



What's so great about oak?

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Got oak?

- Back of dime
- Connecticut quarter
- Wooden buttons
- Tanned Leather
- Mossy oak camo
- Cork



Grapes & Oaks have much in common

- Keystone species
- Inter-species crosses are common
- Widely distributed
- Non-specialized
- Northern Hemisphere natives
- Occupies many ecological niches
- Division between American and European caused by continental drift
- Prized by humans
- Historically significant
- Highly symbolic
- Integral to Western Civilization

Oak Facts

- Oak Genus with 600 species
- Acorns important food source
- Pollen distributed by wind – no bees
- Live hundreds of years
- 20 - 50 years old before produce acorns, depending on species
- Often grow over underground stream – attracts lightening

May 29th Oak Apple Day Defunct English Holiday

Between 1660 and 1859, May 29 was English Oak Apple Day.

The day commemorates Charles II hiding in an oak tree (after loosing the battle of Worcester) to escape the Roundheads in 1651.

Oaks in History

- Important component of wood culture in Northern Europe
- Worship Sites
 - Green Man (face of oak leaves) symbolizes rebirth, spring has sprung, etc.
 - Romans worshiped Jupiter in oak groves
 - Oracle oak of Dodona – where Zeus talked to Greeks
- Had magical properties as home to supernatural beings
- Meetings held under tree –
 - promises made under kept for a long time, like the tree
 - Thor / Jupiter would strike liar with thunderbolts
 - Early Christians burned down sacred oak groves
 - Later Christians declared remaining groves holy
- Barrel – container of choice for 2500 years



Oak and Bottles

- Prior to 1615 English glass makers melted glass over oak fires.
 - Glass melted poorly, inconsistently
 - Glass contained impurities and bubbles
- To save the forests for shipbuilding, James I banned glassmakers from using wood fires
- Glassblowers shift to coal which produces hotter fires
 - Glass flows better in furnace
 - Fewer impurities
 - Fewer bubbles
 - STRONGER GLASS

More than wood oak provides

Edible Mushrooms

- Chantrelle
- Black Trumpet
- Maitake (Sheephead)
- Shitake
- Chicken of the woods
- Morels
- Reishi
- Lions Mane
- Oyster

Home for animals

furry, feathered, 6-legged

Epiphytes

Spanish Moss

Bittersweet

Medicine

Tannins - heal

Oak Bark Tea

Oak Leaf Bath

Oak Moss Oil

Reishi Mushroom

Ink & dyes

Crushed wasp galls

aka oak apples

Why Oak for Barrels?



- Oak has a tight grain
 - permitting a gradual extraction of wood flavors
 - minimizes wine loss through evaporation.
- It is resilient,
 - enabling staves to be bent without breaking
 - has a neutral wood smell.
- Oak is high in tannin,
 - important flavor component
 - Ages wine by gobbling up oxygen

Why Oak for Barrels?

- *Quercus petraea*, *robur*, and *alba* have the lowest in tannins among the 600 plus species of oak
- Heartwood is used for barrels, it has lower tannins than sapwood and bark.
- The more desirable *petraea* oak is tighter grained than any other species
- Tylose blocks flow of liquids
- Bottom Line – we use oak because it
 - transfers little flavor
 - Limits evaporation
 - Absorbs undesirable chemicals
 - Smooths tannins

