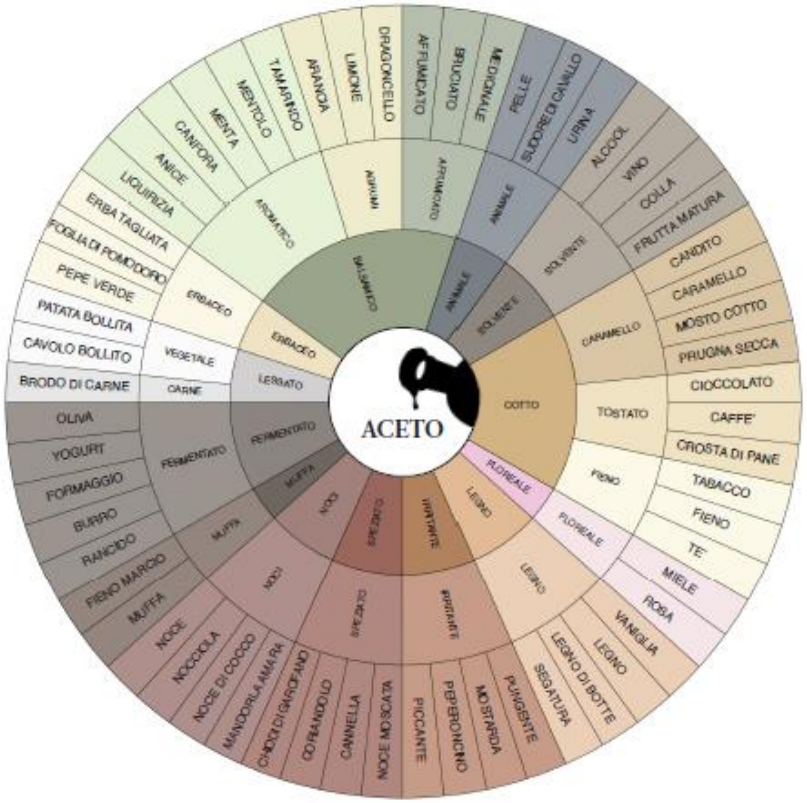
AROMI DEGLI ACETI

Paolo GIUDICI e Giuseppe CORRADINI



25 novembre 2017

CENA DI GALA
CONFRATERNITA DELL'ACETO BALSAMICO TRADIZIONALE

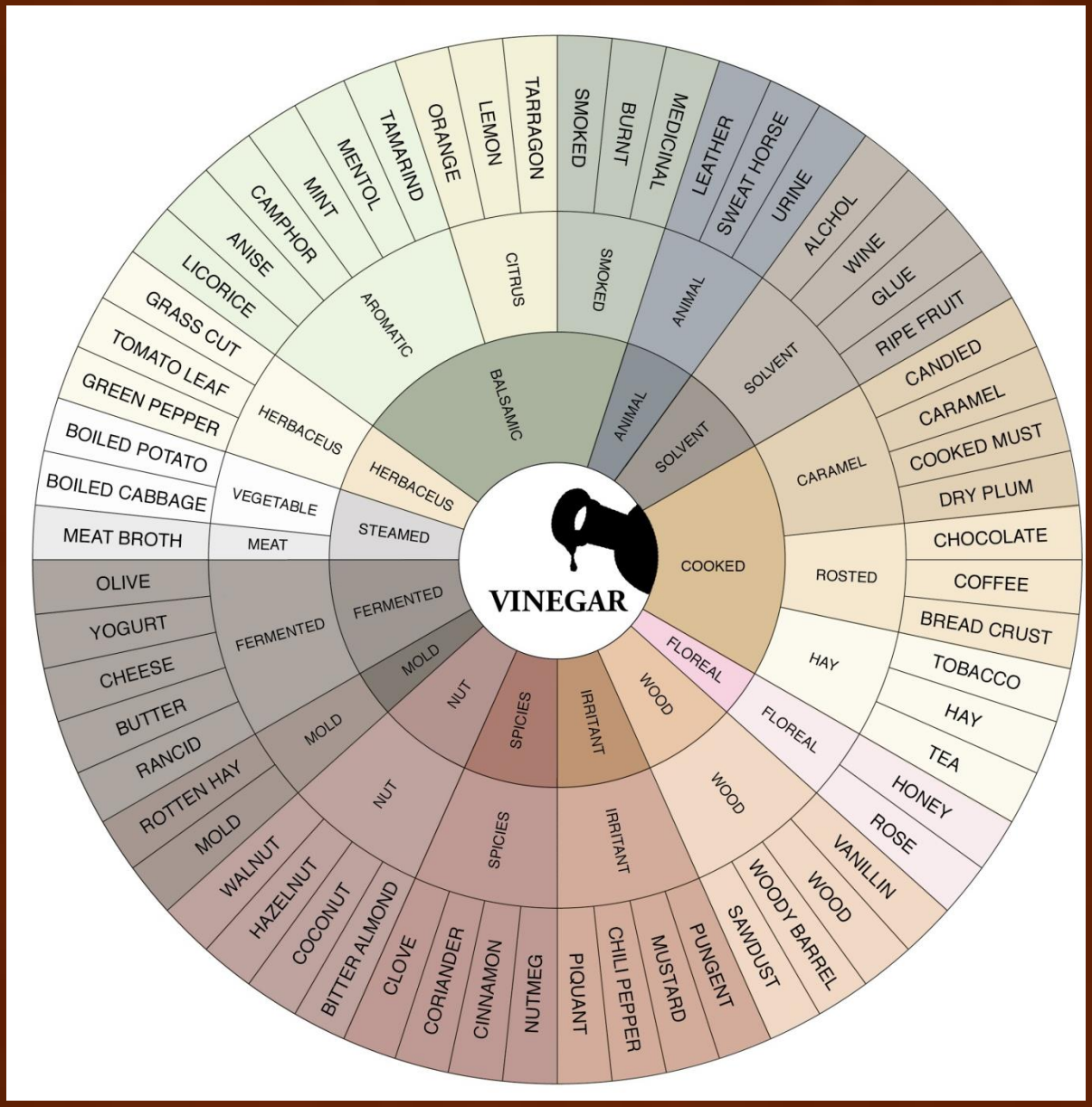
c/o RUOTE DA SOGNO Reggio Emilia

Giuseppe CORRADINI

THE FLAVOR OF VINEGARS

THE FLAVOR OF VINEGARS

The aim of this research
is to deepen the knowledge of vinegars,
with particular attention to sensory aspects
with the creation of a descriptive lexicon.



