



Wine Taints Arising During Malolactic Fermentation

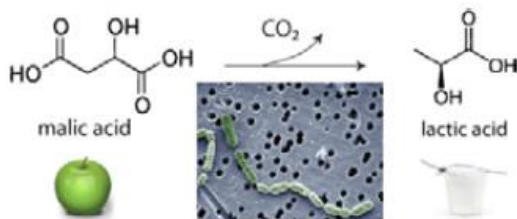


The following is a recap of the talk given by Lucy Joseph, at Wine Flavor 101, U.C. Davis
January 15, 2015

ML Bacteria Sensory Affects

- Buttery or nutty diacetyl
- Fruity ester production
- Release mono-terpenes through glucosidase
- Acetaldehyde metabolism
- Glycerol and erythritol production

Malolactic Fermentation



Lactic Acid Bacteria Found in Wine

- Lactobacillus – *Lb. brevis*, *Lb. casei*, *Lb. hilgardii*, *Lb. plantarum*, *Lb. lindneri*, *Lb. kunkeei*
- Pediococcus – *Pd. parvulus*, *Pd. damnosus*, *Pd. ethanolidurans*
- Oenococcus – *O. oeni*
- Lactococcus

Changes in Aroma/Flavor Compounds

Increases:

- Fusel Alcohols (butanediol, furfuryl alcohol)
- Esters (isoamyl acetate, ethyl lactate, 2-phenethyl acetate)
- Fatty Acids (isovaleric acid, capric acid, caprylic acid)
- Aldehydes and Ketones (butanedione, butanone)
- Lactones (butyrolactone, pantolactone, furaneol)
- Phenols (ethyl and vinyl phenols, eugenol, vanillin)
- Terpenes (terpineol, fernaol)

Changes in Aroma/Flavor Compounds

Decrease

- Fusel Alcohols (Isoamyl alcohol, butanols, hexanols, phenethyl alcohol)
- Esters (ethyl acetate, isoamyl caprylate)
- Aldehydes and ketones (ethanal, furfural)

Spoilage Compounds Produced by Lactics

Bacteria	Compound	Sensory Effect	Threshold
LAB	Acetic Acid	Vinegar, pungent, sour	0.2 ppt
LAB	Ethyl acetate	Nail polish remover	7.5 ppm
Lb., Oeno.	Diacetyl (2,3-butandione)	Butter, nutty, caramel	0.1 to 2 ppm
Lb., Pd.	2-Ethoxy-3,5-hexadiene	Geranium leaves	0.1 ppb
Lb., Oeno.	2-Acetyl-tetrahydropyridine	Mousy	4 to 5 ppb
Lb., Oeno.	2-Ethyltetrahydropyridine	Mousy	2 to 18 ppb
Lb., Oeno.	2-Acetyl-1-pyrroline	Mousy	7 to 8 ppb
Lb., Pd.	Acrolein (+anthocyanin)	Bitter	
Pd.	b-D-Glucan	Ropy, viscous, oily	
Oeno.	Mannitol	Viscous, sweet	
LAB	Skatole (indole)	Fecal	1.7 ppm (1.8)
LAB	Biogenic Amines	None (headache)	

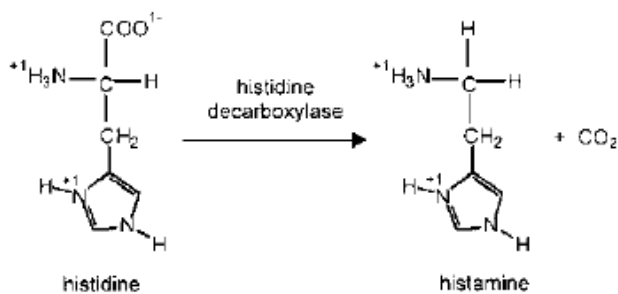
Factors Affecting Mousy Aroma

- Amino acids – ornithine and lysine
- Ethanol – other alcohols do not give the same results
- Metal ions – Fe^{+2} , Mg^{+2} , Mn^{+2} , Ca^{+2} (ETHP)
- Oxygen

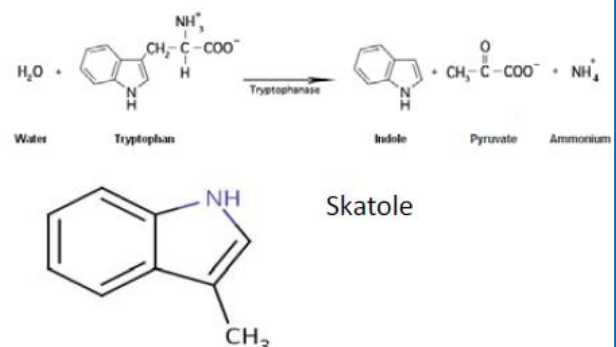
Buttery Aroma

- Chemically 2,3-butanedione (diacetyl), acetoin, and 2,3-butanediol
- Descriptors – buttery, caramel, nutty, fruity, creamy, cocoa butter, buttermilk, sour cream
- Production is controlled by the organism type, the substrate availability, the pH and redox state of the cell

Metabolic Pathways (Biogenic Amines)



Metabolic Pathways (Indole and Skatole)



Here's a handy link

for [MLF, Timing and Proper Nutrient Addition](#)