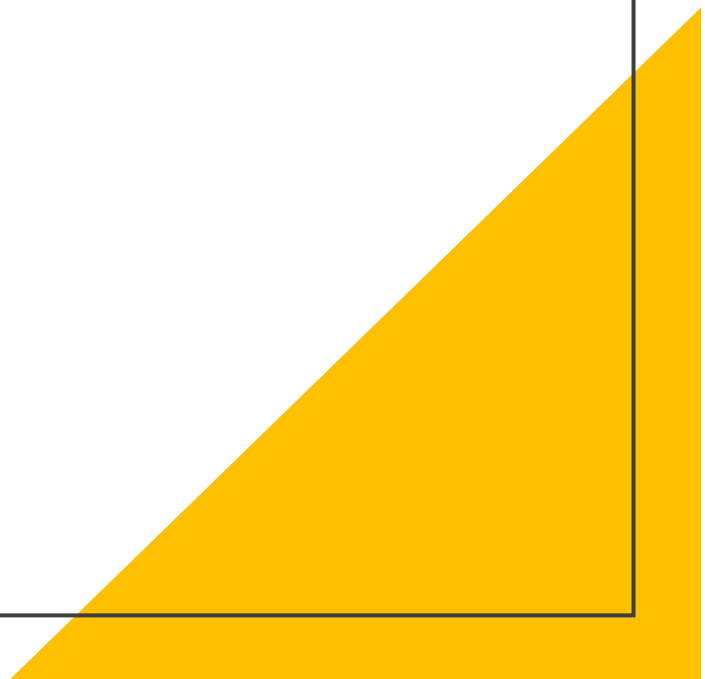
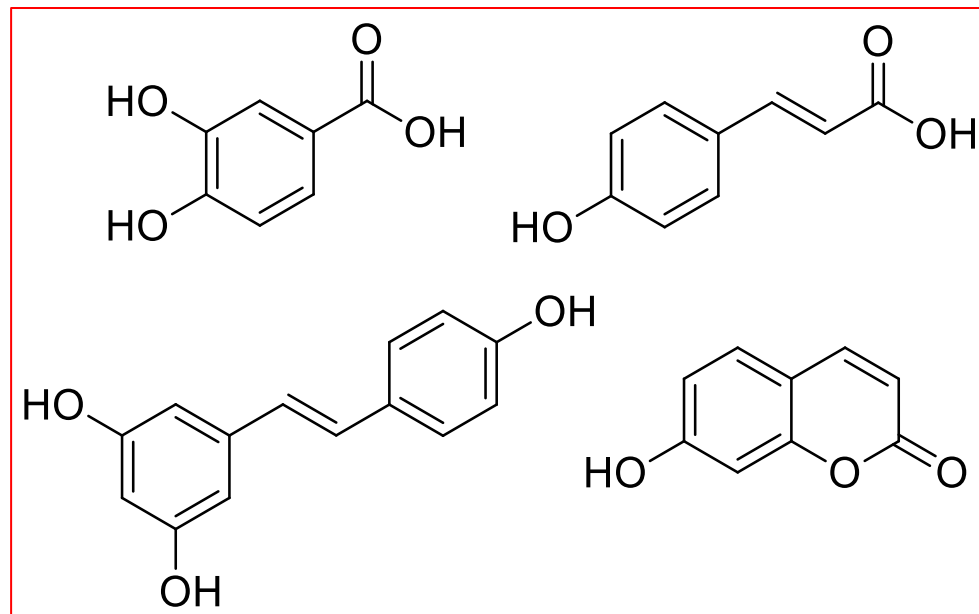
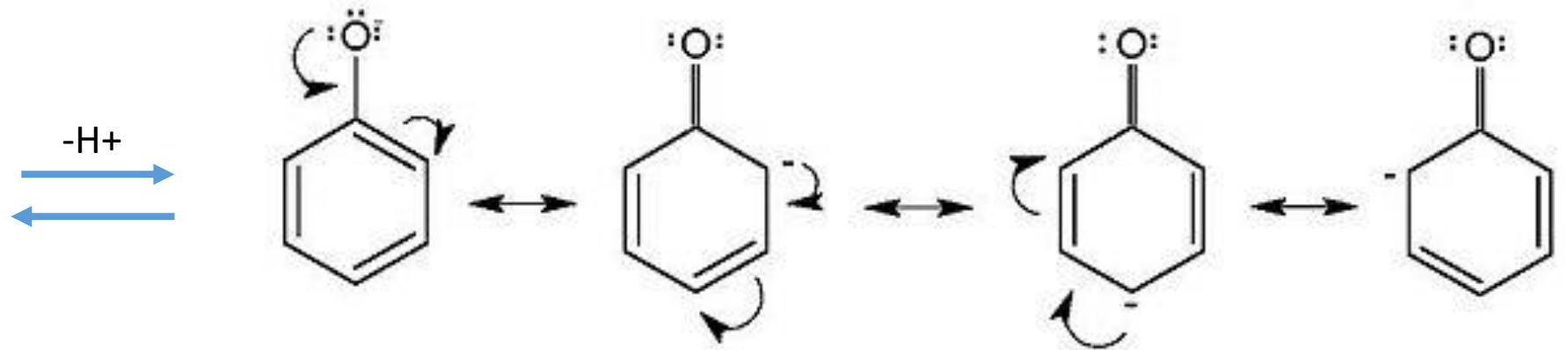
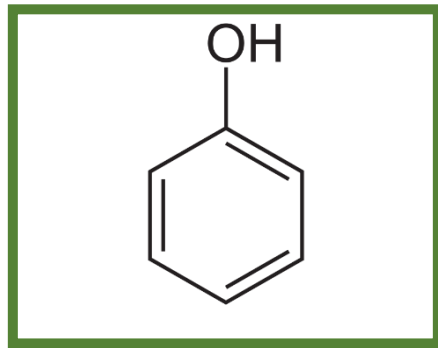