How to Grow Oak

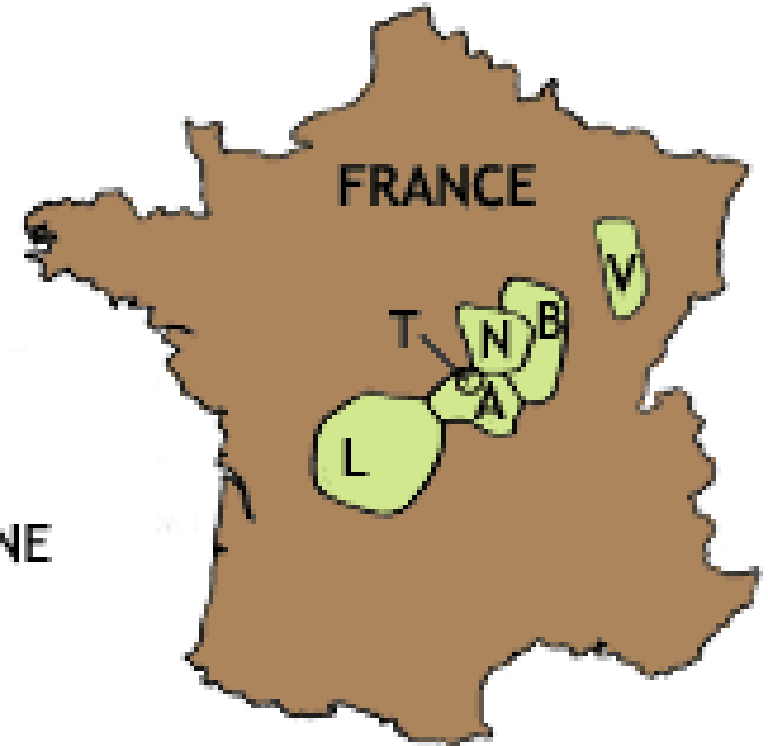
- The spreading oak in the meadow,
- The broad oak of the California countryside
- Are not for Barrels
- Oaks for barrels
 - Grown in tight groves
 - transport issue
 - Reduces knot producing stems
 - Cut from below first branch



Oak Forests



- L-LIMOUSIN
- A-ALLIER
- T-TRONÇAIS
- N-NEVERS
- B-BOURGOGNE
- V-VOSGES



Flavor Characteristics by Forest

*The following flavor characteristics can at best be considered generalizations, and are the personal observations of the editor, **Roberta Manell Montero**.*

- Limousin (li-moo-sahn) perfumes and colors the wine (yellow-gold) rapidly with little finesse. Limousin tends to be fairly aggressive and "simple" on the palate, but adds an attractive vanillin note.
- Nevers (ne-vere) contributes a spicy, almost cinnamon-like flavor, although it can initially seem aggressive in tannin if not toasted enough.
- Vosges (voej) offers a sweet, subtle vanillin aroma that complements a fruity character. Above all, it offers a softer texture on the palate.
- Allier (ah-leay) releases its perfume slowly with finesse, and seems to have a spicier oak component. It is well suited to red and white wines.
- Tronçais (tron-say) located in Allier, releases its perfumes even more slowly, and offers a high level of finesse on the palate. It is typically the tightest grained French oak, which explains its slower rate of extraction.
- Hungarian oak offers very similar flavors to French oak, but its most attractive characteristic is a soft, creamy mouth texture (especially early in the wine's development).
- Czech oak has a sweet, nutty flavor with moderate but complex tannins. Most interesting is a floral note, which has been described as similar to mimosa, a sweet flowering tree from southern France.
- Russian oak imparts a more intense flavor than French oak, but with a similar flavor profile, and is perhaps not as sweet on the palate.
- American white oak is more aromatic and obvious in its wood character. Sensory descriptors range from dill and coconut to smoky and sweet vanilla. Q. Alba does offer more weight and intensity on the palate, but its overt character sometimes clashes with more delicate wines.
- Oregon oak is quite different from American oak, and descriptors commonly used include toasty, resinous, caramel, coffee, spicy and herbal. It is slightly more phenolic than French oak.

