

CHEMICKÉ VZORCE

Monosacharidy
Oligosacharidy

Aminokyseliny

Lipidy
Složky lipidů

Nukleové kyseliny
Složky nukleových kyselin

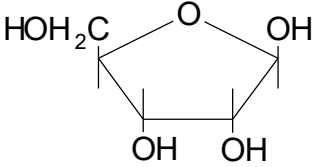
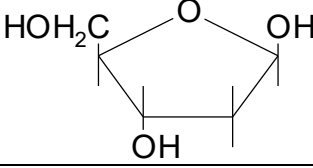
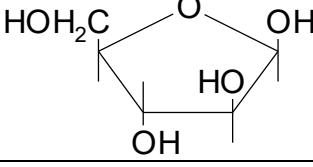
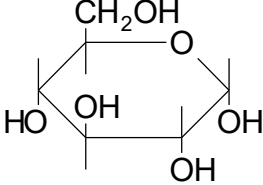
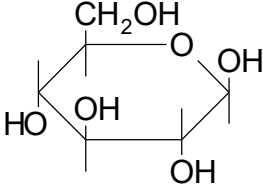
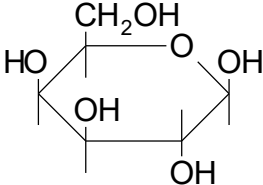
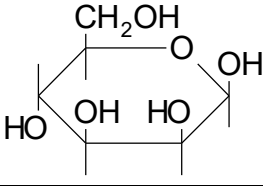
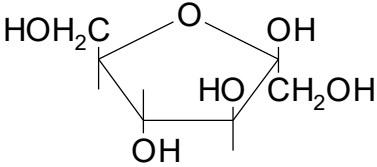
Karoteny
Xanthofyly
Chlorofyly
Chromatografie rostlinných barviv

Deriváty fenolu

Chromogenní substráty

Barevné reakce sacharidů
Barevné reakce aminokyselin a bílkovin

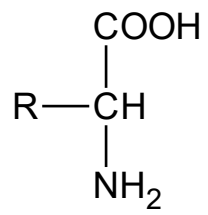
MONOSACHARIDY

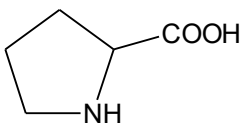
PENTOSY		
aldopentosey		
ribosa	β -D-ribofuranosa	
deoxyribosa	2-deoxy- β -D-ribofuranosa	
arabinsa	β -D-arabinofuranosa	
HEXOSY		
aldohexosey		
glukosa	α -D-glukopyranosa	
glukosa	β -D-glukopyranosa	
galaktosa	β -D-galaktopyranosa	
mannosa	β -D-mannopyranosa	
ketohexosey		
fruktosa	β -D-fruktofuranosa	

OLIGOSACHARIDY

DISACHARIDY		
redukující		
maltosa	4-O- α -D-glukopyranosyl-D-glukopyranosa	
cellobiosa	4-O- β -D-glukopyranosyl-D-glukopyranosa	
laktosa	4-O- β -D-galaktopyranosyl-D-glukopyranosa	
neredukující		
trehalosa	α -D-glukopyranosyl- α -D-glukopyranosid	
sacharosa	α -D-glukopyranosyl- β -D-fruktofuranosid	
TRISACHARIDY		
neredukující		
rafinosa	4-O- α -D-galaktopyranosyl- α -D-glukopyranosyl- β -D-fruktofuranosid	

AMINOKYSELINY

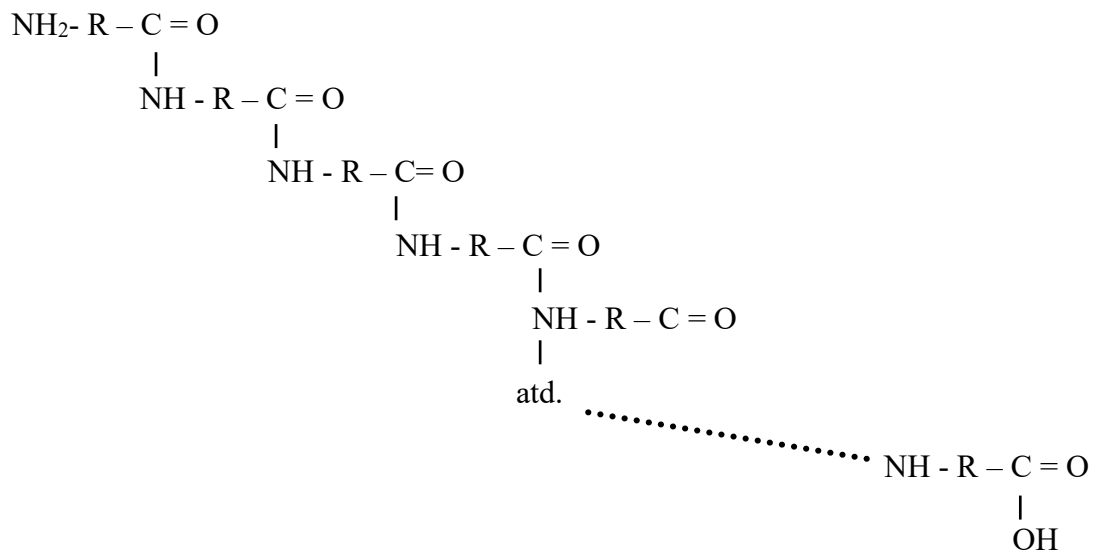


aminokyselina		R =
glycin	gly	H ———
alanin	ala	CH ₃ ———
valin	val	$ \begin{array}{c} \text{H}_3\text{C} \\ \diagdown \\ \text{CH} \text{ ———} \\ \diagup \\ \text{H}_3\text{C} \end{array} $
leucin	leu	$ \begin{array}{c} \text{H}_3\text{C} \\ \diagdown \\ \text{CH}-\text{CH}_2 \text{ ———} \\ \diagup \\ \text{H}_3\text{C} \end{array} $
isoleucin	ile	$ \begin{array}{c} \text{H}_3\text{C}-\text{CH}_2 \\ \diagdown \\ \text{CH} \text{ ———} \\ \diagup \\ \text{H}_3\text{C} \end{array} $
prolin	pro	