Giuseppe
CORRADINI

THE FLAVOR OF VINEGARS

EXPERIMENTAL STUDY OF SENSORIAL PERCEPTIONS:

. CEREAL CHINESE VINEGARS

. BERGAMOT VINEGAR

. TRADITIONAL BALSAMIC VINEGAR

. STRONG WINE VINEGAR

Acetic Acid Bacteria 2017; volume 6:6370

The flavor and taste of cereal Chinese vinegars

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Abstract

A lexicon for describing Chinese cereal vinegars (CCVs) was developed using trained panels of tasters that defined and referenced 23 significant olfactory descriptors, in concert with taste and trigeminal sensation. The sensory analysis was performed on 27 samples, representative of the five well-known Chinese provinces producing vinegar: Shanxi, Jiangsu, Sichuan, Fujian and Tianjin. Several aromatic descriptors define the sensory lexicon, e.g.: licorice, chocolate, meat broth, toasted, walnut, yogurt, coffee; together with five basic tastes, such as acid, sweet, salty, umami and bitter; and four for trigeminal sensations, astringent, pungent, metallic, and piquant (spicy). This preliminary study will be useful to CCVs producers because this lexicon reliably differentiates and characterizes this kind of vinegar.

used as raw material, for the production technology and the more or less extended aging.[3,4] The most widespread and well established vinegars come from four districts and differ for the ingredients: Fujian (water, glutinous rice, red yeast rice, sugar, salt); Jiangsu (water, glutinous rice, bran, sugar, salt); Shanxi (sorghum, barley, bran, chaff, pea, salt, water); Sichuan (bran, wheat, rice, glutinous rice) and Tianjin (water, sorghum, millet, wheat, pea). The production technology has many aspects in common, but also few important differences. Among them, heat treatment or toasting (at least on part of the product) even in the presence of chaff; concentration in open jar or in special evaporation chambers (Shanxi aged vinegar and Zhenjing aromatic vinegar). Furthermore, in the past, in the region of Shanxi and Tianjin, vinegar was concentrated during the harsh winter, removing the ice crystals. All these differences in raw material and technologies suggest marked difference among vinegars, or between vinegars

中国谷物醋的感官风味特征分析[1]

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摘 要：为了分析中国谷物醋（Chinese cereal vinegars, CCV）的感官风味特征，收集了来自山西、四川、福建和江苏，中国四大传统名醋产区的 8 个品牌，3 种不同陈酿程度的食醋产品 24 个，对它们的感官风味进行了分析和比较。结果表明，仅巧克力味、烘焙味、肉汤味等少数几种风味是这些 CCV 产品共有的，而其他一些风味，如酸水味、水果味和甘草味，为某些 CCV 产品所特有。研究还发现，陈酿对提升 CCV 的烘焙味和巧克力味起到了非常关键的作用。而原材料在某些产品风味，如甘草味的形成中可能起到了重要作用。

关键词：中国谷物醋；风味；感官风味特征

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Analysis of sensory flavor characteristics of Chinese cereal vinegar

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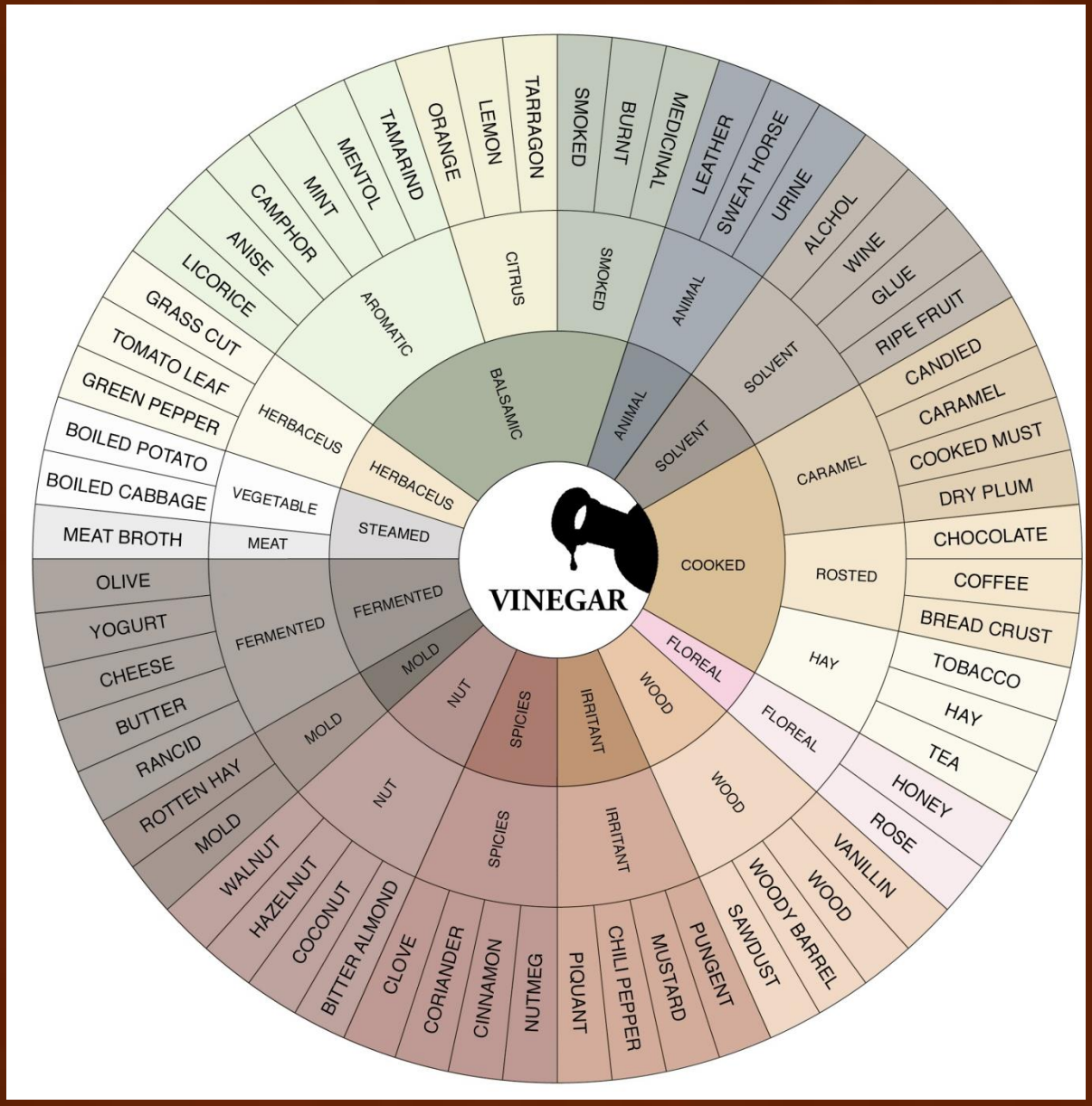
THE WHEEL OF FLAVOR OF VINEGAR



