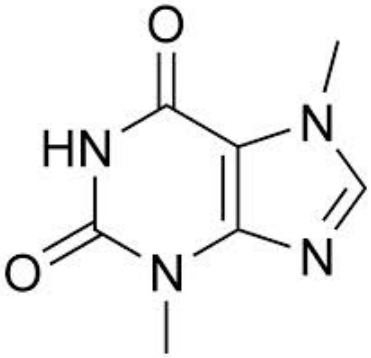
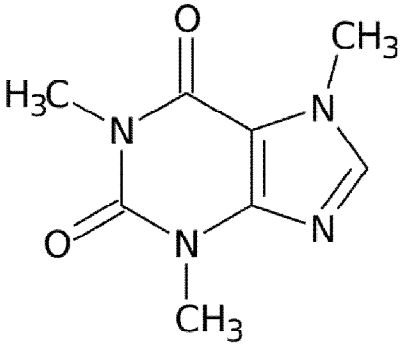
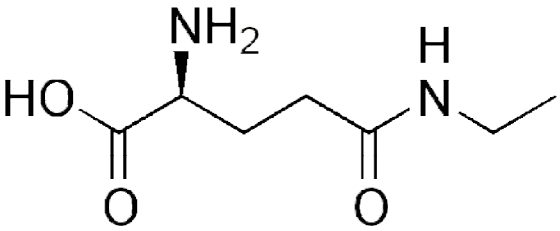


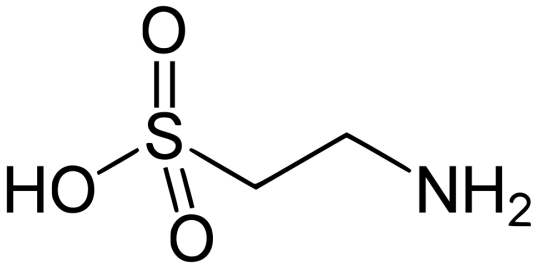
Teobromina



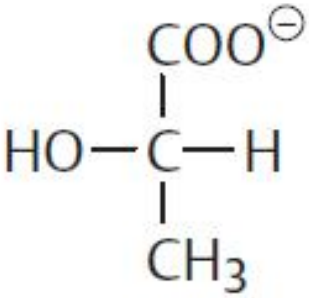
Caffeina



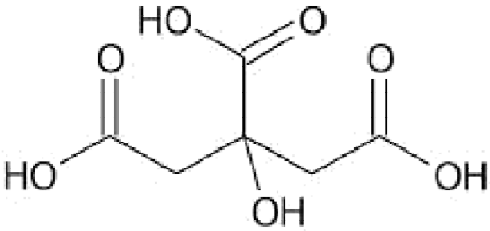
Teanina



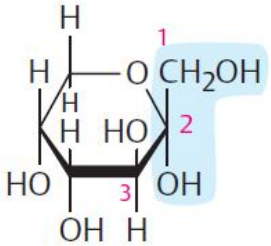
Taurina



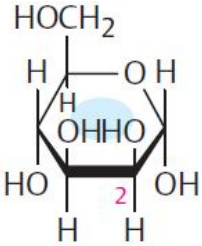
Acido lattico



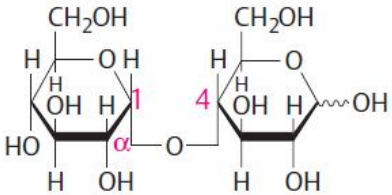
Acido citrico



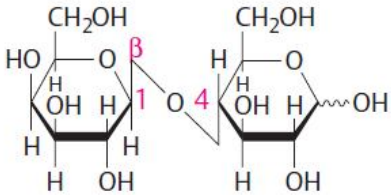
D-Fructose



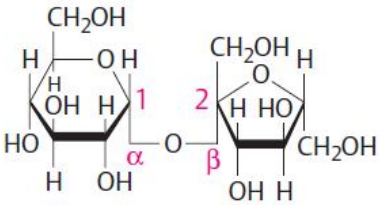
α-D-Mannose



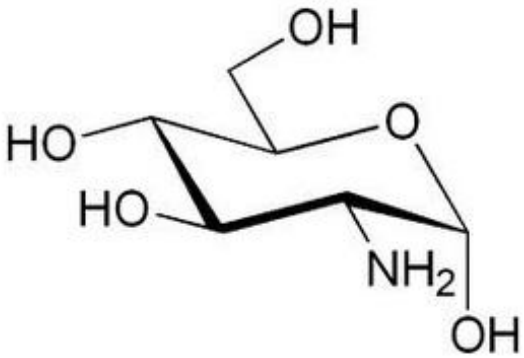
1. Maltose
α-D-Glucopyranosyl-
(1→4)-D-glucopyranose



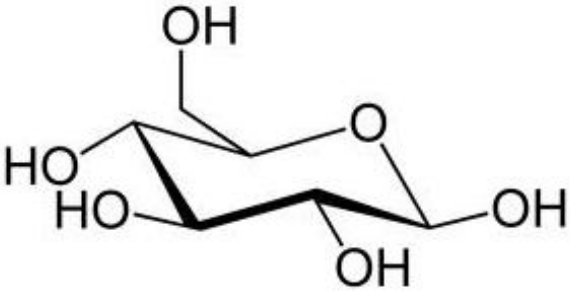
2. Lactose
β-D-Galactopyranosyl-
(1→4)-D-glucopyranose



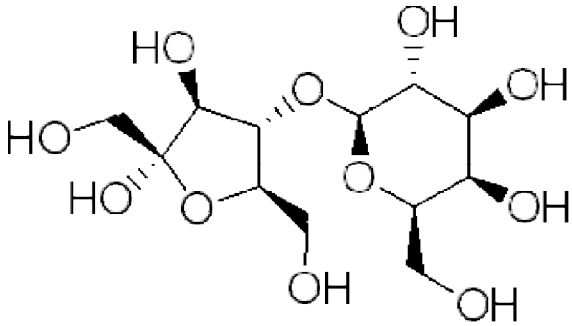
3. Sucrose
α-D-Glucopyranosyl-
(1←→2)-β-D-fructofuranoside



Glucosamine



Glucose (Sugar molecule)

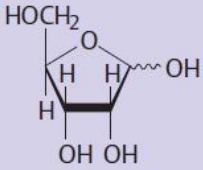


Lattulosio
4-O-β-D-Galactopyranosyl-D-fructose

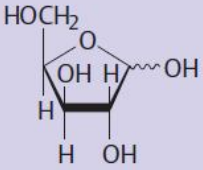
A. Important monosaccharides

① Aldoses

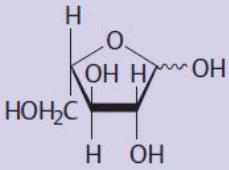
D-Ribose (Rib)



D-Xylose (Xyl)

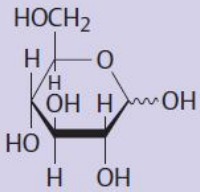


L-Arabinose (Ara)

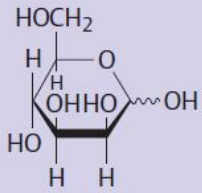


Pentoses

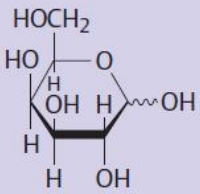
D-Glucose (Glc)



D-Mannose (Man)



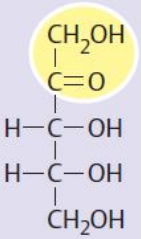
D-Galactose (Gal)