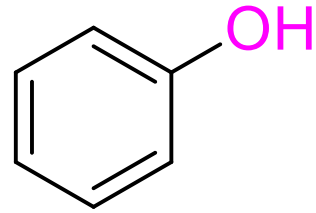
FENOLI



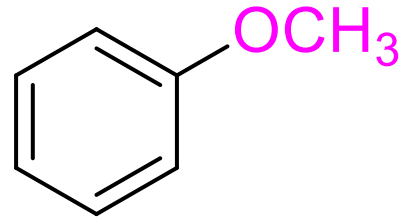
Classificazione chimica



GRUPPO FENOLICO **LIBERO**

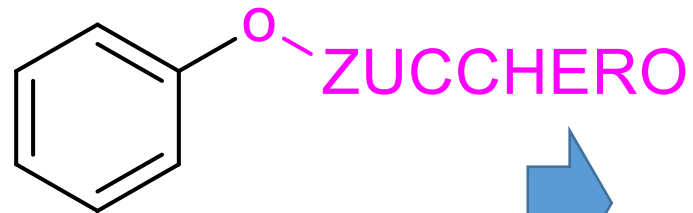


GRUPPO FENOLICO **METILATO**



Aumento della stabilità

GRUPPO FENOLICO **GLICOSILATO**

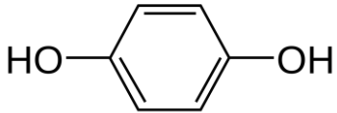


Aumento della solubilità

CLASSIFICAZIONE DEI COMPOSTI FENOLICI NELLE PIANTE

❖ CRITERIO: NUMERO DI ATOMI DI CARBONIO

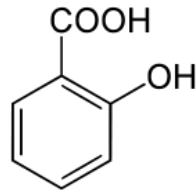
C6



IDROCHINONE

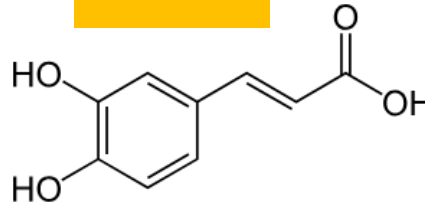
(l'aglicone dell'ARBUTINA)