lysin	lys	
arginin	arg	
kyselina asparagová	asp	
kyselina glutamová	glu	
asparagin	asn	
glutamin	gln	
fenylalanin	phe	
tyrosin	tyr	
histidin	his	
tryptofan	trp	

serin	ser	HO-CH ₂ —
cystein	cys	HS-CH ₂ —
threonin	thr	$\begin{array}{c} \text{H}_3\text{C}-\text{CH}- \\ \\ \text{OH} \end{array}$
methionin	met	$\begin{array}{c} \text{H}_3\text{C}-\text{S}-\text{CH}_2-\text{CH}_2- \\ \\ \text{CH}_2 \end{array}$

primární struktura bílkovin:



LIPIDY

(jednoduché /neutrální/ lipidy)

monoacylglyceroly	1-monoacylglycerol	$\begin{array}{c} \text{R-CO-O-CH}_2 \\ \\ \text{HO-CH} \\ \\ \text{HO-CH}_2 \end{array}$
	2-monoacylglycerol	$\begin{array}{c} \text{HO-CH}_2 \\ \\ \text{R-CO-O-CH} \\ \\ \text{HO-CH}_2 \end{array}$
diacylglyceroly	1,2-diacylglycerol	$\begin{array}{c} \text{R-CO-O-CH}_2 \\ \\ \text{R-CO-O-CH} \\ \\ \text{HO-CH}_2 \end{array}$
	1,3-diacylglycerol	$\begin{array}{c} \text{R-CO-O-CH}_2 \\ \\ \text{HO-CH} \\ \\ \text{R-CO-O-CH}_2 \end{array}$
triacylglyceroly		$\begin{array}{c} \text{R-CO-O-CH}_2 \\ \\ \text{R-CO-O-CH} \\ \\ \text{R-CO-O-CH}_2 \end{array}$

R = alifatický řetězec (zbytek mastné kyseliny)

SLOŽKY LIPIDŮ

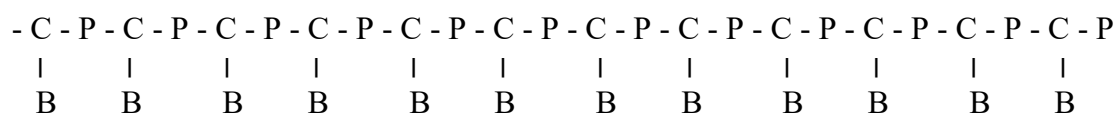
glycerol		$ \begin{array}{c} \text{HO} - \text{CH}_2 \\ \\ \text{HO} - \text{CH} \\ \\ \text{HO} - \text{CH}_2 \end{array} $
mastné kyseliny		
<i>nasyčené</i>		
palmitová	$\text{C}_{16}\text{H}_{32}\text{O}_2$	$\text{CH}_3-(\text{CH}_2)_{14}-\text{COOH}$
stearová	$\text{C}_{18}\text{H}_{36}\text{O}_2$	$\text{CH}_3-(\text{CH}_2)_{16}-\text{COOH}$
<i>nenasyčené</i>		
olejová	$\text{C}_{18}\text{H}_{34}\text{O}_2$ (18 : 1)	$\text{CH}_3-(\text{CH}_2)_7-\text{CH}=\text{CH}-$ $(\text{CH}_2)_7-\text{COOH}$
linolová	$\text{C}_{18}\text{H}_{32}\text{O}_2$ (18 : 2)	$\text{CH}_3-(\text{CH}_2)_4-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}-$ $(\text{CH}_2)_7-\text{COOH}$
linolenová	$\text{C}_{18}\text{H}_{30}\text{O}_2$ (18 : 3)	$\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}-$ $(\text{CH}_2)_7-\text{COOH}$
arachidonová	$\text{C}_{20}\text{H}_{32}\text{O}_2$ (20 : 4)	$\text{CH}_3-(\text{CH}_2)_4-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}-$ $(\text{CH}_2)_3-\text{COOH}$

NUKLEOVÉ KYSELINY

RNA - kyselina ribonukleová

DNA - kyselina deoxyribonukleová

primární struktura:

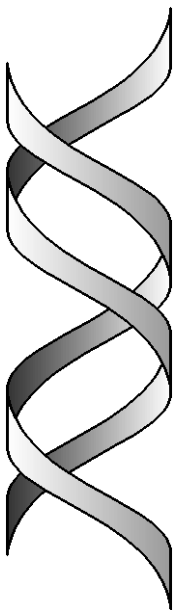


C = cukerný zbytek

P = fosfátový zbytek

B = báze

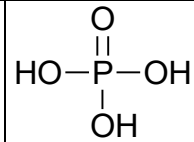
sekundární struktura DNA:



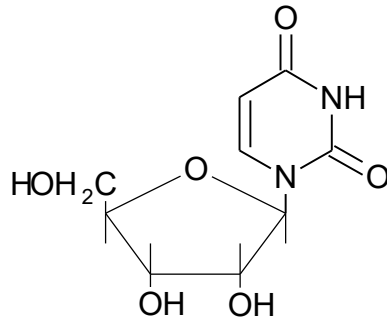
SLOŽKY NUKLEOVÝCH KYSELIN

CUKERNÉ SLOŽKY		
ribosa	RNA	
deoxyribosa	DNA	
BÁZE		
purinové		
adenin	RNA, DNA	
guanin	RNA, DNA	
pyrimidinové		
cytosin	RNA, DNA	
uracil	RNA	
thymin	DNA	

FOSFÁT

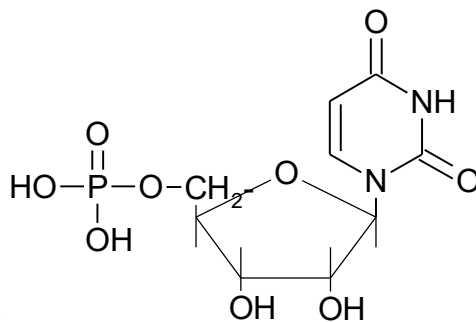


nukleosid = cukr + báze

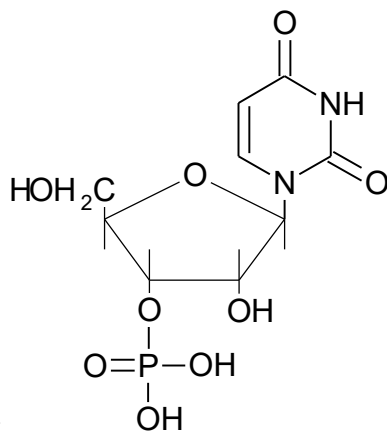


příklad: uridin

nukleotid = cukr + báze + fosfátový zbytek



příklad: uridin-5'-fosfát

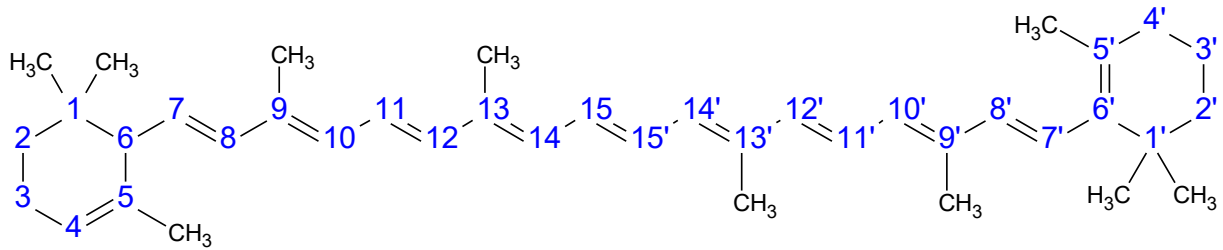


příklad: uridin-3'-fosfát

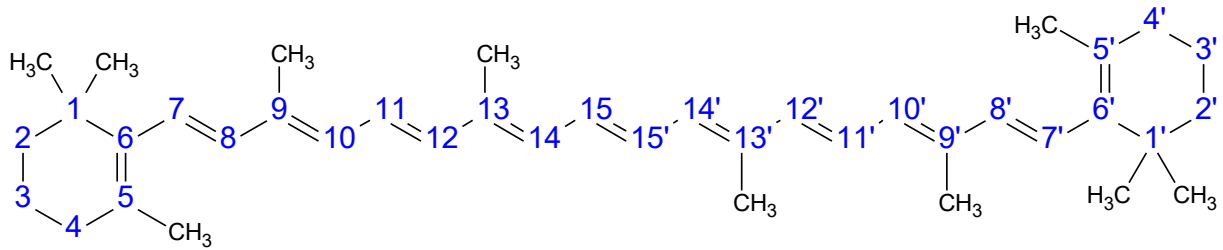
(NA = polynukleotid)

KAROTENY

α -karoten

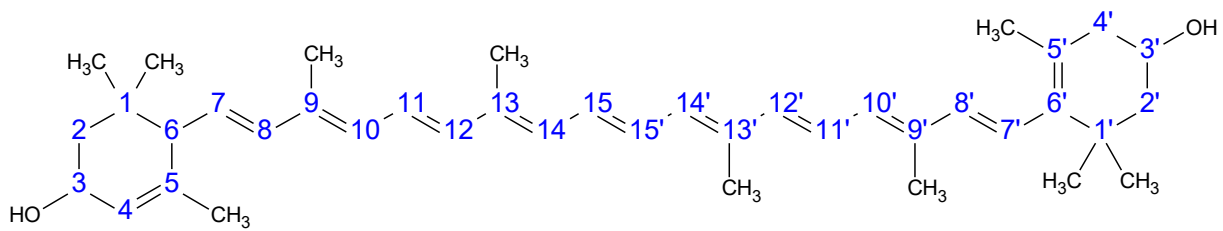


β -karoten



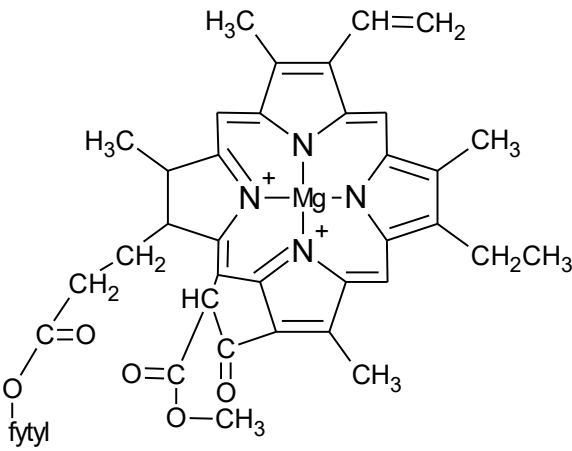
XANTHOFYLY

lutein (3,3'-dihydroxy- α -karoten)