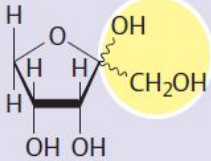


Hexoses

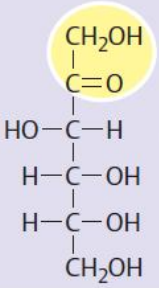
② Ketoses

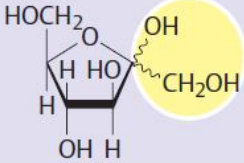
D-Ribulose (Rub)





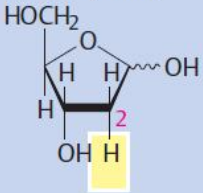
D-Fructose (Fru)



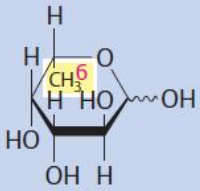


③ Deoxyaldoses

2-Deoxy-D-ribose (dRib)

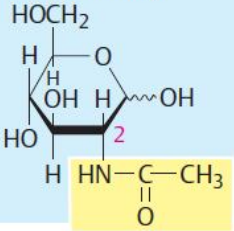


L-Fucose (Fuc)

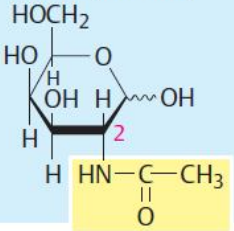


④ Acetylated amino sugars

N-Acetyl-D-glucosamine (GlcNAc)

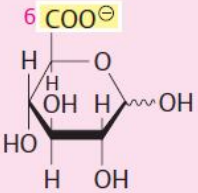


N-Acetyl-D-galactosamine (GalNAc)

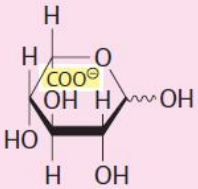


⑤ Acidic monosaccharides

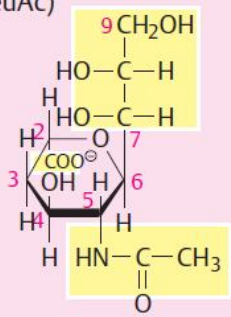
D-Glucuronic acid (GlcUA)



L-Iduronic acid (IduUA)

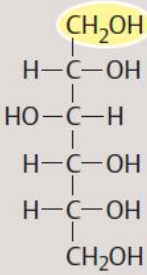


N-Acetylneuraminic acid (NeuAc)

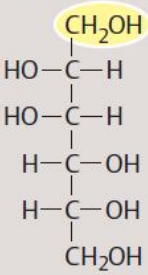


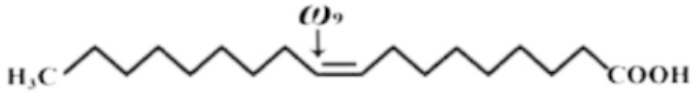
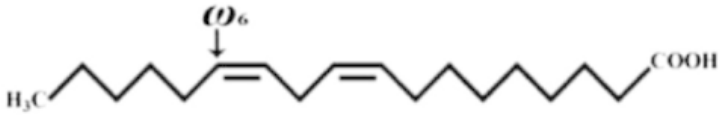
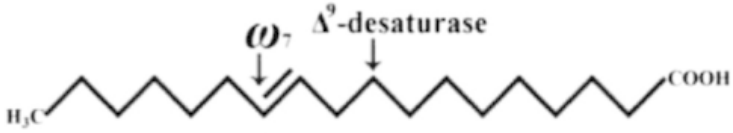
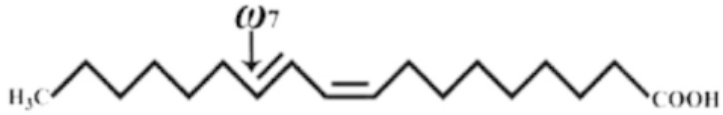
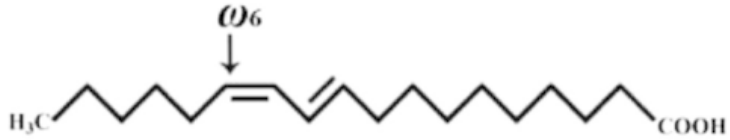
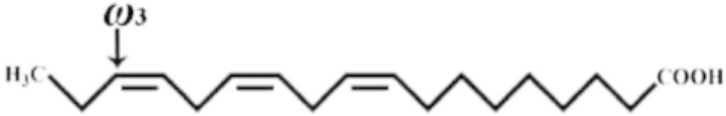
⑥ Sugar alcohols (alditoles)

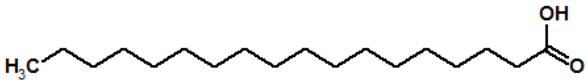
D-Sorbitol

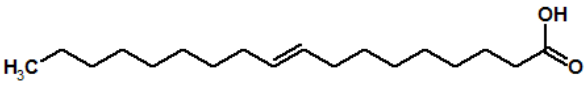


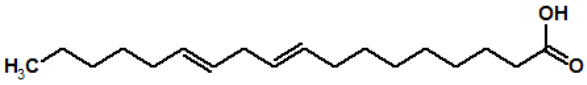
D-Mannitol

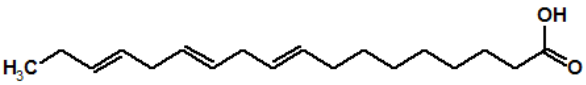


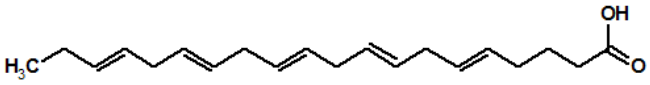
Common/ Trivial name	*ω/n* position (numbering from $-CH_3$ end)	Structure	Systemic name (numbering from -COOH end)
Oleic acid (OA)	*ω*-9		(*cis*-9)-octadecenoic acid
Linoleic acid (LA)	*ω*-6		(*cis*-9,*cis*-12)-octadecadienoic acid
Vaccenic acid (VA)	*ω*-7		(*trans*-11)-octadecenoic acid
9-CLA (Rumenic acid)	*ω*-7		(*cis*-9,*trans*-11)-octadecadienoic acid
10-CLA	*ω*-6		(*trans*-10,*cis*-12)-octadecadienoic acid
α-linolenic acid (ALA)	*ω*-3		(all *cis*-9,12,15)-octadecatrienoic acid
Stearic acid (SA)	-		Octadecanoic acid

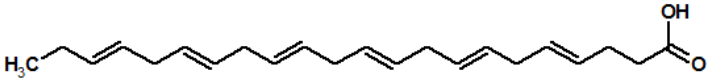
Stearic 18:0  Saturated 18:0

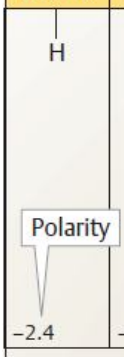
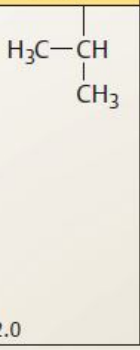
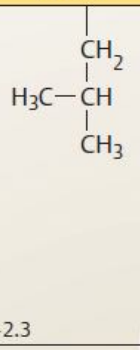
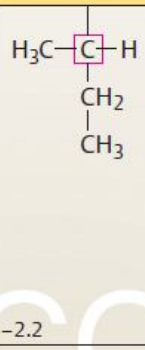
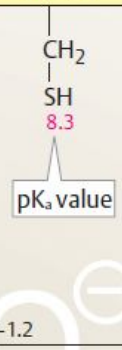
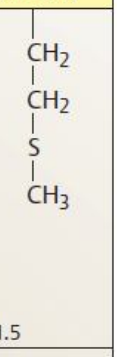
Oleic 18:1, ω-9  Monoene 18:0 Δ9