C6C1



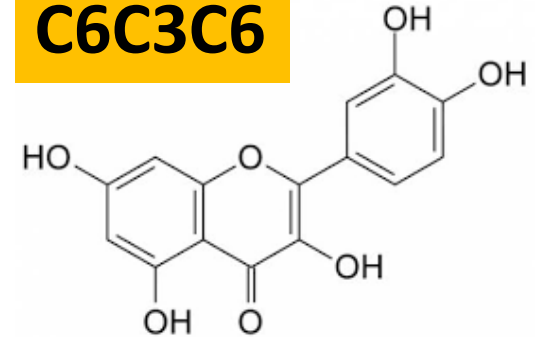
ACIDO SALICILICO

C6C3



ACIDO CAFFEICO

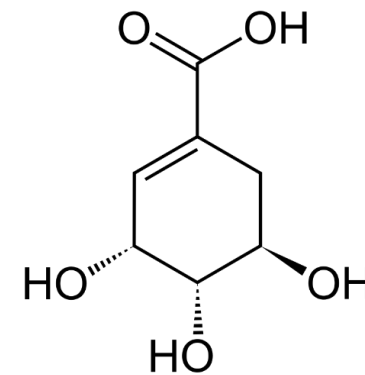
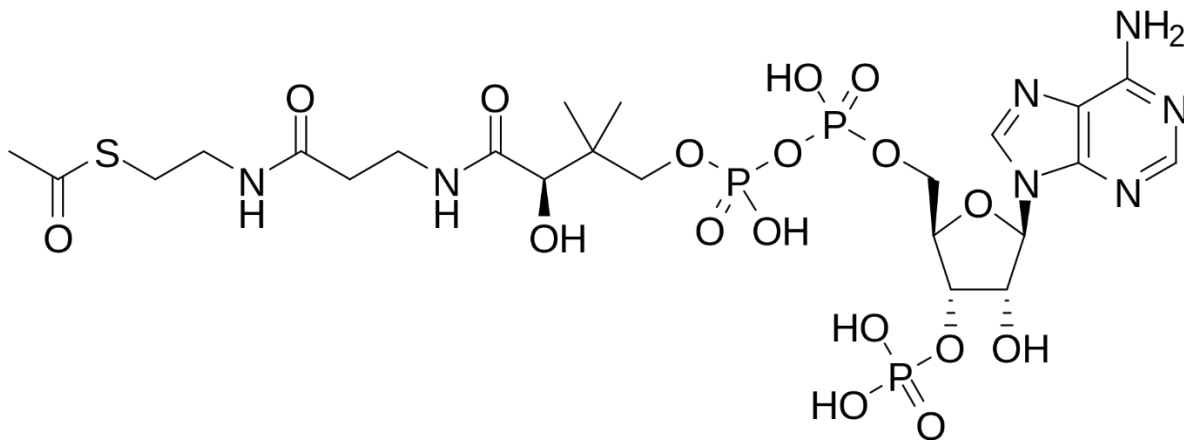
C6C3C6