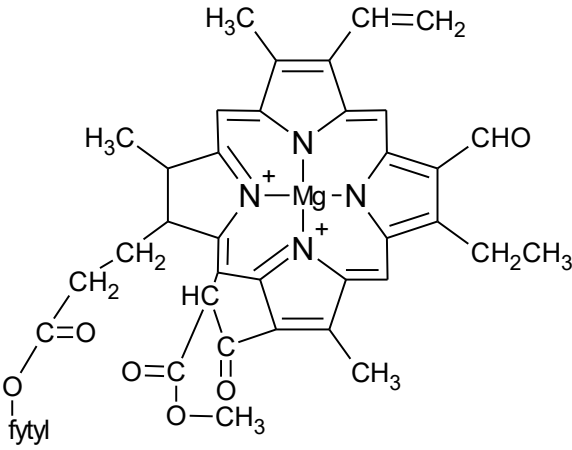


CHLOROFYLY

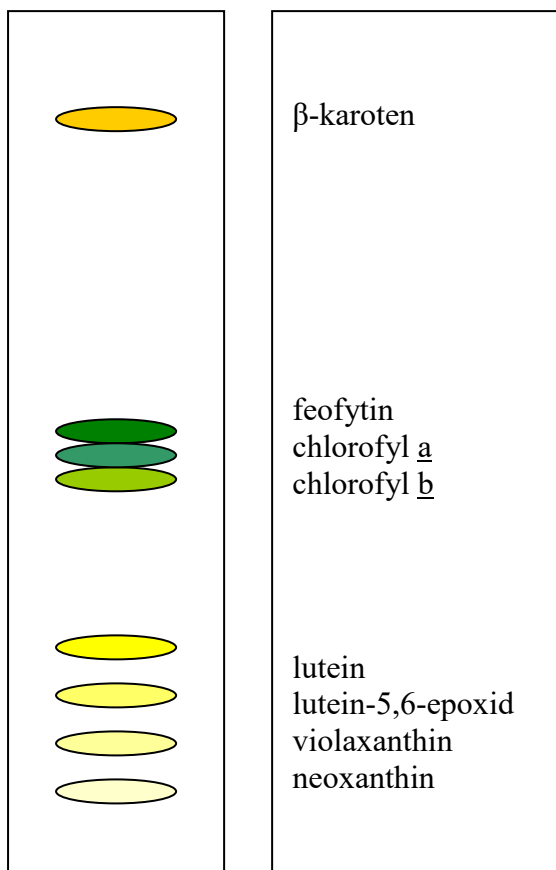
chlorofyl a



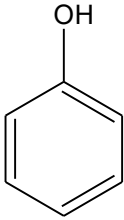
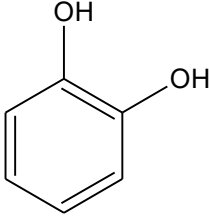
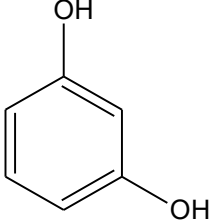
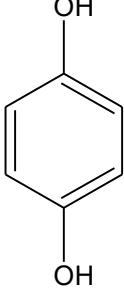
chlorofyl b

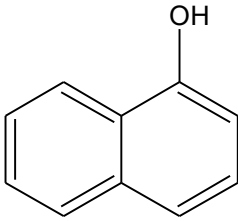
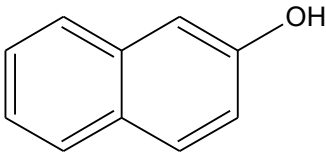
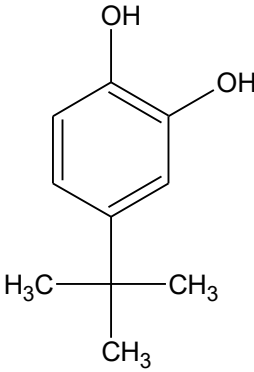


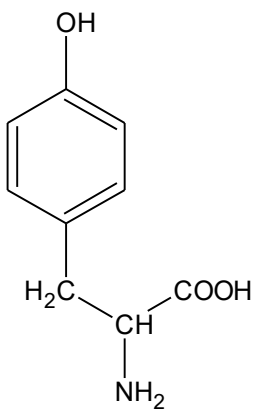
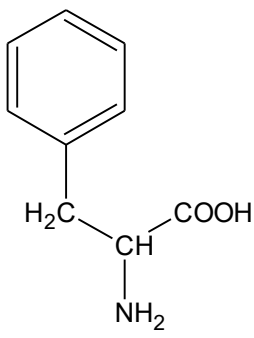
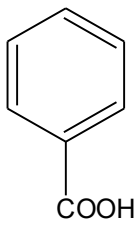
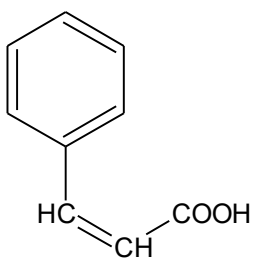
Chromatografie rostlinných barviv