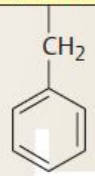
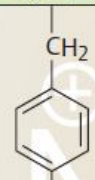
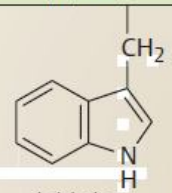
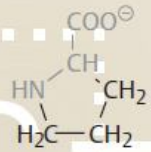
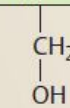
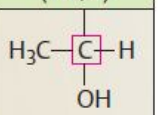
Linoleic 18:2, ω-6  Polyene 18:2 Δ9, 12

Linolenic 18:3, ω-3  Polyene 18:3 Δ9, 12, 15

EPA 20:5, ω-3  Polyene 18:5 Δ5, 8, 11, 14, 17

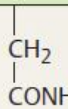
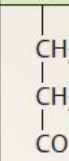
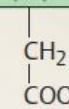
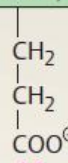
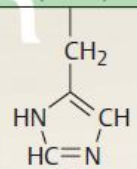
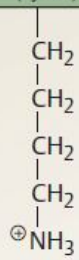
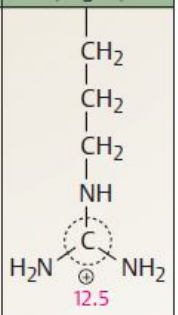
DHA 22:6, ω-3  Polyene 18:6 Δ4, 7, 10, 13, 16, 19

Aliphatic					Sulfur-containing	
Glycine (Gly, G)	Alanine (Ala, A)	Valine ☆ (Val, V)	Leucine ☆ (Leu, L)	Isoleucine ☆ (Ile, I)	Cysteine (Cys, C)	Methionine ☆ (Met, M)
						
−2.4	−1.9	−2.0	−2.3	−2.2	−1.2	−1.5

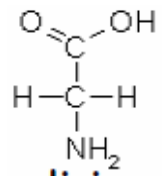
Aromatic			Cyclic	Neutral	
Phenylalanine ☆ (Phe, F)	Tyrosine (Tyr, Y)	Tryptophan ☆ (Trp, W)	Proline (Pro, P)	Serine (Ser, S)	Threonine ☆ (Thr, T)
		 Indole ring	 Pyrrolidine ring		
+0.8	+6.1	+5.9	+6.0	+5.1	+4.9

☆ Essential amino acids

Chiral center

Neutral		Acidic		Basic		
Asparagine (Asn,N)	Glutamine (Gln, Q)	Aspartic acid (Asp, D)	Glutamic acid (Glu, E)	Histidine (His, H)	Lysine ☆ (Lys,K)	Arginine (Arg, R)
				 Imidazole ring		
+9.7	+9.4	+11.0	+10.2	+10.3	+15.0	+20.0

AMINOACIDI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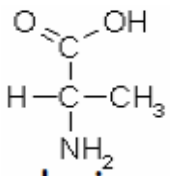
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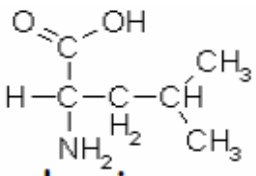
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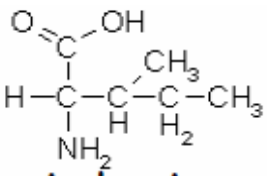
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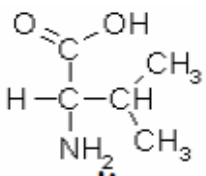
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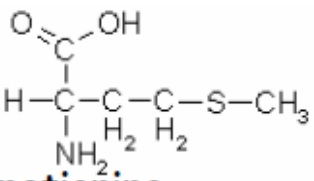
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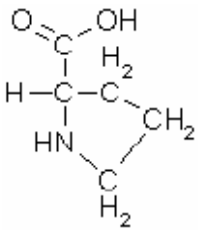
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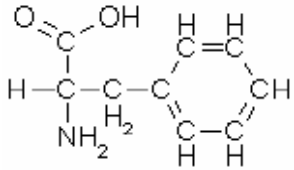
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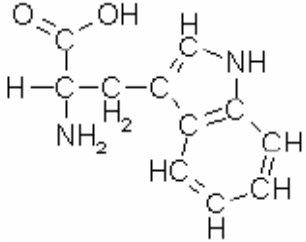
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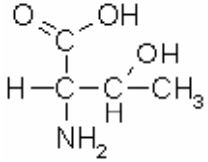
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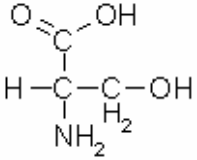
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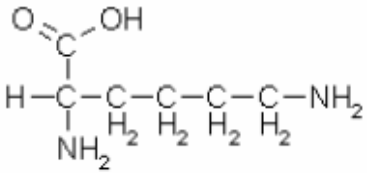
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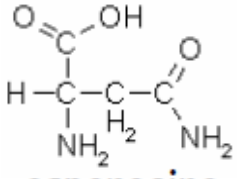
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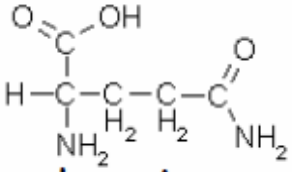
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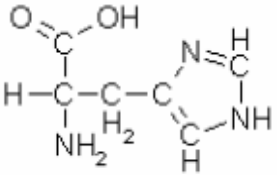
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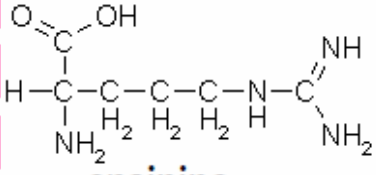
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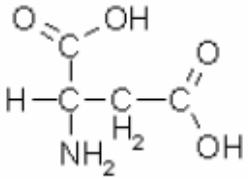
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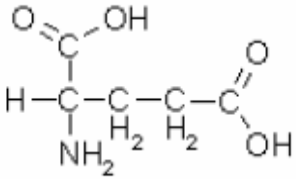
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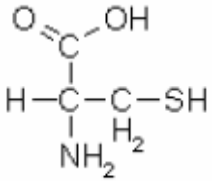
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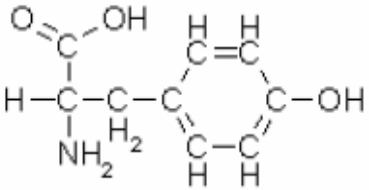
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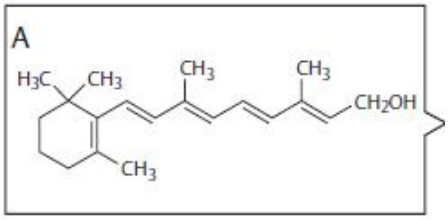
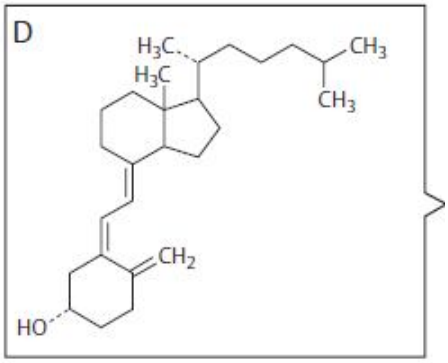
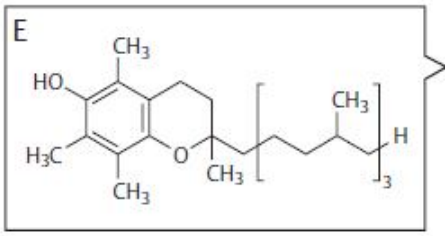
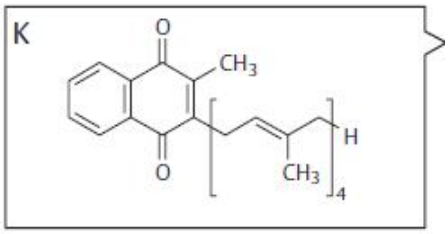
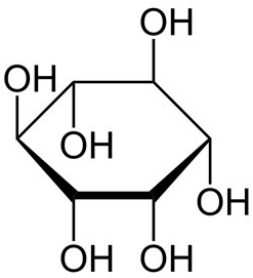
Vitamine