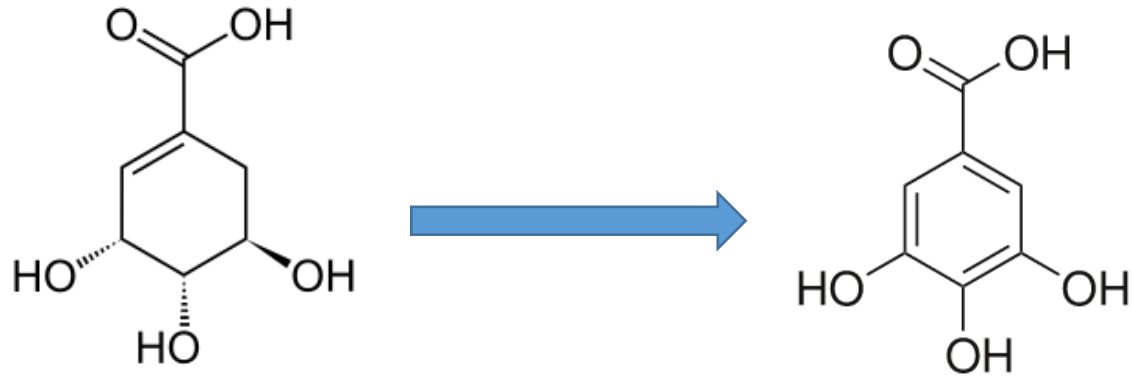
QUERCETINA

❖ CRITERIO BIOSINTETICO di classificazione dei fenoli

- **VIA DELL' ACIDO SCICHIMICO**
- **VIA DELL' ACETILCOENZIMA A**
- **BIOSINTESI MISTA**



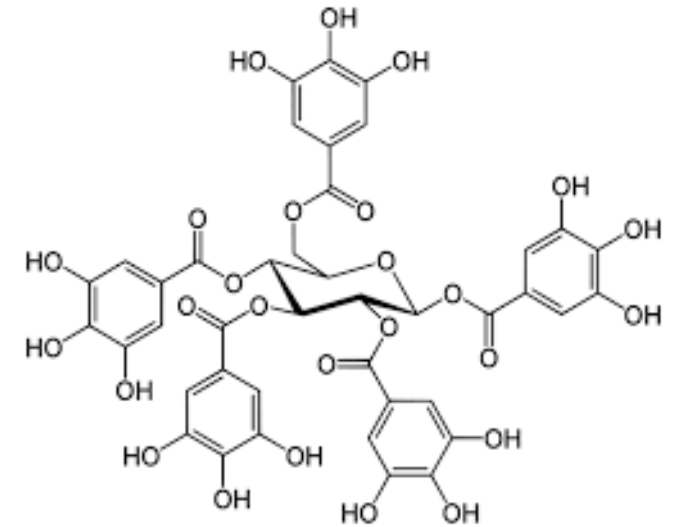
Via dell'acido scichimico: formazione dell'acido gallico



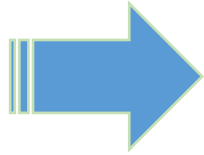
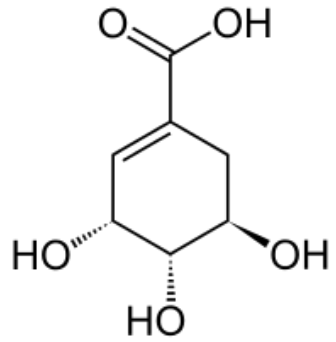
Acido gallico e derivati

Prime forme di difesa chimica,
sebbene ancora di tipo aspecifico

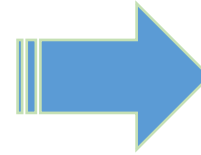
Cammino evolutivo



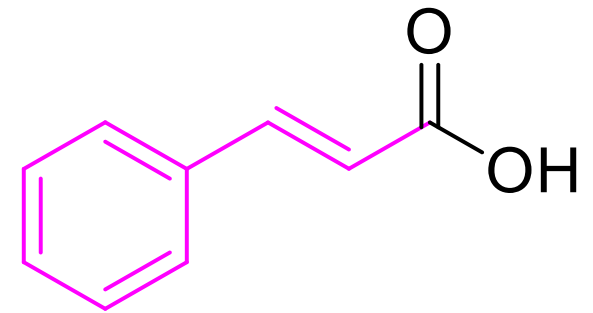
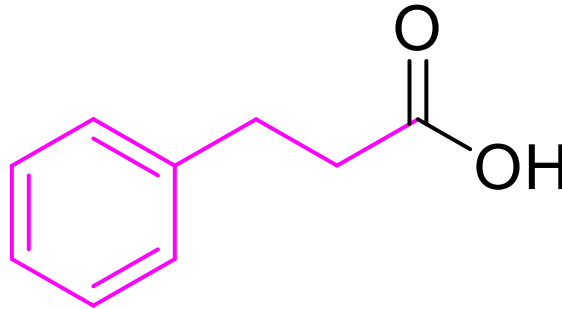
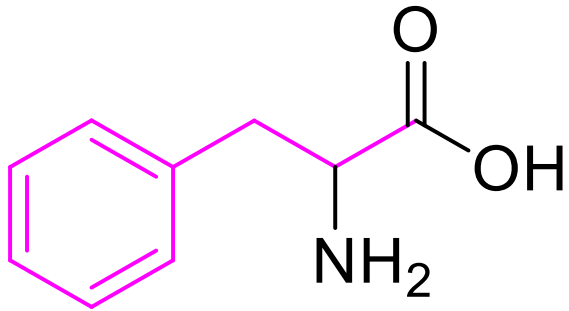
Via dell'acido scichimico: formazione dei fenilpropanoidi