DERIVÁTY FENOLU

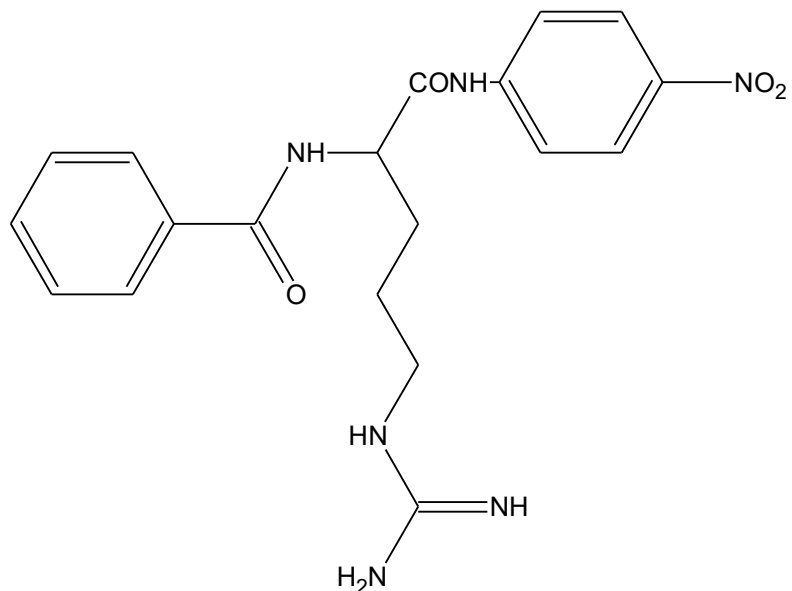
fenol	hydroxybenzen	
pyrokatechol	1,2-dihydroxybenzen	
resorcin	1,3-dihydroxybenzen	
hydrochinon	1,4-dihydroxybenzen	

1-naftol		 <chem>Oc1ccc2ccccc12</chem>
2-naftol		 <chem>Oc1ccc2ccccc12</chem>
4-terciární butylkatechol		 <chem>CC(C)(C)c1ccc(O)c(O)c1</chem>

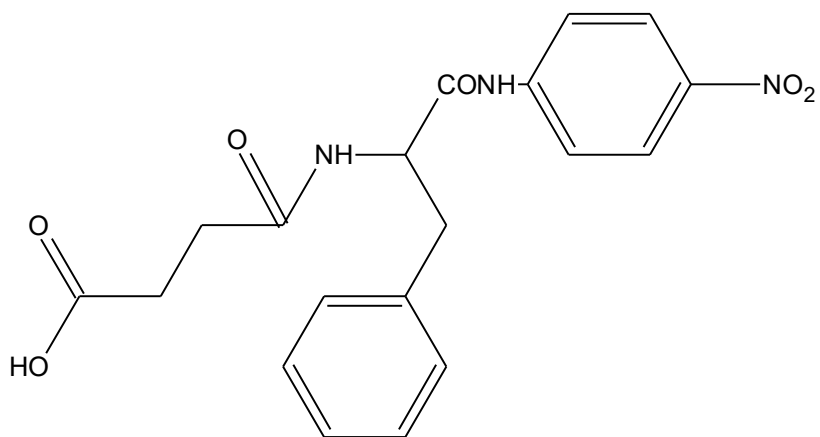
tyrosin		
fenylalanin		
kyselina benzoová		
kyselina skořicová	kyselina β-fenylakrylová	

CHROMOGENNÍ SUBSTRÁTY

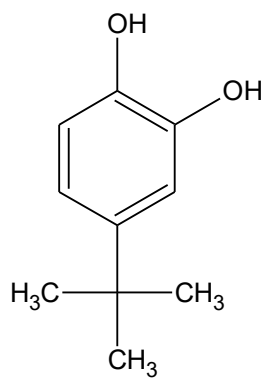
N α -benzoyl-D,L-arginin-p-nitroanilid (BAPNA)



N-sukcinyl-L-fenylalanin-p-nitroanilid (SPPNA)

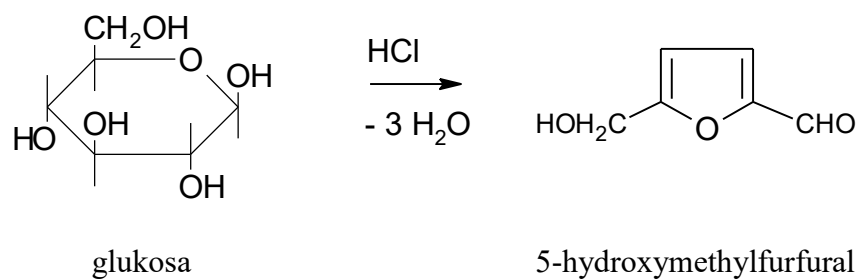
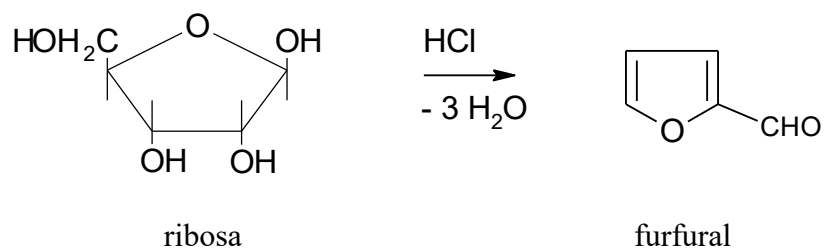