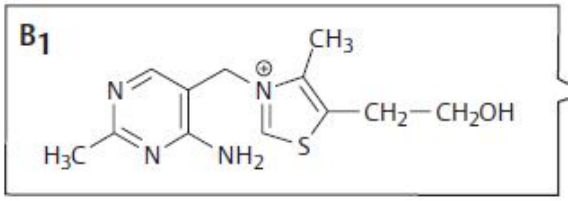


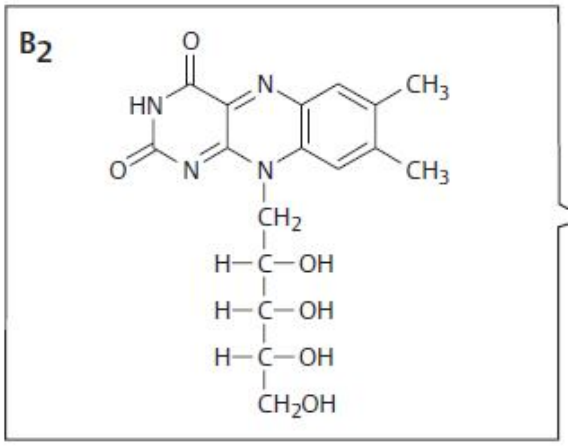


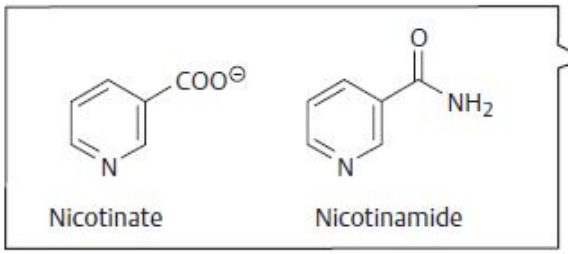


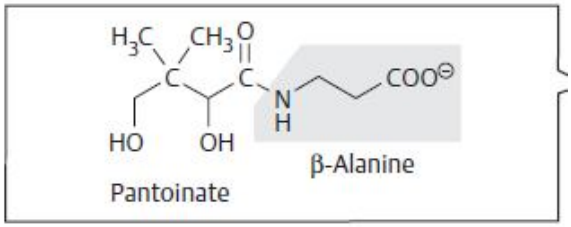


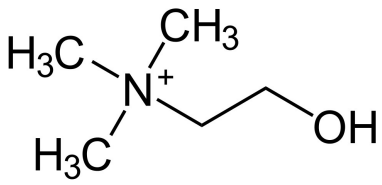
Inositolo









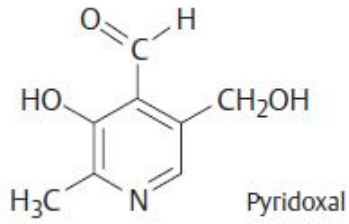


colina

Vitamine

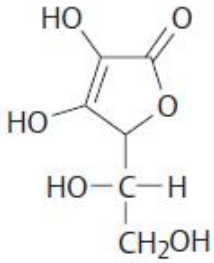
* Adult daily requirement

B_6



Pyridoxal

C



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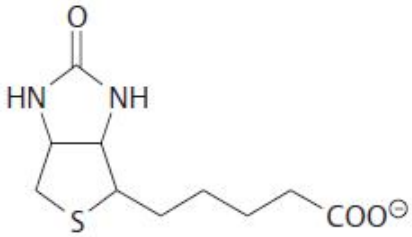


Foto ossidazione lipidi

Start: Formation of peroxy ($RO_2^{\bullet}$), alkoxy ($RO^{\bullet}$) or alkyl ($R^{\bullet}$) radicals

Chain propagation:

(1) $R^{\bullet} + O_2 \longrightarrow RO_2^{\bullet}$ k_1: $10^9\,l\,mol^{-1}\,s^{-1}$

(2) $RO_2^{\bullet} + RH \longrightarrow ROOH + R^{\bullet}$ k_2: $10-60\,l\,mol^{-1}\,s^{-1}$

(3) $RO^{\bullet} + RH \longrightarrow ROH + R^{\bullet}$

Chain branching:

(4) $ROOH \longrightarrow RO^{\bullet} + {}^{\bullet}OH$

(5) $2\,ROOH \longrightarrow RO_2^{\bullet} + RO^{\bullet} + H_2O$

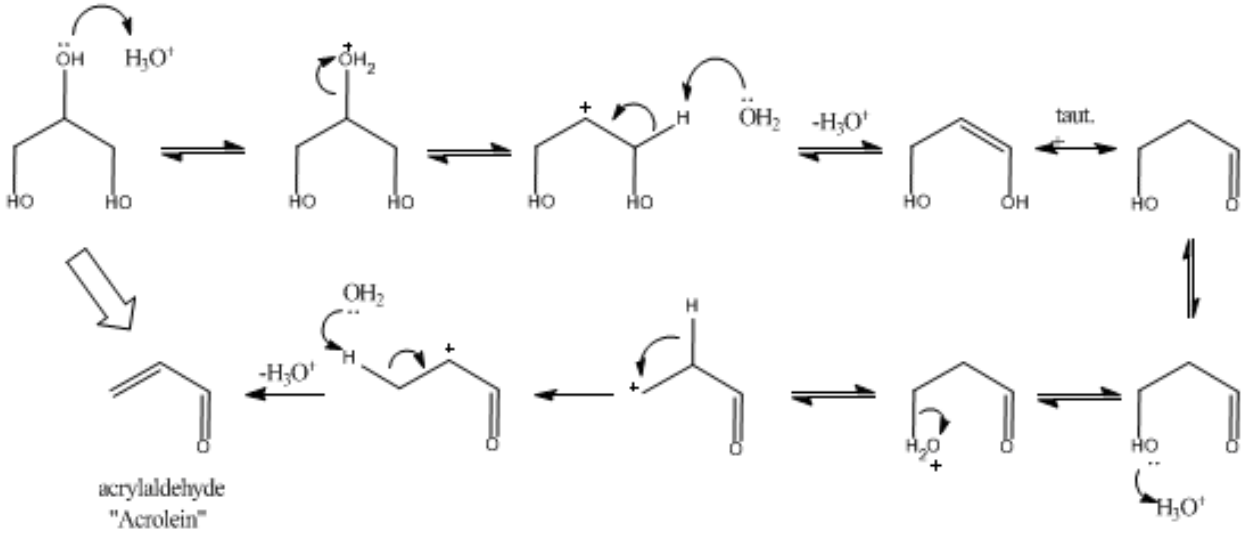
Chain termination:

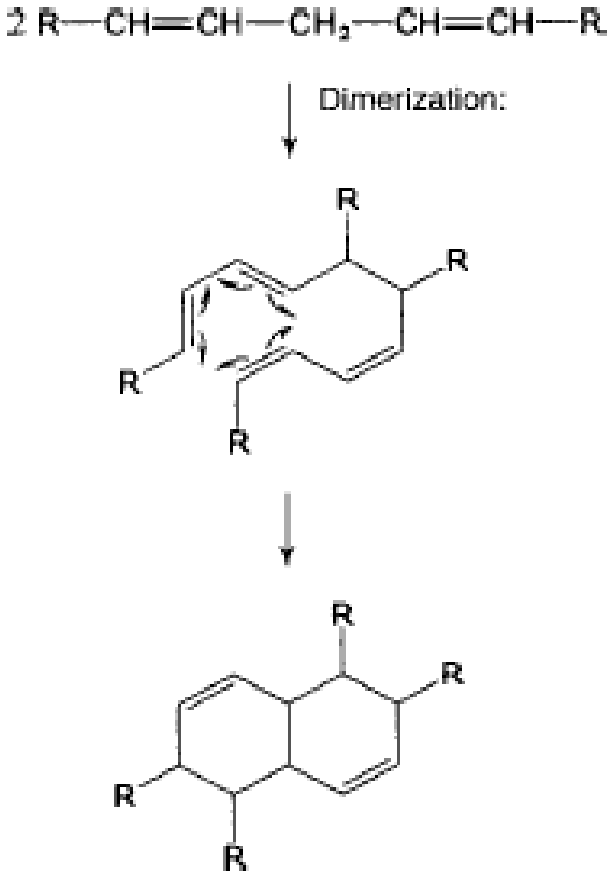
(6) $2\,R^{\bullet} \longrightarrow$

(7) $R^{\bullet} + RO_2^{\bullet} \longrightarrow$ } Stable products

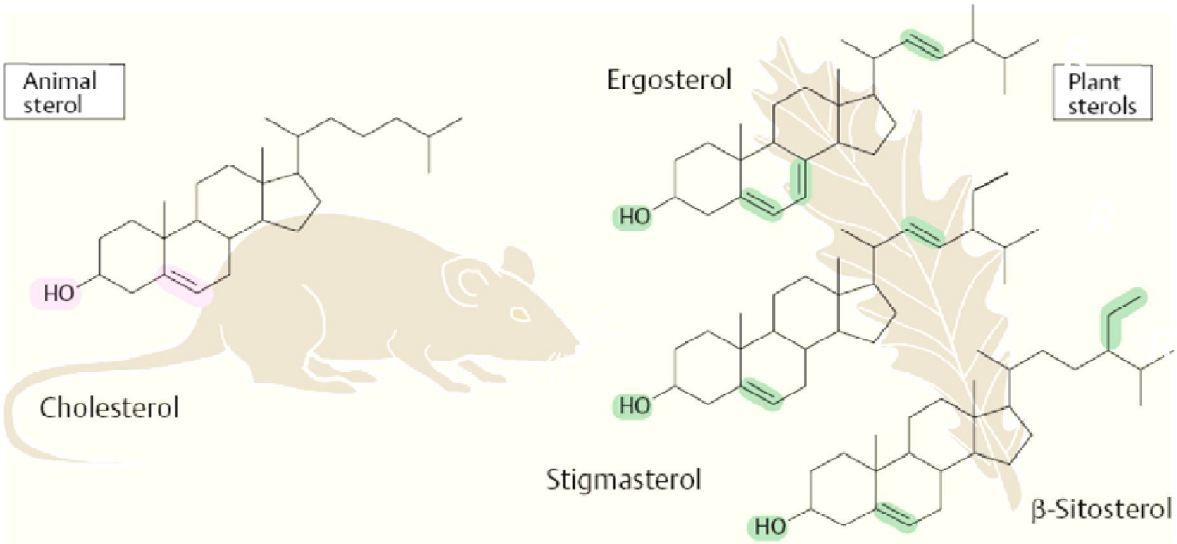
(8) $2\,RO_2^{\bullet} \longrightarrow$

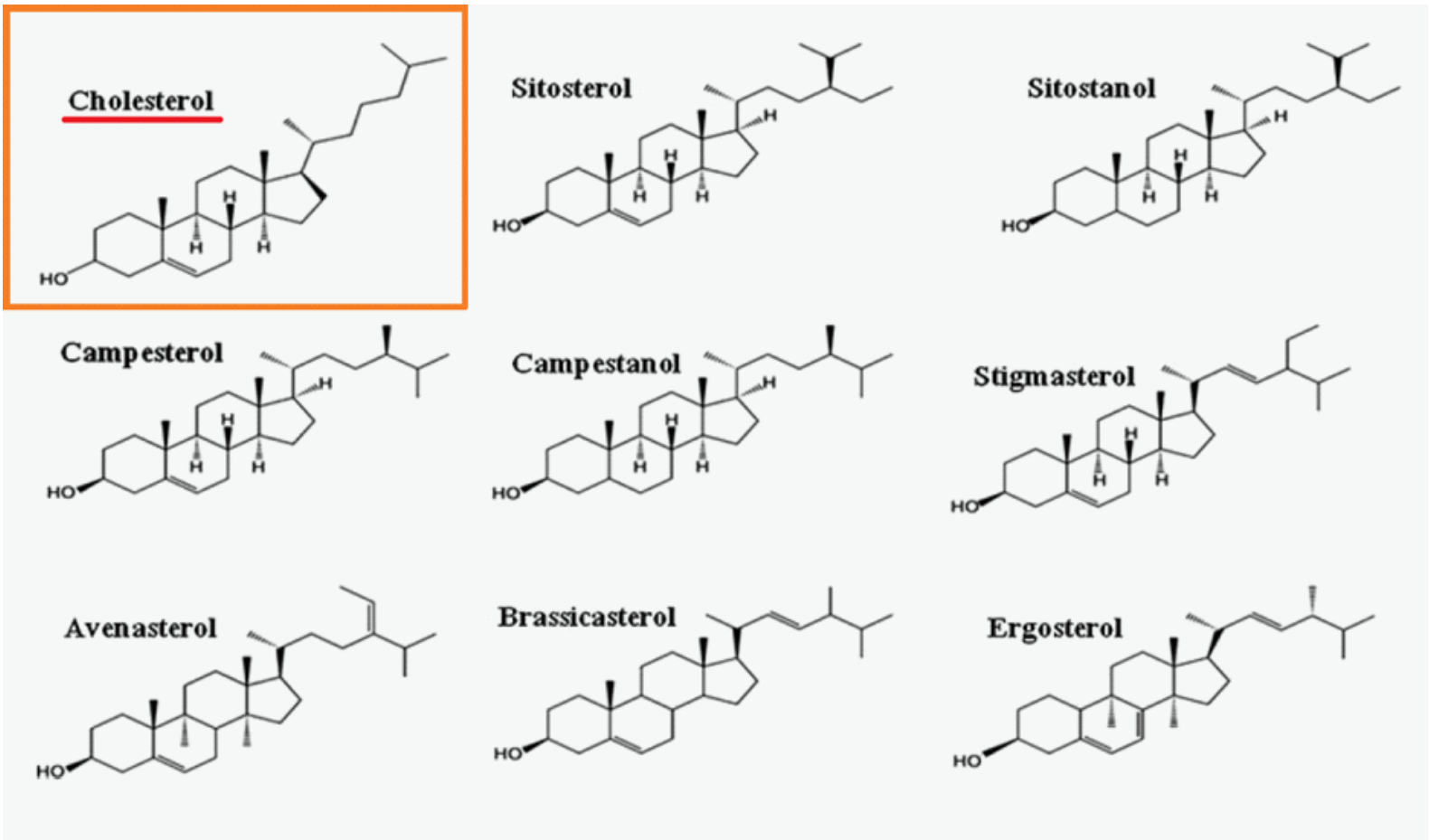
Formazione acroleina

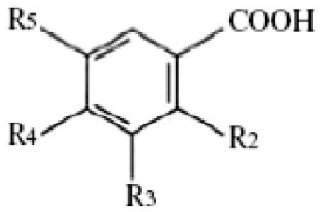


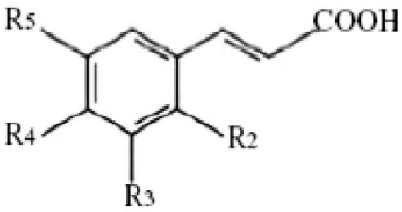


Dimerizzazione acidi grassi polinsaturi

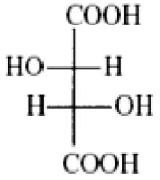

Animal sterol
HO
Cholesterol
Ergosterol
HO
Plant sterols
HO
Stigmasterol
HO
β-Sitosterol


Cholesterol
Sitosterol
Sitostanol
Campesterol
Campestanol
Stigmasterol
Avenasterol
Brassicasterol
Ergosterol
HO

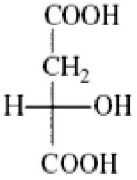




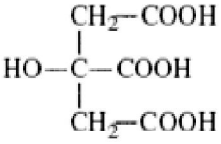
(1) Benzoic acids	R2	R3	R4	R5	(2) Cinnamic acids
p-Hydroxybenzoic acid	H	H	OH	H	*p*-Coumaric acid
Protocatechic acid	H	OH	OH	H	Caffeic acid
Vanillic acid	H	OCH_3	OH	H	Ferulic acid
Gallic acid	H	OH	OH	OH	
Syringic acid	H	OCH_3	OH	OCH_3	Sinapic acid
Salicylic acid	OH	H	H	H	
Gentisic acid	OH	H	H	OH	



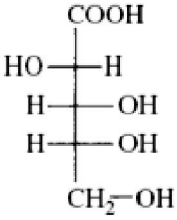