AA AROMATICI

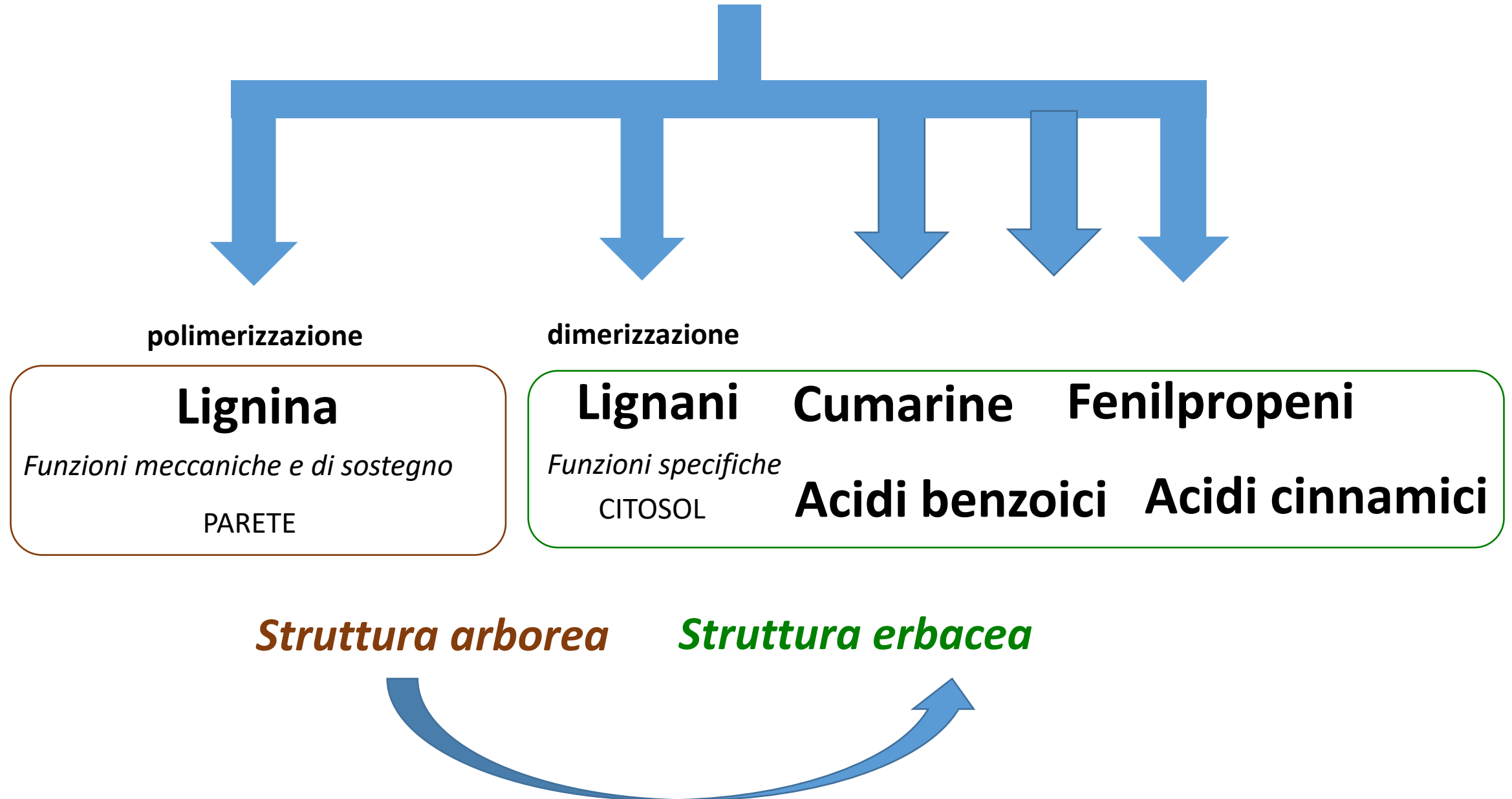


FENILPROPANOIDI



C6C3

utilizzo dei fenilpropanoidi (C6C3)