4-terciární butylkatechol (TBC)

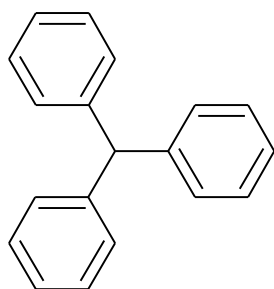


BAREVNÉ REAKCE SACHARIDŮ

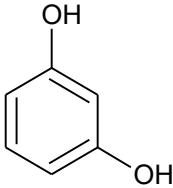
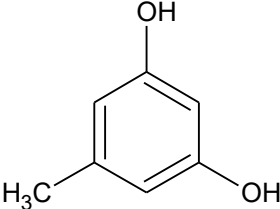
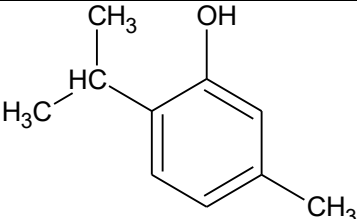
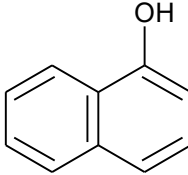
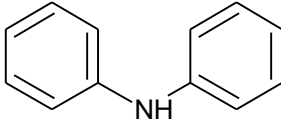
Reakce založené na tvorbě furfuralu a jeho derivátů



furfural
5-hydroxymethylfurfural + aromatické fenoly, aromatické aminy → analoga
trifenylmethanových
barviv

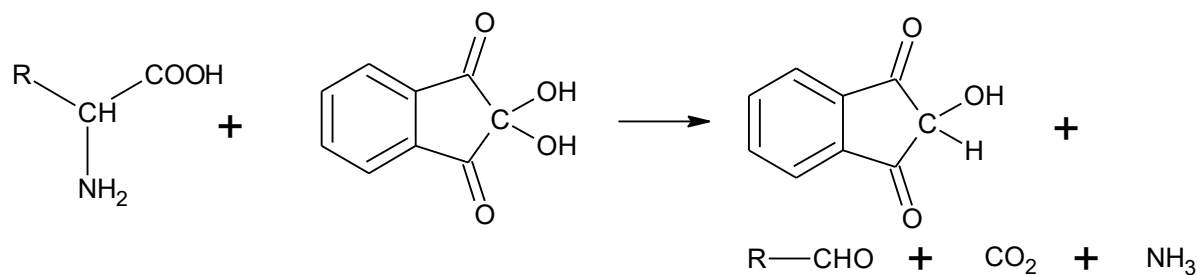


trifenylmethan

resorcin	1,3-dihydroxybenzen	
orcin	5-methyl-1,3-dihydroxybenzen	
thymol	1-hydroxy-3-methyl-6-isopropylbenzen	
1-naftol		
difenylamin		