L(+)-Tartaric acid



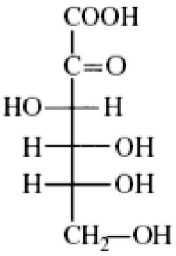
L(−)-Malic acid



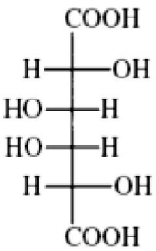
Citric acid



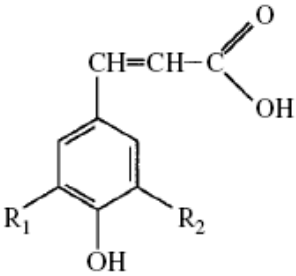
D-Gluconic acid



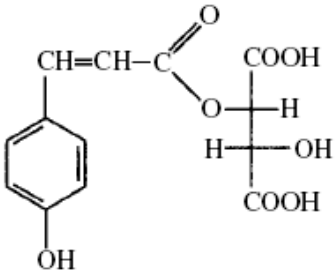
2-keto D-Gluconic acid



Mucic acid

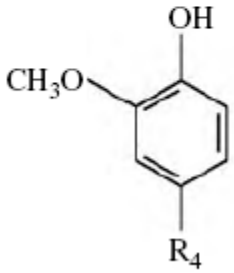


Coumaric acid
($R_1 = R_2 = H$)
Caffeic acid
($R_1 = OH$; $R_2 = H$)



Coumaryl tartaric acid

R_4	Name	Origin
$CH_2 - CH_3$	Ethyl phenol	Red wine
$CH = CH_2$	Vinyl phenol	White wine



R_4	Name	Origin
H	Gaiacol	Wood
CH_3	Methyl gaiacol	Wood
$CH_2 - CH_3$	Ethyl gaiacol	Red wine
$CH = CH_2$	Vinyl gaiacol	White wine
$CH_2 - CH_2 - CH_3$	Propyl gaiacol	Wood
$CH = CH - CH_3$	Allyl gaiacol	Wood

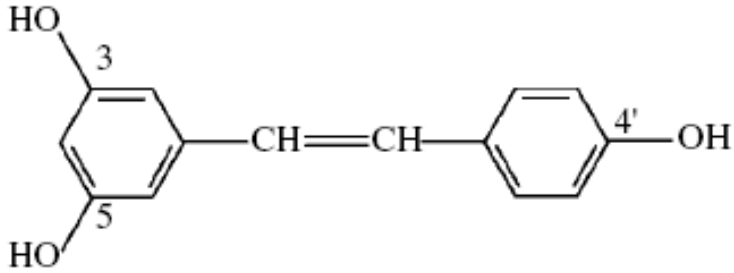
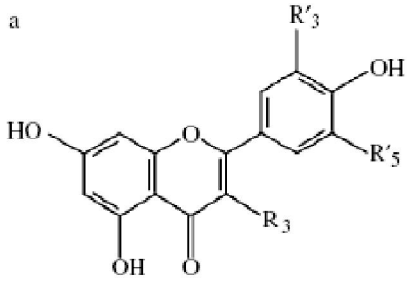


Fig. 6.6. Trihydroxy-3.5,4′-stilben (resveratrol)

flavonoidi

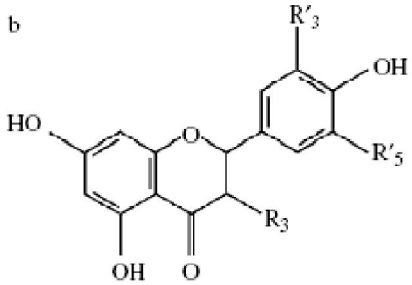
a



a) R_3 = OH

R′3	R′5	Name of aglycone
H	H	Kaempferol
OH	H	Quercetin
OH	OH	Myricetin

b

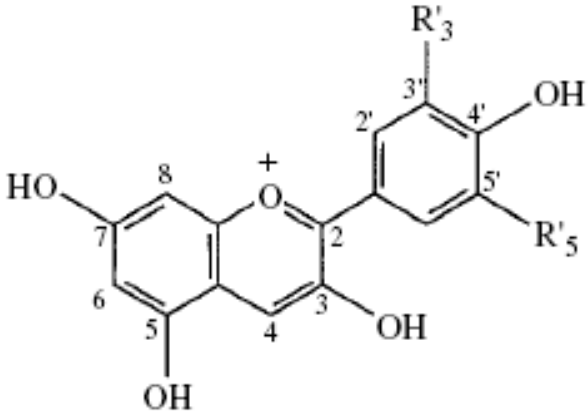


b) R_3 = OH

R′3	R′5	Name of aglycone
OH	H	Dihydroquercetin (taxifolin)