Composition of Oak

- **Tannin** - Tannins are approximately 1% of American oak and 8% of French oak mass, they play a vital role in aging. Hydrolysable, heat sensitive tannins stored in the tree's radial rays, are controlled by seasoning regimes, bending techniques, toasting times, and toasting temperatures.
- **Lignin --> Vanillin** - A family of compounds, notably vanillin, is released during oak lignin breakdown. Slowly, nature's elements including precipitation, ultraviolet rays, and fungi, break down lignin. Toasting accelerates the degradation
- **Cellulose** - cellulose is nearly 50% of white oak, but plays only a small part in aging wine. It is important because it holds the wood together.
- **Hemicellulose --> Wood Sugars/Body** - Air seasoning initiates the polymer's breakdown into simple sugars. As oak climbs through 300 F during toasting, more simple sugars form. Caramelized sugars and sweet-associated aromas then develop. Toasty characters develop as the oak passes 420 F.

Approximate composition of select Oak Species

	% cellulose	% hemicellulose	%lignin	%extractives	%ASH	Common name
Q. robur	38	29	25	4.4	0.3	European Oak
Q. petraea	22-50	17-30	17-30	2-10		Sessile Oak
Q. alba	44	24	24	5.4	1	Georgia Swamp
Q. alba	42	28	25	5.3	0.2	Tennessee Upland
Q. prinus	41	30	22	6.6	0.4	Chestnut Oak
Q. stellata	38	30	26	5.8	0.5	Post Oak