Giuseppe
CORRADINI

THE FLAVOR OF VINEGARS

ATTEMPT TO FIND A LINK BETWEEN DESCRIPTORS AND SENSORY ACTIVE MOLECULES

. bibliographic study of sensory active molecules
. descriptors found experimentally
. descriptors found in the bibliography

ACETI DI VINO E BALSAMICI: DESCRITTORI OLFATTIVI E CHEMESTETICI; SOSTANZE SENSORIALMENTE ATTIVE

Wine and balsamic vinegars: olfactory and chemesthetic attributes; sensory active substances

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• PAROLE CHIAVE
aceto, aceto balsamico tradizionale, analisi sensoriale, descrittori, aromi, standard di riferimento
• KEYWORDS
vinegar, traditional balsamic vinegar, sensory analysis, attributes, aromas, reference standard

Premessa

Nel mondo occidentale e per lungo tempo, l'aceto è stato considerato un prodotto povero; solo recentemente e grazie al successo di alcuni aceti speciali (Jerez, Oxo, balsamici) ha

7 Vinegars: Process, Aging, and Spoilage

Paolo Giudici, Tommaso Bonciani, Federico Lemmetti, and Giuseppe Corradini

CONTENTS

7.1 VINEGAR

The production of vinegar can be presumably dated back to the dawn of agriculture and, although once conceived as a poor product, these days its use is widespread as a condiment and food preservative. Vinegar can be defined as a varied ensemble of condiments and/or beverages characterized by a set of specific features:

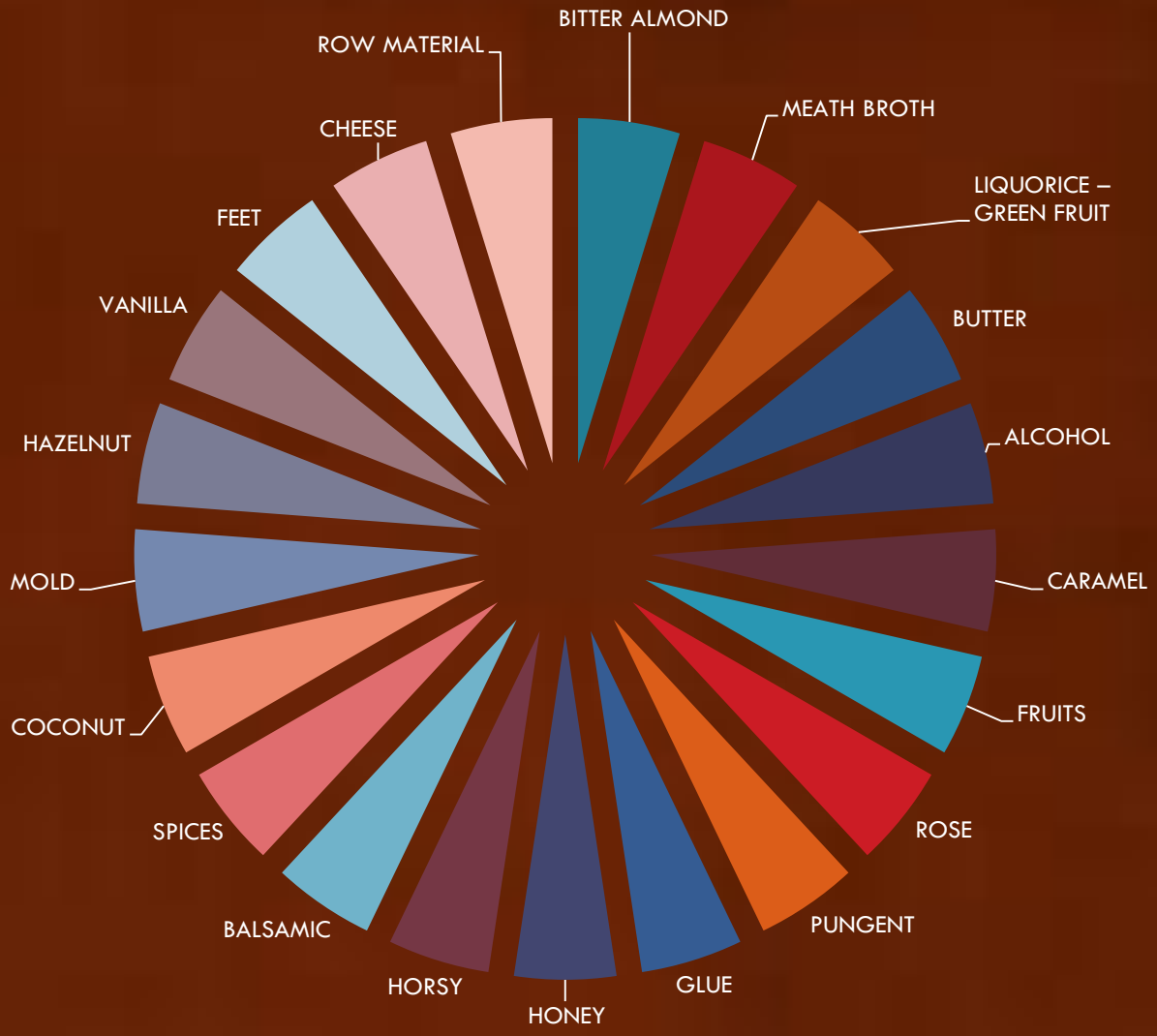
- They result from the onset of at least two successive events of fermentation starting from agricultural raw materials, usually consisting of an alcoholic fermentation followed by an acetic fermentation.