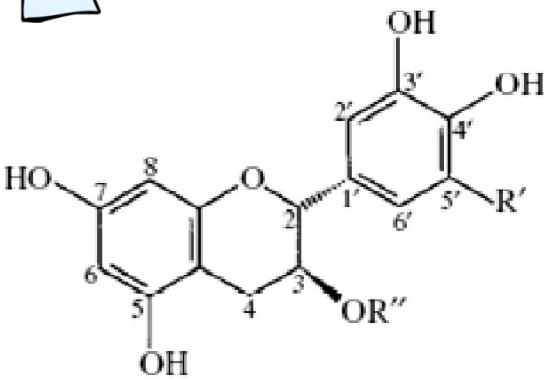
Flavonoids: a, flavone (R_3 = H) and flavonol (R_3 = OH); b, flavanone (R_3 = H) and flavanonol (R_3 = OH)

antocianine



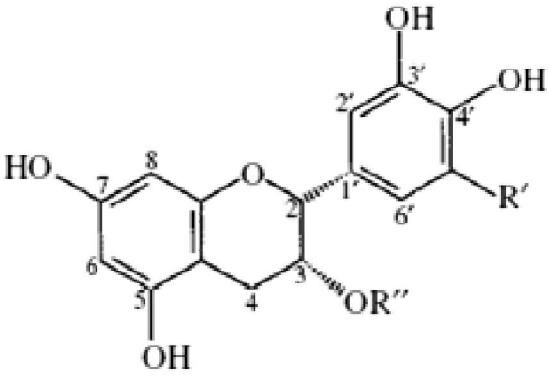
R'3	R'5	Name of aglycone
OH	H	Cyanidin
OCH_3	H	Peonidin
OH	OH	Delphinidin
OH	OCH_3	Petunidin
OCH_3	OCH_3	Malvidin

flavanoli



Catechin Series

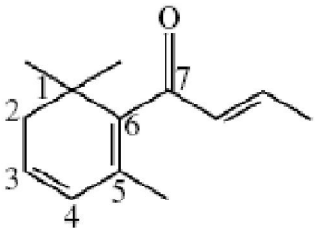
R′ = H, R″ = H: (+)-catechin (2R, 3S)
R′ = H, R″ = H: (–)-catechin (2S, 3R)
R′ = OH, R″ = H: gallocatochin
R′ = H, R″ = gallic acid: galloyl catechin (catechin-3-0-gallate)



Epicatechin Series

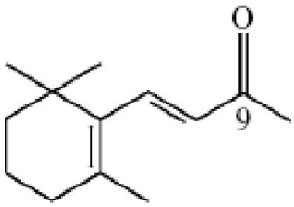
R′ = H, R″ = H: (+)-epicatechin (2S, 3S)
R′ = H, R″ = H: (–)-epicatechin (2R, 3R)
R′ = OH, R″ = H: epigallocatechin
R′ = H, R″ = gallic acid: galloyl epicatechin (epicatechin-3-0-gallate)

norisoprenoidi



E.g. β-damascenone

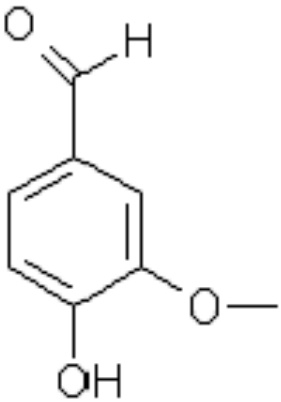
Damascone series



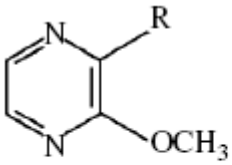
E.g. β-ionone

Ionone series

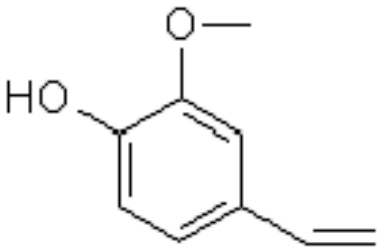
Vanillina



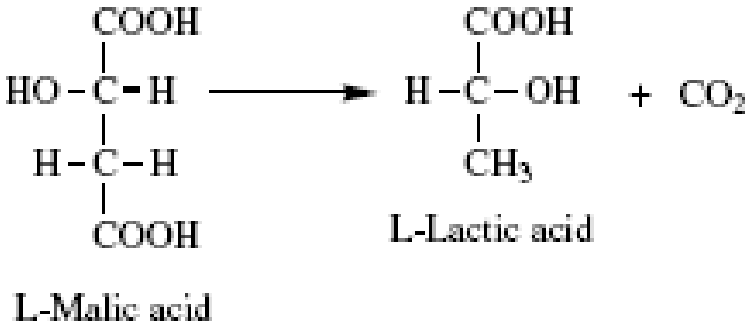
metossi pirazine



R: $CH_2CH(CH_3)_2$ — 2-Methoxy-3-isobutylpyrazine
R: $CH(CH_3)_2$ — 2-Methoxy-3-isopropylpyrazine
R: $CH(CH_3)CH_2CH_3$ — 2-Methoxy-3-*sec*-butylpyrazine



4-Vinyl guaiacolo



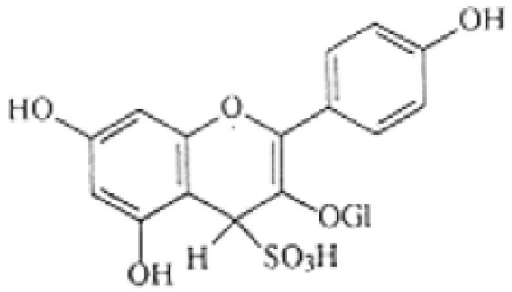
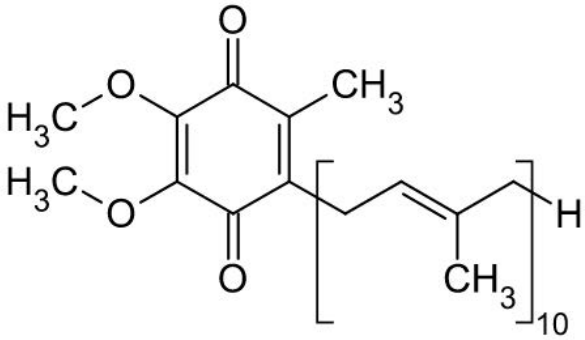
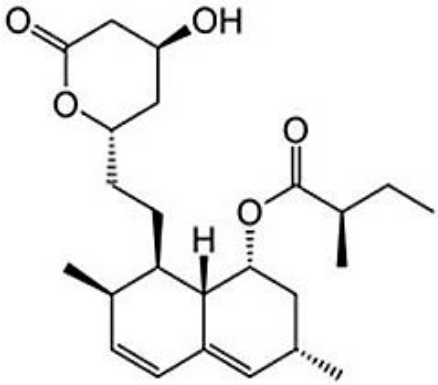


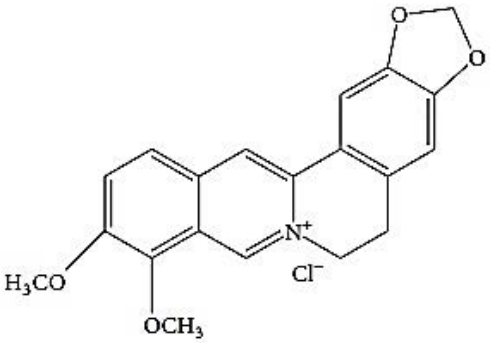
FIGURE 26
Colorless anthocyanin-sulfate
(-SO_2) complex.



