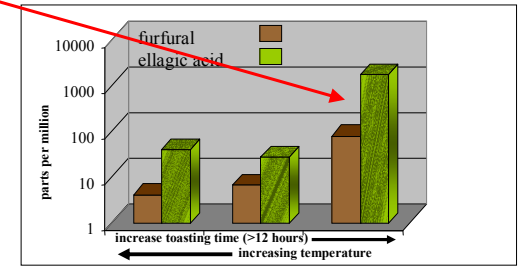
creating caramelised sugars
&
vanillin

alternatives

creating vanillin
&
manipulating tannins





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High Vanilla Tank Staves

All *Oak Solutions Group* products that are high vanilla do indeed contain vanillin in excess of at least 100 ppm; however they also contain elevated levels of caramelised sugars

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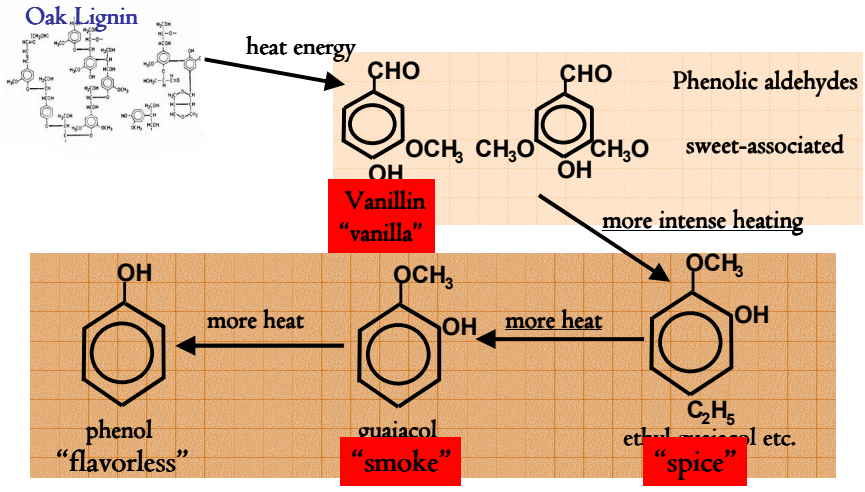
Smoke & Spice



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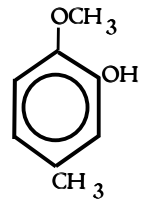
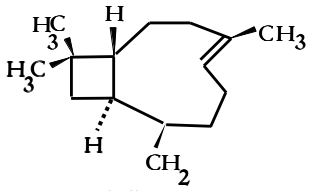
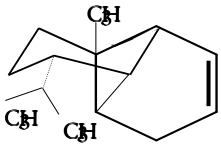
Spicy flavors that can extract from oak



methyl guaiacol
'smoky' spicy, clove-like
made by moderate smoke
creating toast temperatures



caryophyllene
from French oak, sesquiterpene
"aroma midway between clove & turpentine"



copaene
oily, spicy tricylic sesquiterpene
found in French oak

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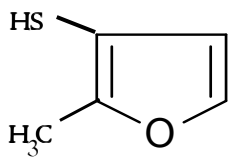
Mocha

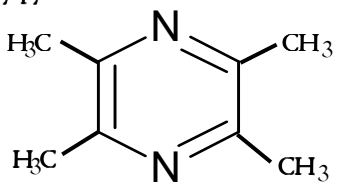
The flavor of mocha is *usually* attributable to organosulphur compounds and requires a combined effect of wood and wine

Examples

1. Confirmed – methylfuranthiol and furfurylthiol. A combination of furfural from toasted oak but requires access to sulphur (e.g.cysteine from the wine)



2. 'suspects', include 4-mercapto-4-methylpentyl acetate and tetramethylpyrazine



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Oak Powder

Used in fermentation to 'clean up' flavors – e.g. bell pepper

Toasted powder does not contain tannin (< 1%)

In fermentation: almost no oak extract (action of yeast)
no oxidative power
strong subtractive element, the high surface area and activity of the lignin adsorbs some 'undesirables' by adsorption