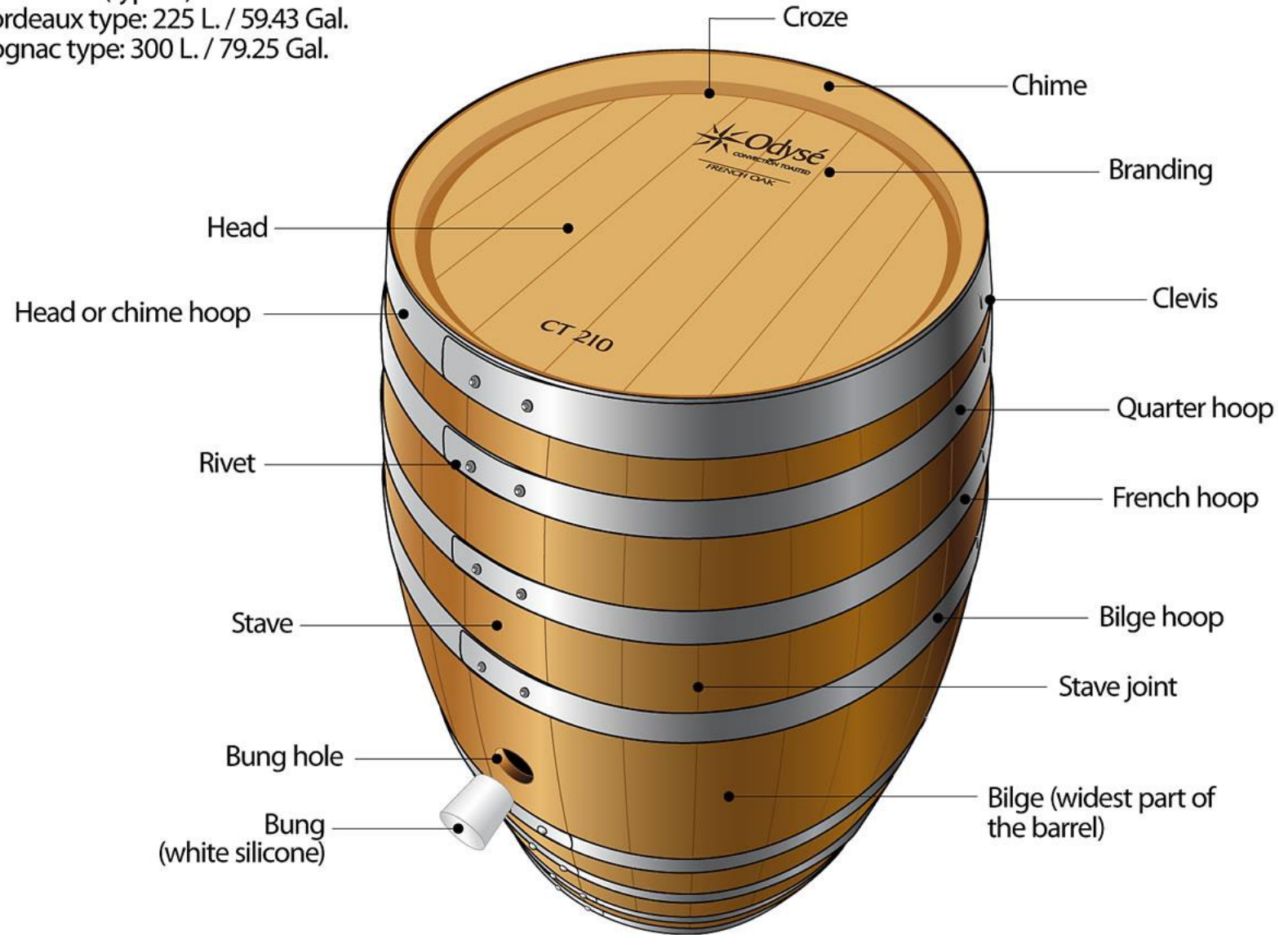
Oak Flavor and Aroma Compounds

Eugenol & Isoeugenol	Spice clove aroma. present in raw oak
Guaiacol and 4-methylguaiacol	Smoky aromas developed by heavy toasting. Guaiacol has more char and 4-methylguaiacol more spice.
Cis-oak lactone and trans-oak lactone	Main aroma of raw oak
Furfural and 5-Methylfurfural	Sweet, butterscotch, caramel flavors develop with toasting
Vanillin	Vanilla present in raw and toasted oak

Parts of a Barrel

French oak: *Quercus petraea*
American oak: *Quercus alba*
CT: Convection Toasted
Hoops (galvanized steel)
American barrel: 6; French barrel: 8
Barrel sizes (typical):
Bordeaux type: 225 L. / 59.43 Gal.
Cognac type: 300 L. / 79.25 Gal.

Toasting levels (typical):



Making Staves

Staves cut with grain



Alba is quarter
sawn then
sawn again,
boards
Perhaps 10' in
length

Robar and *Petraea*
are split into
wedges then split
to form staves

Staves are then bent to shape

Barrel Sizes and Names

Barrel type	Capacity		Oak Source	Purpose
	(L)	(G)		
Gorda	700	185	American	Whiskey
Madeira Drum	650	171	French	Madeira
Port Pipe	522	138	European	Port
Butt	573	151	European	Sherry
Sherry Puncheon	500	132	European	Sherry
Barrique	300	79	Varied	Varied
Hogshead	286	76	American	Varied
American Standard	200	53	American	Varied
Quarter Cask	50	13	Varied	Varied
Bordeaux	225	59	French	Wine
Burgundy	228	60	French	Wine