FENILPROPANOIDI

1. FENILPROPENI

2. CUMARINE

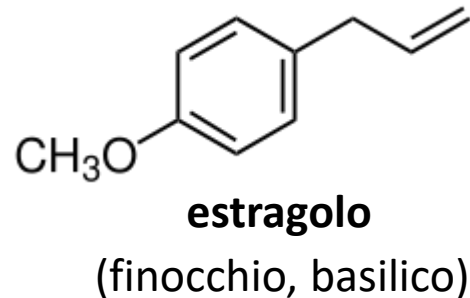
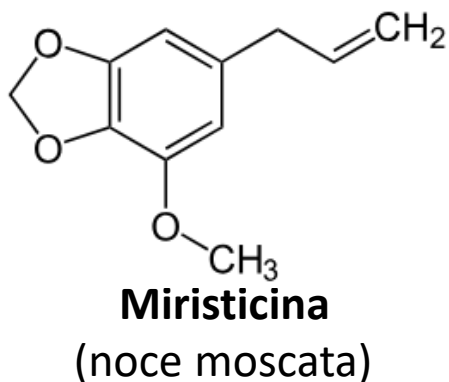
3. ACIDI BENZOICI

4. ACIDI CINNAMICI E DERIVATI

5. LIGNANI

6. LIGNINA

FENILPROPENI



Toxicity of Nutmeg (Myristicin): A Review

Rahman N.A.A[#], Fazilah A and Effarizah M.E

Food Technology Division, School of Industrial Technology, Universiti Sains Malaysia (USM), 11800 USM, Penang, Malaysia
E-mail: [#]fazilah@usm.my

Abstract— In this paper a detailed review of myristicin is reported. Numerous literatures report that myristicin is responsible for hallucinogenic effects, which induced by the consumption of nutmeg due to its metabolism structure of 3-methoxy-4,5-methylenedioxyamphetamine (MMDA). Minimum dosage of nutmeg that can cause psychogenic effect is 5 g (ground nutmeg) with 1 to 2 mg myristicin content and this dosage is considered as 'toxic dose'. At higher dosage of myristicin death may occur. Additionally, **Myristicin poisoning can lead to many health problems that related to brain problem.** Those symptoms usually occur 3 to 6 hours after ingestion of myristicin or foodstuffs containing it, and effects may persist up to 72 hours. California Poison Control System (CPCS) electronic database 72.3% exposures between 1997 and 2008 that were intentional for recreational purposes (between ages 13 and 20 years old). The remaining considered as unintentionally exposed. Between 1998 to 2008, Texas Poison Center Network (TPCN) received seventeen nutmeg poisoning and 64.7% from that cases involved abuse, and the rest was unintentional exposure. Most of the nutmeg exposures were via the oral route and minor cases of nutmeg exposure occurred through insufflated nutmeg, unintentional dermal and ocular exposures. Nutmeg also has been misused by mixing it with other drugs in order to get "high". For intoxication cases, treatments like decontamination (cathartic, charcoal, dilution, fresh air, IV fluids) and supportive care (benzodiazepines) will be provided to reduce the effects.

L'EFSA ricerca pareri sull'estragolo nei preparati a base di semi di finocchio

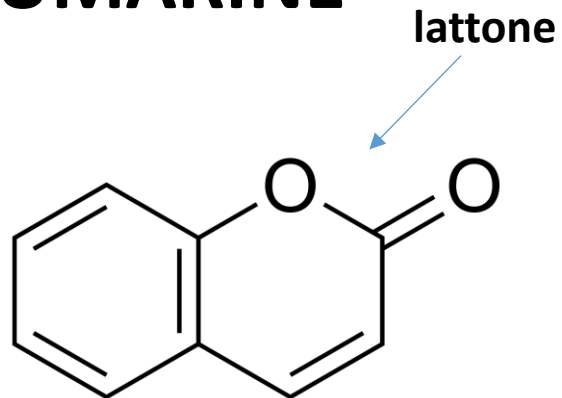
Pubblicato il: 16 Luglio 2025 | 2 minuti di lettura

Share:    

L'EFSA invita a presentare osservazioni sulla sua bozza di valutazione dei rischi per la salute connessi all'estragolo nei preparati a base di semi di finocchio, tisane incluse.