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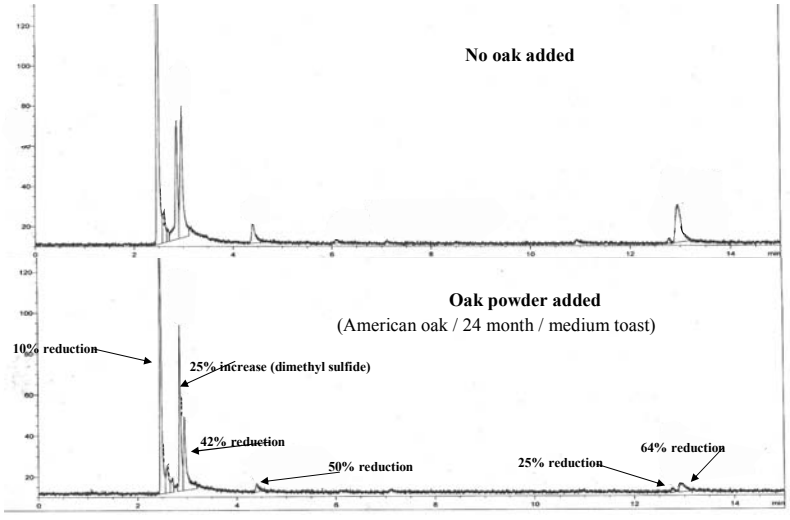
An example of flavor subtraction by powder during fermentation



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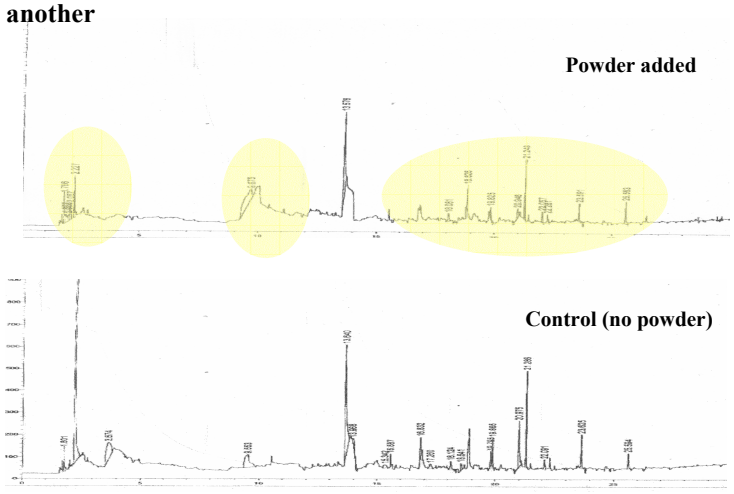
….and another



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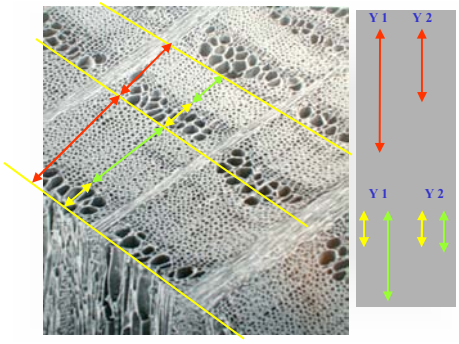
The "horrible" chips of yester-year:



The annual rings of oak

- the relatively porous earlywood
- &
- the relatively impervious latewood

The problem was due to wine gaining access to latewood flavors to an extent that was not possible with barrels – easy answer? Use larger chips!

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Finally what else can Alternatives do better than a barrel?

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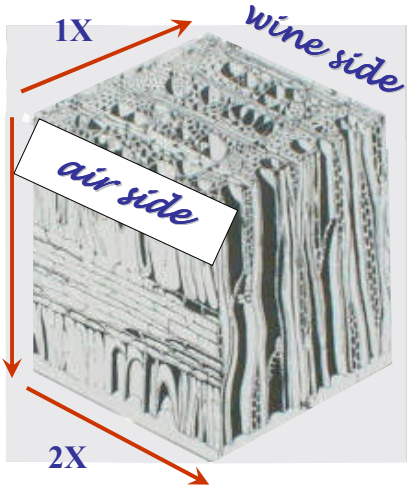
Faster flavor transport

Ring porous oak

up to 2.5 x faster even if the alternative was the same size as a barrel stave



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Problems of hot climate maturation (and high alcohol wine)

Ethyl alcohol + acetic acid (from oak) → Ethyl acetate that is OTT

Alcohols + oxidation → Imbalance of too much aldehydes

They do not exist with Alternatives!

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For the Future……

- Wide range of flavors can be created from oak because of the wide range of processing conditions that are available
- Interactions with specific oak products and individual wines will allow flavours that are specific to a winery, grape, or wine-maker