Light – Dull, Sappy, Clove, Spicy

Medium – Clove, Coconut, Sawdust,
Woody, Vanilla

Medium+ - Vanilla, Woody, Toffee

Heavy – Toasty, Toffee, Coffee,
Smoke

Char – Coffee, Smoke, doused
campfire

Toasting and Charring

TOASTING



LIGHT



MEDIUM

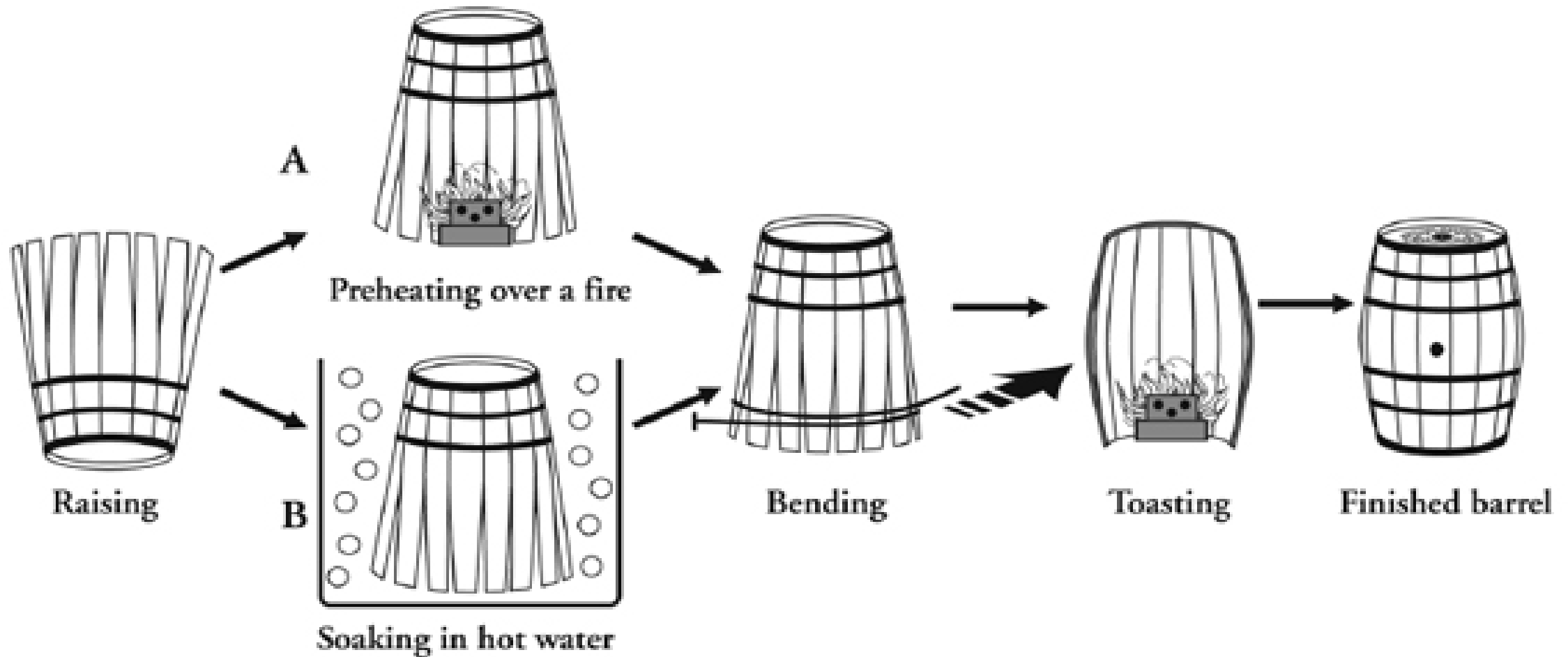


MEDIUM PLUS



HEAVY

Barrel Toasting Process



Eng's Content Study of Wine Reviews

- 15,000 wine review evaluated for content.
- 4.1% cited oak as a flavor component of wine
- Most in a negative context

Wine down Wednesday: An amateur's guide to reviewing wine

By [Rachel Eng \(@racheleng\)](#) October 22nd, 2014

Other woods

- Historically, the type of wood the winemaker chose was a question of tradition, wine variety, economics and personal taste.
- California Redwood was commonly used for tanks.
 - Too rigid to allow bending of the staves
 - it imparts a yellow tint to the wine.
- Chestnut
 - is too porous
 - must be coated with paraffin to prevent evaporation.

Barrel Alternative S





► **Barrel Insert Sticks**

Using the same quality of American and French Oak, we offer a practical alternative for the renovation of your barrels.