CUMARINE



Famiglia dei **benzopironi**

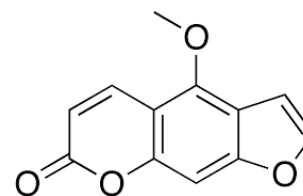
Famiglia delle Apiaceae (Ombrellifere)



Famiglia Rutaceae



Azione flebotonica sul microcircolo: è in grado di aumentare il tono venoso e ha notevoli proprietà antiedemigene, ovvero riduce la quantità di liquidi nei tessuti. È



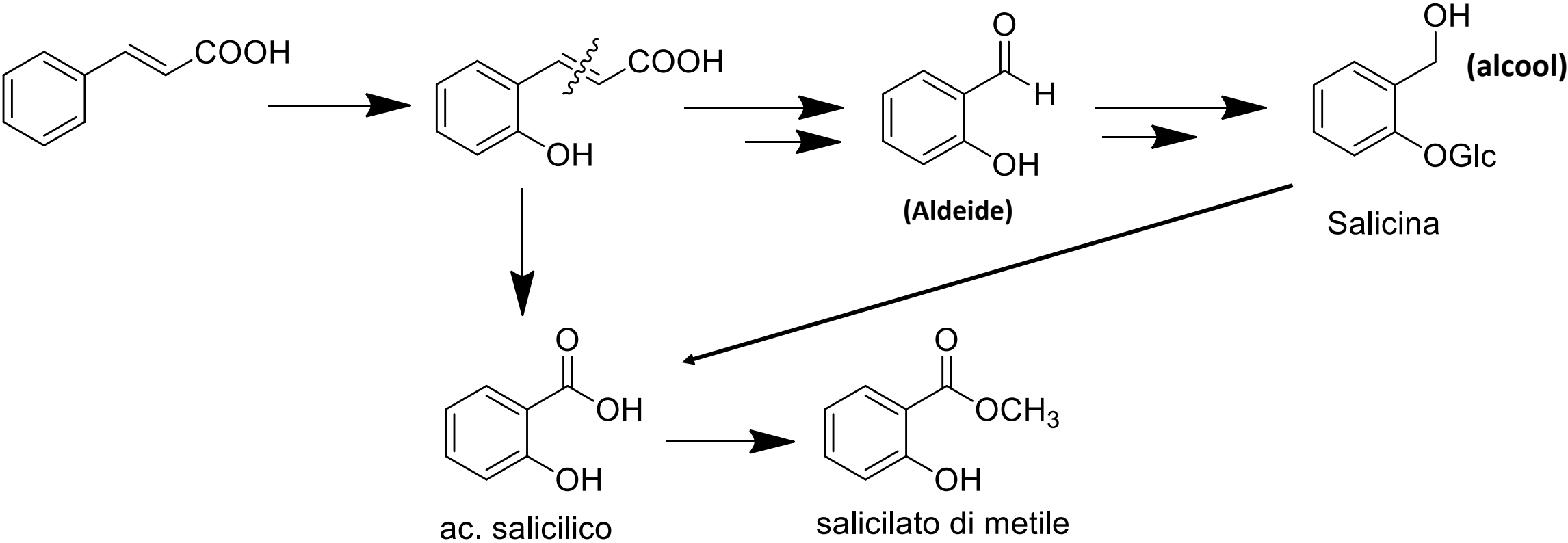
Bergapten

Fotosensibilizzante: le cumarine del Bergamotto hanno un'azione fotosensibilizzante e sono quindi impiegate nella terapia fotodinamica per stimolare la pigmentazione cutanea in caso di vitiligine.

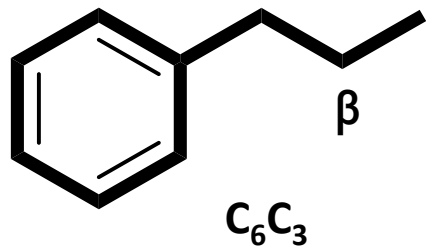
Acidi benzoici



Perché classificarli come fenilpropanoidi???