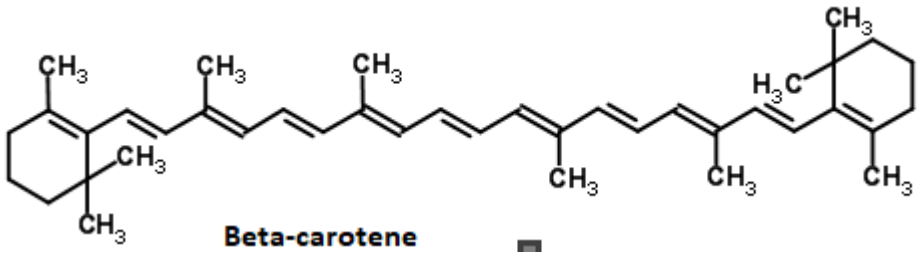
COENZIMA Q

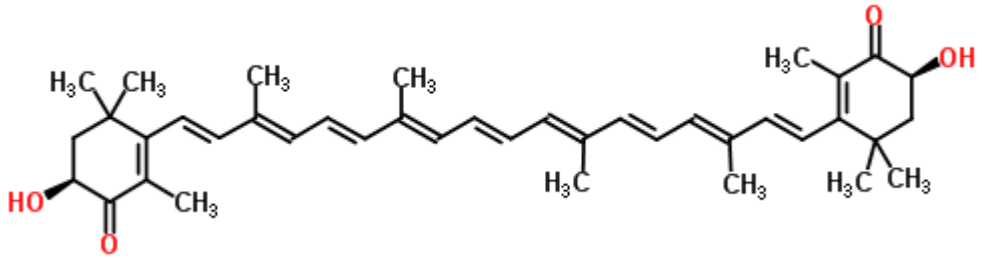


MONACOLINA K

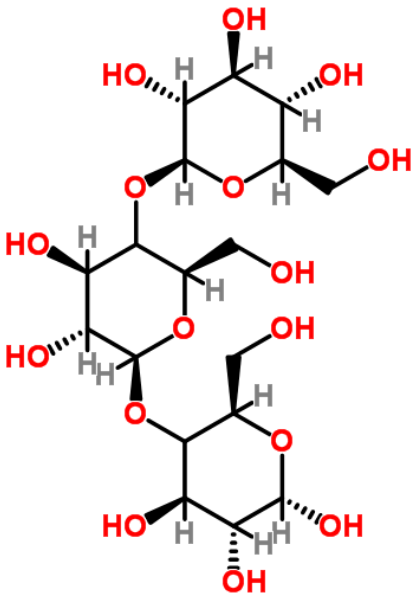


BERBERINA

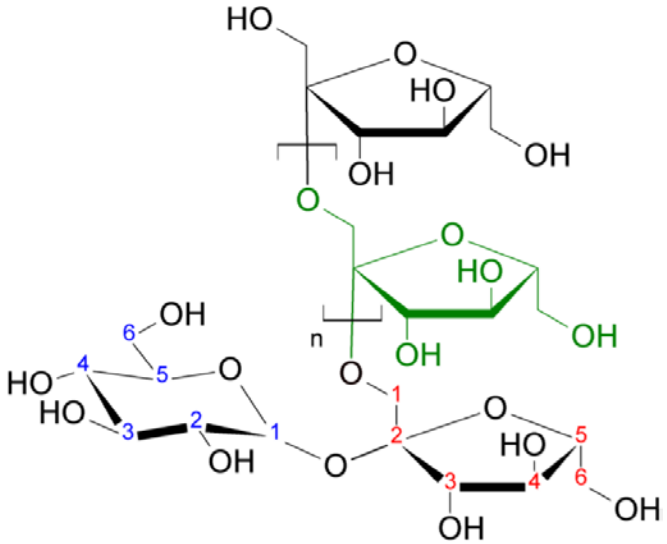




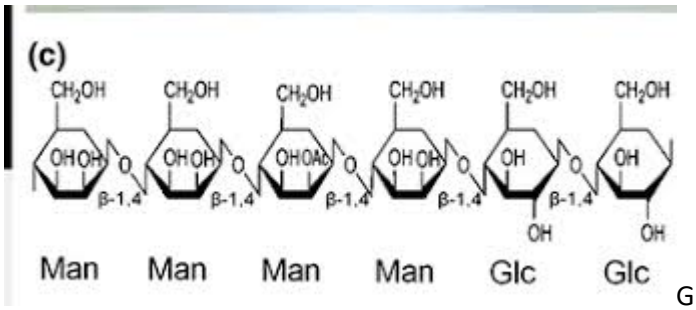
ASTAXANTINA



BETAGLUCANO

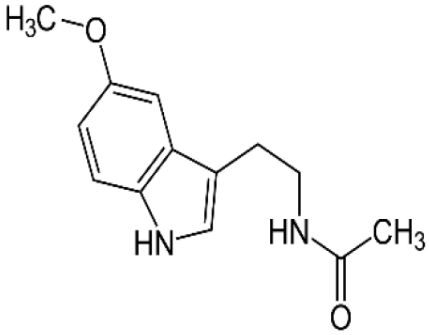


INULINA

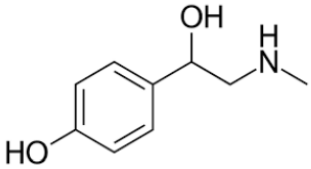


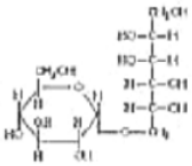
GLUCOMANNANo

MELATONINA

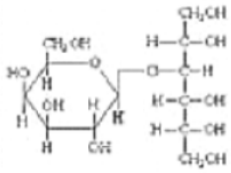


SINEFRINA

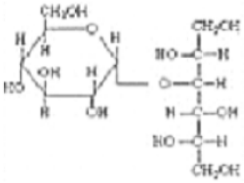




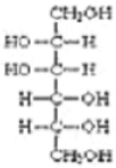
Isomalt E953



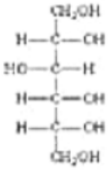
Lactitol E966



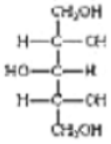
Maltitol E965



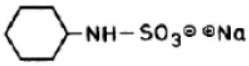
Mannitol E421



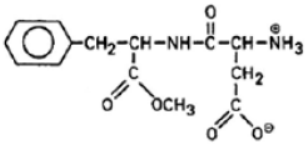
Sorbitol E420



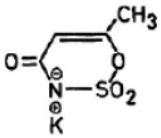
Xylitol E967



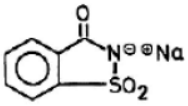
Sodium cyclamate (E952)



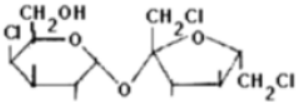
Aspartame (E951)



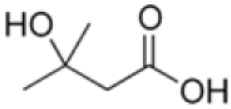
Acesulfame K (E950)



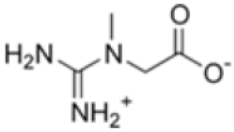
Saccharin sodium salt (E954)



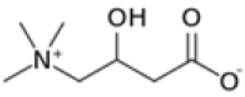
Sucralose (E955)



HMB



Creatina



Carnitina