Giuseppe CORRADINI

THE FLAVOR OF VINEGARS

FAMILIES OF DESCRIPTORS

20 + 1 FAMILIES

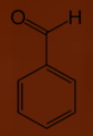


Giuseppe CORRADINI

THE FLAVOR OF VINEGARS

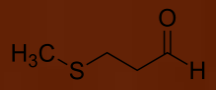
BITTER ALMOND (F.1)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
BITTER ALMOND [ABEF]	NO	F.1 BITTER ALMOND	benzaldehyde

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
benzaldehyde CAS : 100-52-7	Almond, fruity, chypry, hazelnut (Mosciano, 1994c)	

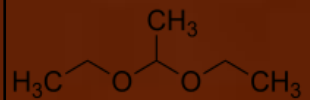
MEAT BROTH (F.2)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
BOILED CABBAG [E]	SF2.1 BOILED POTATO	F.2 MEAT BROTH	methional
MAIS [E]	"	"	"
BOILED POTATO [AE]	"	"	"
SAVOY CABBAGE SEASONED [E]	"	"	"
BROTH [E]	SF2.2 MEATH BROTH	F.2 MEAT BROTH	methional
YEAST [BDEF]	"	"	"
FISH [E]	"	"	"
SOY SOUCE [EF]	"	"	"
UMAMI [E]	"	"	"
BOLOGNA [F]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
methional CAS : 3268-49-3	Vegetable oil, tomato cream, potato peel and french's fried, yeast, bread, Limburger cheese with shades of tasty soup of meat (Mosciano, 1999a)	

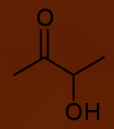
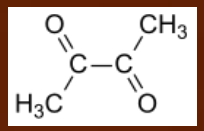
LICORICE / GREEN FRUIT (F.3)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
GRASS CUT [E]	SF.3.1 HERBACEOUS	F.3 LICORICE / GREEN FRUIT	acetaldeyde-dyetilacetal
TOMATO LEAF [E]	"	"	"
IMMATURE FRUIT [E]	"	"	"
GREEN APPLE [F]	"	"	"
POPPY [E]	"	"	"
SWEET PEPPER [F]	"	"	"
GREEN TOMATO [E]	"	"	"
VEGETABLE [D]	"	"	"
ANISE [E]	SF.3.2 LICORICE	F.3 LICORICE / GREEN FRUIT	acetaldeyde-dyetilacetal
ORANGE [EF]	"	"	"
DRY ORANGE BUCK [E]	"	"	"
TARRAGON [E]	"	"	"
LEMON [BEF]	"	"	"
LICORICE [CEF]	"	"	"
TAMARIND [F]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
acetaldeyde-dyetilacetal CAS : 105-57-7	Green fruit and aromatic notes of licorice, ether, green walnut, earthy and vegetable (Mosciano, 1994c)	

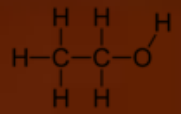
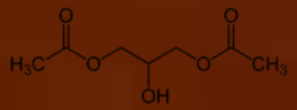
BUTTER (F.4)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
BUTTER [E]	NO	F.4 BUTTER	acetoin diacetyl
CARAMEL BUTTER [A]	"	"	"
ALMOND BUTTER [A]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
acetoin CAS : 513-86-0	Sweet, buttery, creamy, fats of milk (www.thegoodscentscompany.com 18.02.2016) Pleasant smell of butter and almonds (López Alejandre et al. 2007)	
diacetyl CAS : 431-03-8	Sweet, creamy, buttery, pungent, with a caramel nuance Mosciano, 1991a)	

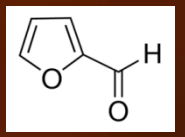
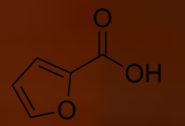
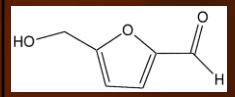
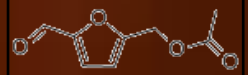
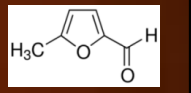
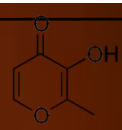
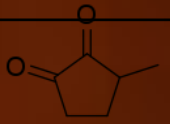
ALCOHOL (F.5)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
ALCOHOL [ABE]	NO	F.5 ALCOHOL	alcohol ethanol 1,2,3-propanetriol

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
alcohol ethanol CAS : 64-17-5	Strong, medicinal, alcoholic ethereal (www.thegoodscentscompany.com 18.02.2016)	
1,2,3-propantriol diacetat CAS : 25395-31-7	Smell slightly alcoholic (Luebke 1986)	