- A simplified Method of Infusion
- Available in American & French Oak
- Available in 4-Toast Levels:
Light - Medium - Medium Plus - Heavy
- Air-Seasoned 18-24 Months
- Inserts directly through the Bung hole
- Recommended Usage: One set of sticks per barrel. One-half set of sticks may also be used, depending on how much flavor you desire.
- Includes American and French
13" long x 1-1/8" & 1-1/4" wide x 3/8" thick
16 sets (32 pieces)

► **Oak Wood Toasting Levels**



Oak Chips Inc.
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Email: oc_inc@frontier.com
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*Excellence in Wood
for Your Wine*

American and French Oak

Est. 1975



OAK CHIPS, INC.
306 West North Street
Waverly, OH 45690

Excellence in Wood for Your Wine

OCI ensures that every product has a toast level consistent in color and roasted evenly throughout.
We also offer a variety of sizes and toast levels that is unmatched by anyone!

Oak Chips



- Available in American & French Oak
- Available in 4-Toast Levels:
Light - Medium - Medium Plus - Heavy
- Available in 3-different sizes:
Powder - Small - Large
- Air Seasoned 18-24 Months
- Packaged in 50 pound (22.7 Kg) Poly Bags
- Available in 15 or 20 pound Nylon Mesh Infusion Bags
- Available in 24-different types of chips to ensure your specific needs in the production of your wines

Nu-Oak



- Nu-Oak Enhances Aromatic Profile
- Fruit Expression is Intensified
- Color is Stabilized and Enriches Sweetness
- Aids in the Fermentation Process

Oak Cubes



- Available in American & French Oak
- Available in 4-Toast Levels:
Light - Medium - Medium Plus - Heavy
- Air Seasoned 18-24 Months
- American Oak - Approx. 1/2" x 1/2"
- French Oak - Approx. 3/8" x 3/8"

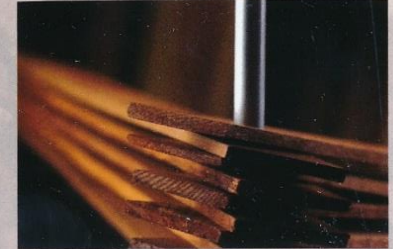
Oak Segments



- Available in American & French Oak
- Available in 4-Toast Levels:
Light - Medium - Medium Plus - Heavy
- Air Seasoned 18-24 Months
- Packaged in 15 or 20 pound Nylon Infusion Bags
- American Oak 2" long x 3" wide x 3/8" thick
- French Oak 2" long x 3" wide x 5/16" thick

Oak Chips Inc. (OCI)
www.oakchipsinc.com

Tank & Barrel Inserts



- Available in American and French Oak
- Available in 4-Toast Levels:
Light - Medium - Medium Plus - Heavy
- Air-Seasoned 18-24 Months
- American Oak Approx. size 38" to 40" long x 2-1/2" to 3" x 3/8" wide
- French Oak Approx. size 38" to 40" long x 2-1/2" to 3" x 5/16" wide
- Inserts can be custom cut and drilled to accommodate your specific system, upon request

Shavings



- Toasted and Untoasted
- Available in American & French Oak

OCI
FINE APPALACHIAN OAKS

Ingredients

- Neutral Grain Spirits @ 192[^]
- Distilled water
- Wood cubes
 - added 3/7/126
 - Removed 4/11/16
- Served at 60[^]



Welcome to my
lab!

Now let me perform an experiment on you

Wood Used

- American Oak
 - Medium Toast
 - Medium Toast Plus
 - Heavy Toast
- French Oak
 - Medium Toast
 - Medium Toast Plus
 - Heavy Toast
- Shagbark Hickory – raw
- Pecan – raw
- Mesquite -- Raw

Tasting Notes

Control

- French Oak Medium Toast
- French Oak Medium + Toast
- French Oak Heavy Toast
- American Oak Medium Toast
- American Oak Medium + Toast
- American Oak Heavy Toast
- Pecan no toast
- Shagbark Hickory no toast
- Mesquite no toast

- General Observations
 - French is more in your fact
 - French has higher color transfer
 - Lower toast more color transfer
 - Lower toast more wood
 - Higher toast smoke

Consider what happens when cooking a steak. Place it in a cold pan and juices run out. Place it in a hot pan searing the side and juices are retained, the searing creates a barrier to flow from the wood.

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