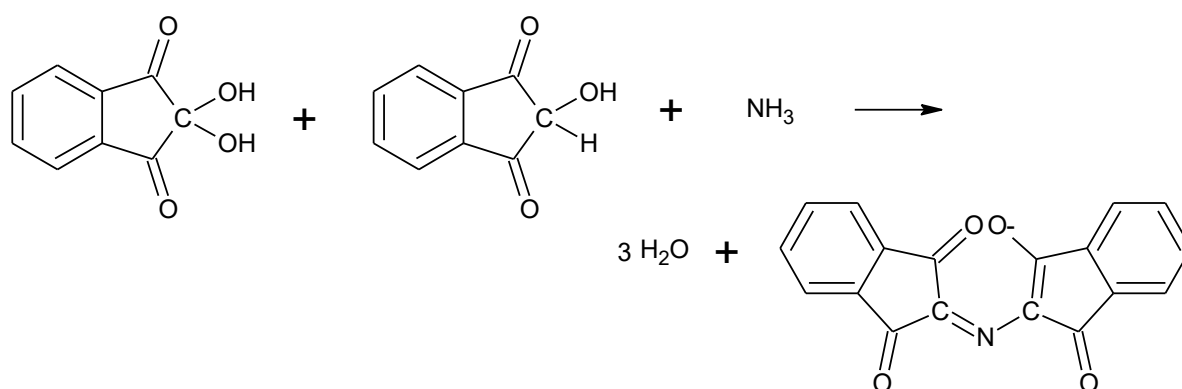
BAREVNÉ REAKCE AMINOKYSELIN A BÍLKOVIN

ninhydrinová reakce

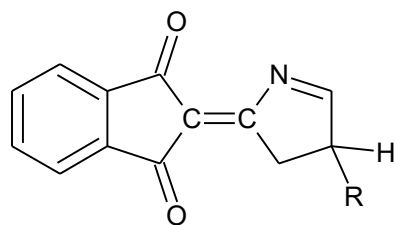


aminokyselina

ninhydrin

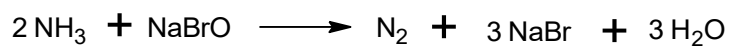
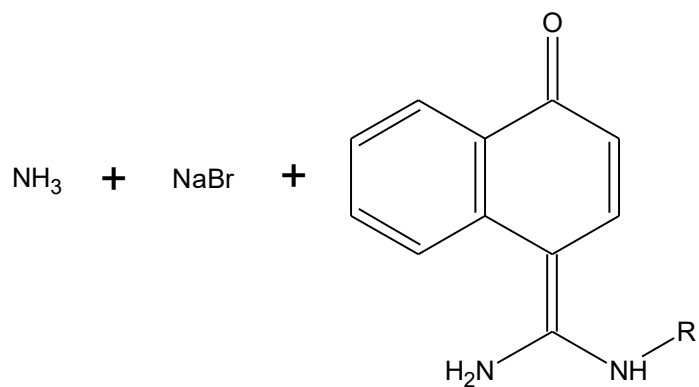
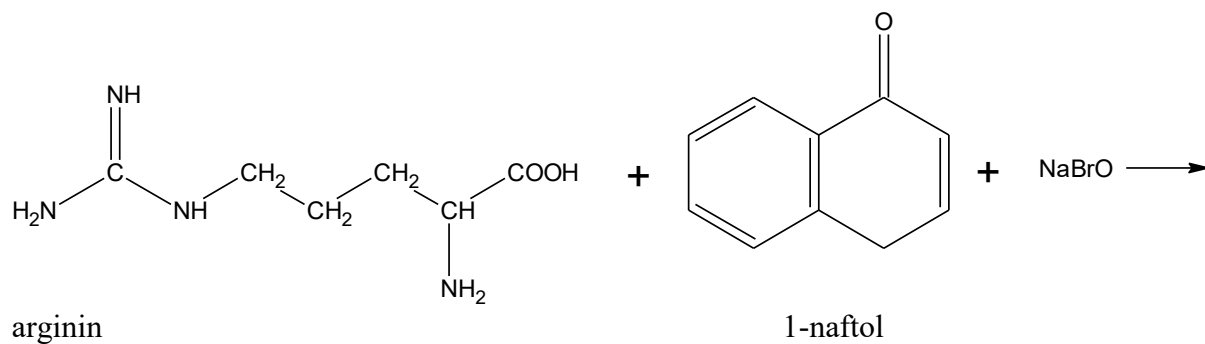


reakční produkt prolinu (hydroxyprolinu):