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
BALSAMIC [E]	SF.6.1 CARAMEL	F.6 CARAMEL	2-furfuraldehyde 2-furoic acid 5-hydroxymethyl-furfural (HMF) 5-acetoxymethyl-furfural 5-methyl-2-furfuraldehyde Malthol
DARK BEER [E]	"	"	"
COFFEE CARAMEL [AF]	"	"	"
CANDIED [E]	"	"	"
CARAMEL [CEF]	"	"	"
CARAMEL WOOD [A]	"	"	"
CAROB [C]	"	"	"
COKED [E]	"	"	"
MADERIZED [D]	"	"	"
MALT [EF]	"	"	"
MARMALADE [A]	"	"	"
MOLASSES [EF]	"	"	"
BOLOGNESE MUSTARD [C]	"	"	"
COKED MUST [E]	"	"	"
BREAD [E]	"	"	"
TOMATO (CONCENTRATED) [E]	"	"	"
PLUM [E]	"	"	"
DRY PLUM [CF]	"	"	"
RAISINS [EF]	"	"	"
COKED WINE [CDF]	"	"	"
PEANUTS [E]	SF.6.2 ROASTED	F.6 CARAMEL	2-furfuraldehyde 2-furoic acid 5-hydroxymethyl-furfural (HMF) 5-acetoxymethyl-furfural 5-methyl-2-furfuraldehyde malthol
BREAD CRUST [E]	"	"	"
POP CORN [E]	"	"	"
ROASTED [EF]	"	"	"
COCOA [CE]	SF.6.3 CHOCOLATE	F.6 CARAMEL	2-furfuraldehyde 2-furoic acid 5-hydroxymethyl-furfural (HMF) 5-acetoxymethyl-furfural 5-methyl-2-furfuraldehyde malthol
COFFEE [CEF]	"	"	"
CHOCOLATE [EF]	"	"	"
HAY [E]	"	"	"
TOBBACCO [E]	"	"	"
TEA	"	"	"

CARAMEL (F.6)

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
2-furfuraldehyde CAS : 98-01-1	Sweet, woody, bread, caramel, with a slight phenolic nuance (Mosciano,1993)	
2-furoic acid CAS : 88-14-2	Odorless, with acid-terroso-caramel flavor (www.thegoodscentscompany.com 18.02.2016)	
5-hydroxymethyl-furfural (HMF) CAS : 67-47-0	Strong aroma of caramel and butter; typical of many baked and dried products (www.thegoodscentscompany.com 18.02.2016)	
5-acetoxy methyl-furfural CAS : 10551-58-3	NOT DEFINED	
5-methyl-2-furfuraldehyd eCAS : 620-02-0	Sweet aroma of caramel, bread and coffee (Mosciano 1992)	
malthol CAS : 118-71-8	Salty exalter with aroma of yolk sugar, caramel (www.thegoodscentscompany.com 18.02.2016)	
ciclotene CAS : 765-70-8	Caramel, maple syrup, sweet, burnt, coffee, bouquet of bread (Mosciano, 1992)	

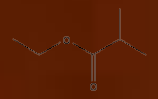
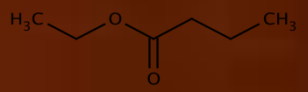
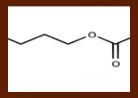
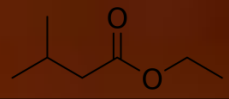
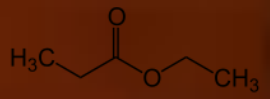
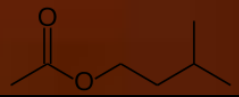
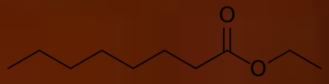
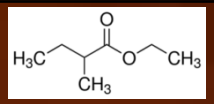
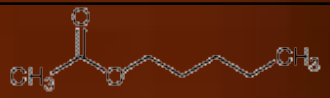
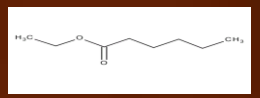
Giuseppe CORRADINI

THE FLAVOR OF VINEGARS

FRUIT (F.7)

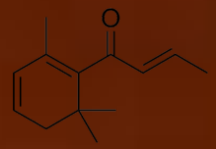
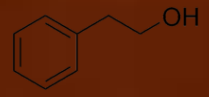
DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
PINEAPPLE [A]	NO	F.7 FRUIT	ethyl isobutyrate ethyl butyrate butyl acetate ethyl isovalerate ethyl propanoate isoamyl acetate ethyl octanoate ethyl 2-methylbutyrate amyl acetate ethyl hexanoate hexyl acetate
BANANA [AEF]	"	"	"
STRAWBERRY [E]	"	"	"
FRUITY [CD]	"	"	"
RED FRUITS [ABE]	"	"	"
APPLE [BCEF]	"	"	"
APPLE JUICE [A]	"	"	"

FRUIT (F.7)

ethyl isobutyrate CAS : 97-62-1	Pungent, ethereal and fruity with a nuance of rum and eggs (Mosciano, 1997a)	
ethyl butyrate CAS : 105-54-4	Fruity, sweet, All Fruits, apple, fresh, ethereal (Mosciano, 1994b)	
butyl acetate CAS : 123-86-4	Acute, ethereal, diffuse, banana (Mosciano, 1999)	
ethyl isovalerate CAS : 108-64-5	Sweet, diffuse, fruity, sharp, pineapple, green apple (Mosciano, 1998a)	
ethyl propanoate CAS : 105-37-3	Sweet, ethereal, rum, grape, wine, fermented with a egg flip nuance (Mosciano, 1998)	
isoamyl acetate CAS : 123-92-2	Sweet, banana, ripe fruit (Mosciano, 1991a)	
ethyl octanoate CAS : 106-32-1	Waxy, sweet, moldy, pineapple and creamy fruit, gradient dairy products (Mosciano, 1997a)	
ethyl 2-methylbutyrate CAS : 7452-79-1	Fruity aroma, berries, grapes, pineapple, mango with cherry notes (Mosciano, 1997)	
amyl acetate CAS: 628-63-7	Banana ethereal, fruity, pear, apple, banana (www.thegoodscentscompany.com 18.02.2016)	
ethyl hexanoate CAS : 123-66-0	Sweet, fruity, pineapple, waxy, green banana (Mosciano, 1997d)	
hexyl acetate CAS : 142-92-7	Fruity, green, fresh, sweet, banana peel, apple and pear (Mosciano, 1993)	

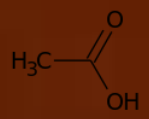
ROSE (F.8)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
FLOWERS [F]	NO	F.8 ROSE	β –damascenone phenylethyl alcohol
ORANGE FLOWERS [F]	"	"	"
ROSE [F]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
β –damascenone CAS : 23696-85-7	Woody, floral, herbal, green and fruity with spicy notes of tobacco (Mosciano, 1991b) It is one of the greatest smells of rose, it derives from degradation of carotenoids *(Sachihiko Isoe et al.,1973)*	
phenylethyl alcohol CAS : 60-12-8	Sweet, floral and bread with a hint of rose honey (Mosciano, 1993a) Pleasant scent of rose *(Fahlbusch et al.,2003)*	

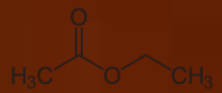
PUNGENT (F.9)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
ACID [E]	NO	F.9 PUNGENT	acetic acid
ACETIC ACID [EF]	"	"	"
IRRITANT [C]	"	"	"
PUNGENT [ABEF]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
acetic acid CAS : 64-19-7	Sharp, pungent, sour (www.thegoodscentscompany.com 18.02.2016)	

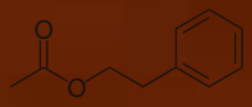
GLUE (F.10)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
VINEGAR [EF]	NO	F.10 GLUE	ethyl acetate
GLUE [AEF]	"	"	"
ETHYL ACETATE [BF]	"	"	"
NAPHTHALENE [E]	"	"	"
SOLVENT [F]	"	"	"
PAINT [E]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
ethyl acetate CAS : 141-78-6	Etherial, fruity, sweet, grape and rum-like (Mosciano, 1994)	

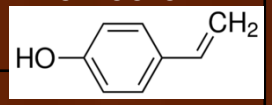
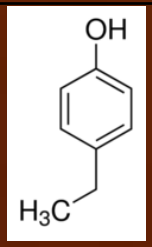
HONEY (F.11)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
BEESWAX [E]	NO	F.11 HONEY	2-phenylethyl acetate
HONEY [ABCEF]			
WINE [E]			

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
2-phenylethyl acetate CAS : 103-45-7	Sweet, honey, floral, balsamic nuance (Mosciano, 2001)	

HORSY (F.12)

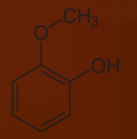
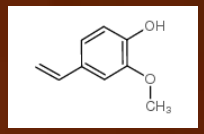
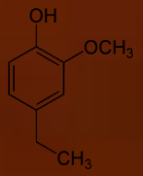
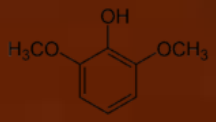
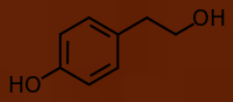
DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES molecole correlate
LEATHER [BEF]	SF.12.1 HORSY	F.12 HORSY	4-vinylphenol 4-ethylphenol
FARM [E]	"	"	"
CAT URINE [F]	"	"	"
STABLE [E]	"	"	"
SWEAT HORSE [EF]	"	"	"
TANNIN [E]	"	"	"
URINE/STABLE [E]	"	"	"
CHEMICAL [ABE]	SF.12.2 MEDICINAL	F.12 HORSY	4-vinylphenol 4-ethylphenol
MEDICINAL [AEF]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL
4-vinylphenol CAS: 2628-17-3	Chemical, phenolic, medicinal with sweet musty and meaty nuances Mosciano, Gerard P&F 15, No. 1, 19, (1990)	
4-ethylphenol CAS : 123-07-9	Horsy, leather, medicinal, smoky, barnyard, animal and sweaty saddle-like (Pollnitz et. al, 2000) Smoked, phenolic, creosote and sapid Mosciano (1998)	

BALSAMIC (F.13)

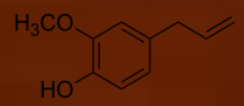
DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
NUTMEG [E]	SF.13.1 PIQUANT	F.13 BALSAMIC	guaiacol 4-vinylguaiacol 4-ethylguaiacol* syringol tyrosol
OLIVE [E]	"	"	"
PEPPER [AE]	"	"	"
CHILI PEPPER [E]	"	"	"
PIQUANT [CDE]	"	"	"
PIQUANT-SMOKED [A]	"	"	"
HORSERADISH [E]	"	"	"
MUSTARD [F]	"	"	"
GINGER [EF]	"	"	"
CAMPHOR [E]	SF.13.2 BALSAMIC	F.13 BALSAMIC	guaiacol 4-vinylguaiacol 4-ethylguaiacol* syringol tyrosol
INCENSE [E]	"	"	"
MINT [E]	"	"	"
MENTHOL [E]	"	"	"
ROSEMARY [E]	"	"	"
VICS VAPORUB [F]	"	"	"
SMOKED [E]	SF.13.3 SMOKED	F.13 BALSAMIC	guaiacol 4-vinylguaiacol 4-ethylguaiacol* syringol tyrosol
BURNT [EF]	"	"	"
RHUBARB [E]	"	"	"
WOOD [CEF]	SF.13.4 WOODY BARREL	F.13 BALSAMIC	guaiacol 4-vinylguaiacol 4-ethylguaiacol* syringol tyrosol
BARREL WOOD [F]	"	"	"