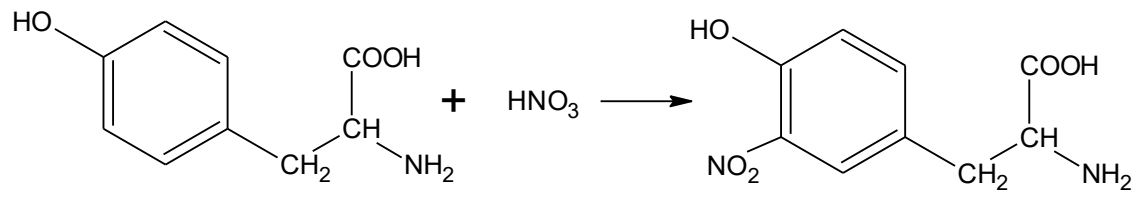


R = -H, -OH

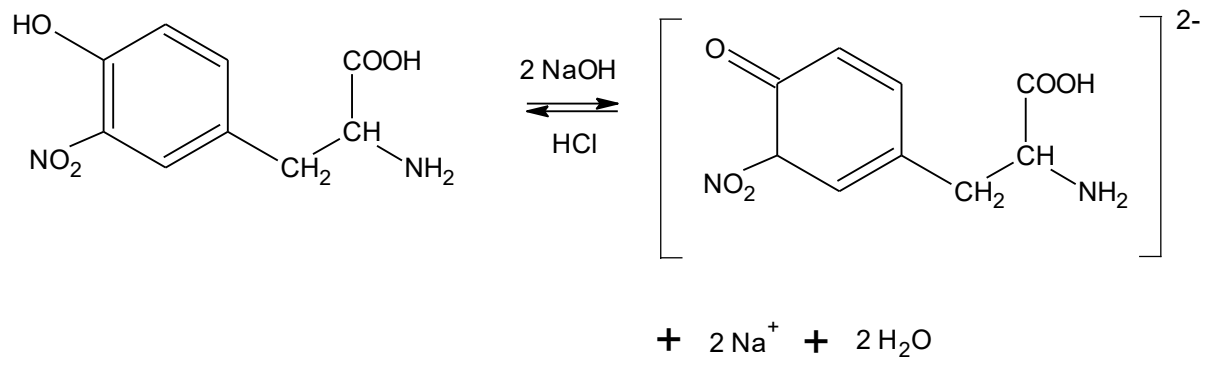
Sakaguchiho reakce



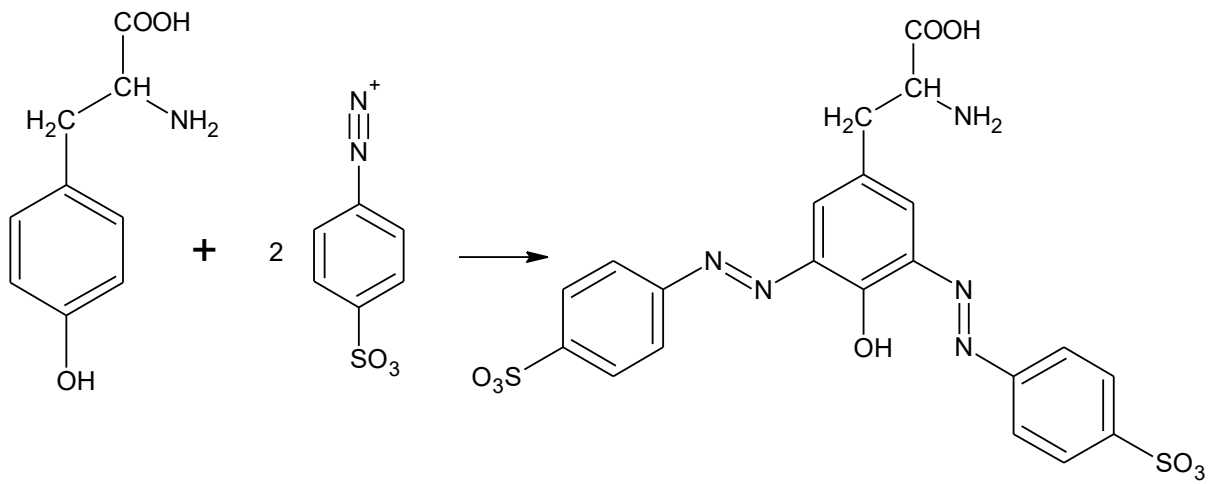
xanthoproteinová reakce



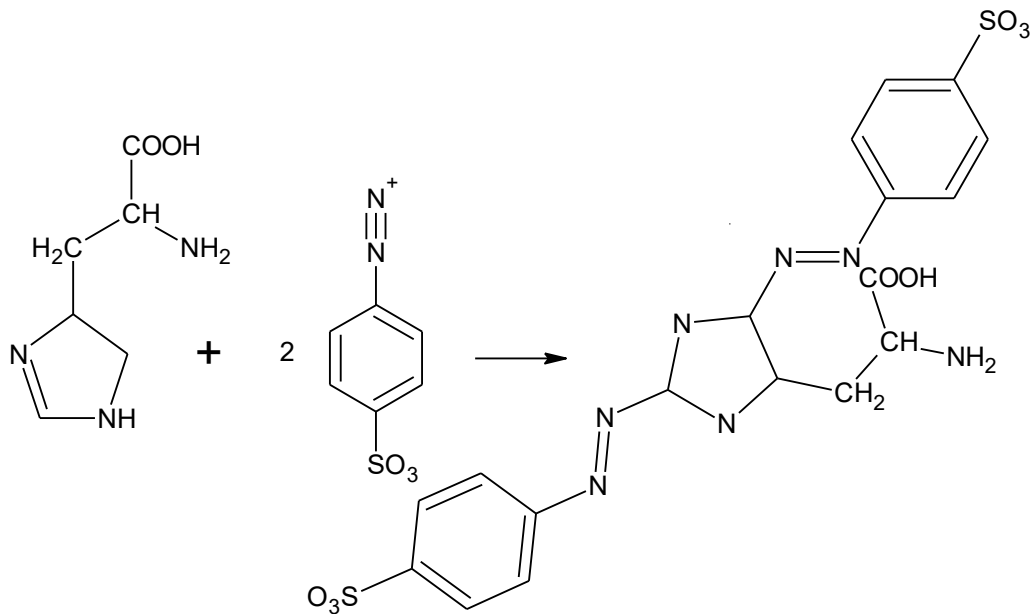
tyrosin



Paulyho reakce

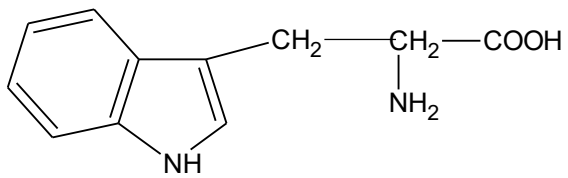
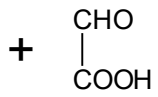
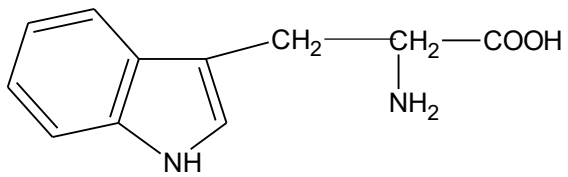


tyrosin

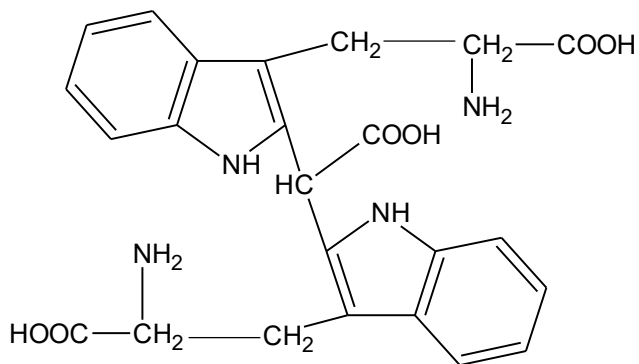
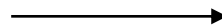


histidin

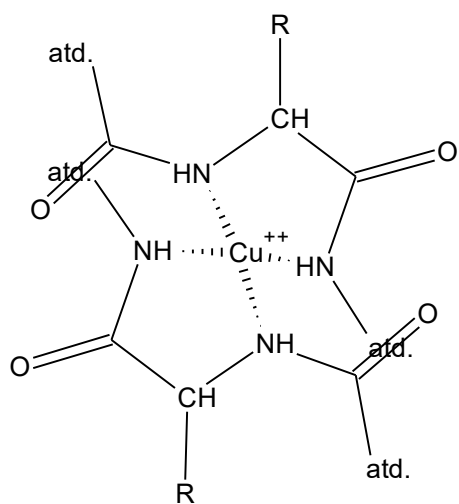
Adamkiewiczova reakce



tryptofan



biuretová reakce



biuret