BALSAMIC (F.13)

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
guaiacol CAS : 90-05-1	Phenolic, smoky, spicy, medicinal, vanilla and salty meat (bacon) with woody nuances (Mosciano, 1997b)	
4-vinylguaiacol CAS: 7786-61-0	Fresh, woody, amber, cedar, toasted peanuts (www.thegoodscentscompany.com 18.02.2016)	
4-ethylguaiacol* CAS: 2785-89-9	Spicy, smoky bacon, phenolic, clove (Luebke, William tgsc, 1996) Spicy and clove-like with medicinal, woody and sweet vanilla nuances (Mosciano, Gerard P&F 15, No. 1, 19, 1990)	
syringol CAS : 91-10-1	Sweet, phenolic, smoked, medicinal, balsamic (Mosciano 1994)	
tyrosol CAS : 501-94-0	Slightly fruity and floral, sweet low odor strength (www.thegoodscentscompany.com 18.02.2016)	

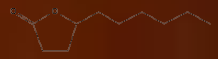
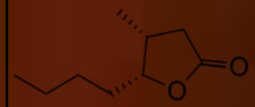
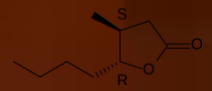
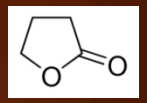
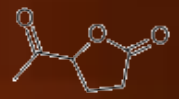
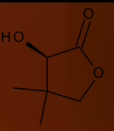
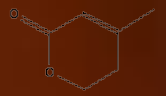
SPICES (F.14)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
CINNAMON [E]	NO	F.14 SPICES	eugenol
CORIANDER [E]			
CLOVE [ABE]			
SPICES [CDEF]			

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
eugenol CAS : 97-53-0	Sweet, spicy, cloves, woody, with phenolic resins, ham and salty bacon, with notes of cinnamon and shades of hot pepper (Mosciano, 2001a)	

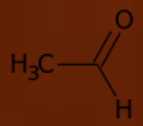
COCONUT (F.15)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
WOOD OF CARPENTRY [BE]	NO	F.15 COCONUT	γ-decalactones cis-β-metyl-γ-octalattone trans-β-metyl-γ-octalattone γ-Butyrolactone Solerone pantolactone dehydro-mevalonic acid
CORK [E]	"	"	"
COCONUT [AB]	"	"	"

γ-decalactones CAS : 706-14-9	Fruity, peach, creamy and sweet with a greasy nuance (Mosciano, 1996a)	
cis-β-metyl-γ-octalattone CAS: 39212-23-2	Coconut, celery or fresh wood. Oak lattices are substances with a high ratio between the concentration and the perception threshold that can be detected at the concentration of 1µg / L in the air (Masson et al., 2000)	
trans-β-metyl-γ-octalattone CAS: nd	Coconut, celery or fresh wood, which can be detected by humans at a concentration of 20 µg / L in the air (Masson et al., 2000)	
γ-Butyrolactone CAS : 96-48-0	Creamy and oily smell with creamy taste, dairy, with aftertaste of peach (γ-butyrolactone naturally present in small quantities of wine and its derivatives (Mosciano, 1991)	
solerone CAS : 29393-32-6	Aroma to define. It derives from the cyclization of hydrolysed fatty acids during alcoholic fermentation	
pantolactone CAS : 599-04-2	Cotton candy (www.thegoodscentscompany.com 18.02.2016)	
dehydro-mevalonic acid lactone CAS : 2381-87-5	To be defined. It derives from the cyclization of hydrolysed fatty acids during alcoholic fermentation	

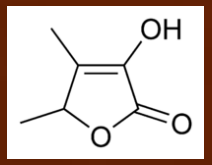
MOLD (F.16)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
OXIDIZED APPLE SKIN [F]	NO	F.16 MOLD	acethaldeyde
CELLAR [F]	"	"	"
CLOSED [E]	"	"	"
ROTTEN HAY [E]	"	"	"
ROTTEN FLOWER/FRUIT [F]	"	"	"
MOLD [E]	"	"	"
MUSK [E]	"	"	"
BOILED EGG [F]	"	"	"
SULFUR [F]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
acethaldeyde CAS : 75-07-0	Pungent, ethereal, fresh, penetrating, fruity and musty (Mosciano, 1997c)	

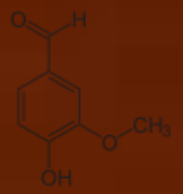
HAZELNUT (F.17)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
CHERRY INTO ALCHOL [E]	NO	F.17 HAZELNUT	sotolon
CHERRY [AEF]	"	"	"
CHOCOLATE TO THE HAZELNUT [E]	"	"	"
HAZELNUT [E]	"	"	"
WALNUT [EF]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
sotolon 28664-35-9	Hazelnuts with low concentrations and curry at higher concentrations (Callejon et al., 2008) Caramel strong and burned maple syrup (www.thegoodscentscompany.com 18.02.2016)	

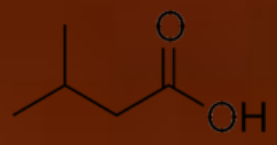
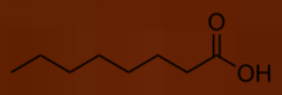
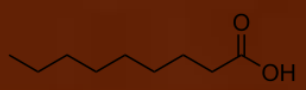
VANILLA (F.18)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
CAPPUCCINO [E]	NO	F.18 VANILLA	vanillin
CAKE TO THE VANILLA [E]	"	"	"
VANILLA [ABCE]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
vanillin CAS : 121-33-5	Sweet, vanilla, creamy and phenolic (Mosciano, 1996)	

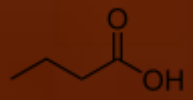
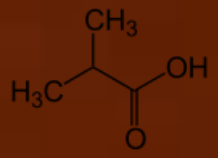
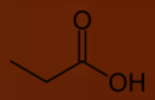
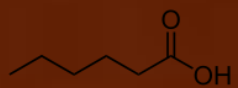
FEET (F.19)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
RANCED CHEESE [AE]	NO	F.19 FEET	isovaleric acid octanoic acid nonanoic acid
SILAGE MAIS [E]	"	"	"
RANCED OIL [EF]	"	"	"
FEET [AE]	"	"	"
RANCID [AE]	"	"	"

MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
isovaleric acid CAS : 503-74-2	Cheese, dairy products, acid, bitter, pungent, fruity, smelly, ripe fats and fruity notes (Mosciano 1993b) It is an important component of the cause of unpleasant smell of foot, as it is produced by skin bacteria that metabolize leucine (Ara et al.,2006)	
octanoic acid CAS : 124-07-2	Fat, waxy, rancid oil, vegetable and cheese (Luebke, 1988)	
nonanoic acid CAS : 112-05-0	Waxy, cheese with nuances derived from milk (Mosciano, 1989)	

CHEESE (F.20)

DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
CHEESE [ABEF]	NO	F.20 CHEESE	butyric acid isobutyric acid propanoic acid hexanoic acid
MILK [E]	"	"	"
VOMIT [E]	"	"	"
YOGURT [EF]	"	"	"

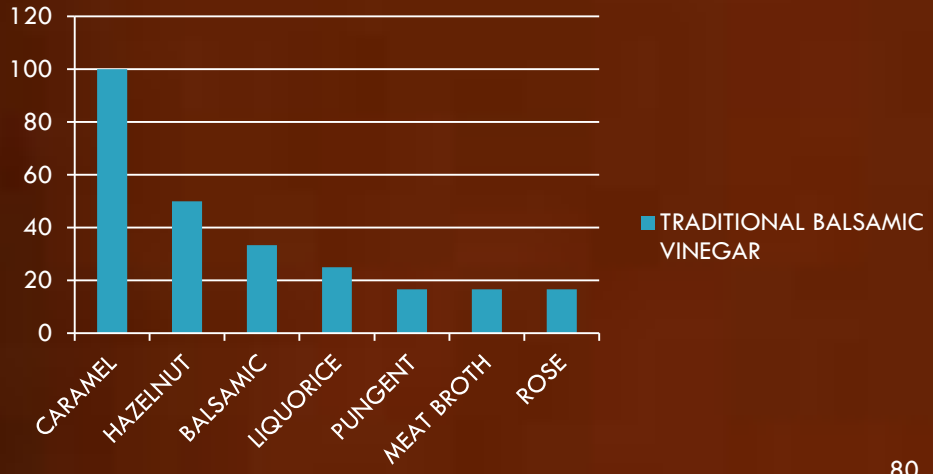
MOLECULE CAS number	SMELL (authors citations)	STRUCTURAL FORMULA
butyric acid CAS : 107-92-6	Pungent, similar to dairy products, cheese, butter, with a fruity nuance (Mosciano, 1994a)	
isobutyric acid CAS : 79-31-2	Rancid, cheese (www.adv-bio.com/search 25/02/2016) Similar smell of human sweat (www.hmbd.ca/metabolites/hmbd 1873 25/01/2016)	
propanoic acid CAS : 79-09-4	Pungent, acid, similar dairy products (Mosciano, 1990)	
hexanoic acid CAS : 142-62-1	Cheese, sweat, fat, acid (Luebke, 1988)	

ROW MATERIAL (F.20+1)

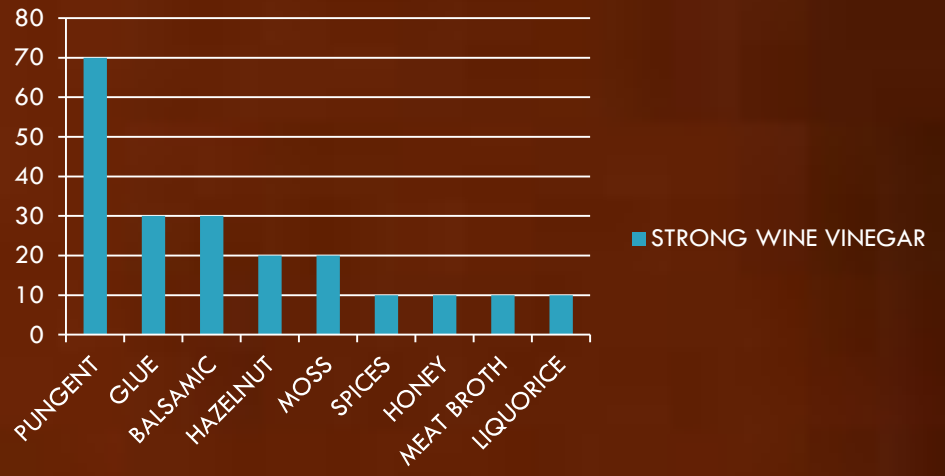
DESCRIPTOR	SUBFAMILY	FAMILY	RELATED MOLECULES
CHESTNUTS/FLOUR [E]	NO	F.20+1 ROW MATERIAL	NO
CEREALS [E]	"	"	"
BRAN [E]	"	"	"
FLOUR [E]	"	"	"

APPLICATION OF FAMILIES OF DESCRIPTORS

TRADITIONAL BALSAMIC VINEGAR



STRONG WINE VINEGAR



COMPARISON MOLECOLE HYPOTHESIZED

TRADITIONAL BALSAMIC VINEGAR	STRONG WINE VINEGAR
furfural	acetic acid
sotolon	etihyl acetate
volatile fenol (F.13)	volatile fenol (F.13)
acetaldeyde-dyetilacetal	sotolon
acetic acid	acethaldeyde
methional	eugenol
β –damascenone e/o phenylethyl alcohol	2-phenylethyl acetate
	methional
	acetaldeyde-dyetilacetal

THANK YOU,
FOR YOUR ATTENTION

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THE FLAVOR OF VINEGARS

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