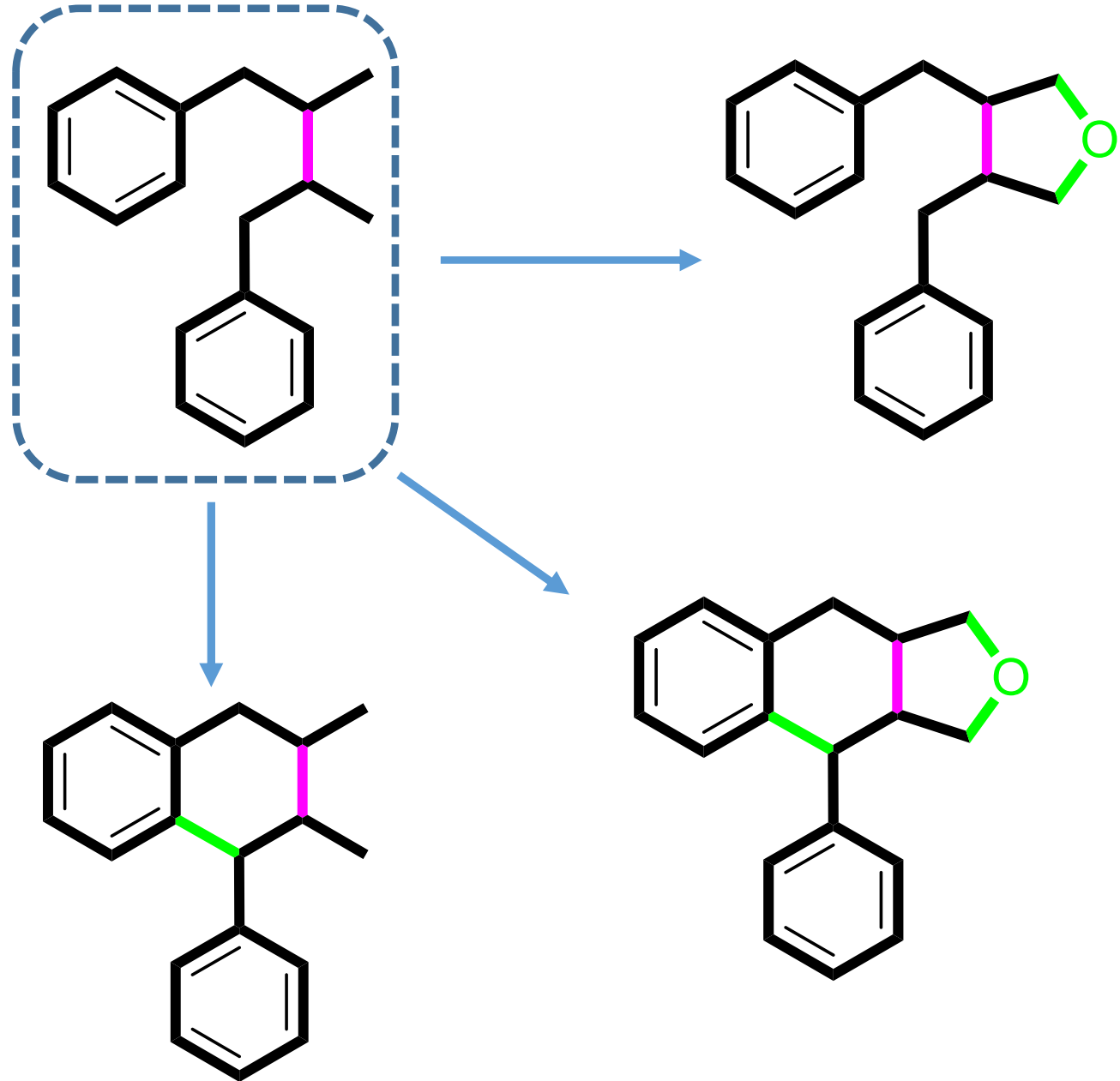
Lignani



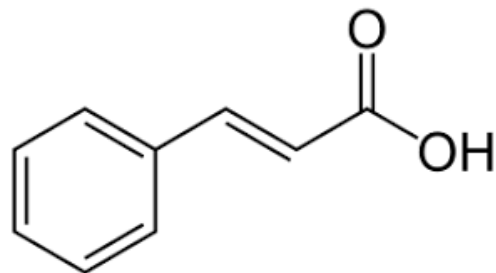
La ciclizzazione della struttura base porta a strutture più complesse

Per la formazione dei lignani, due unità C_6C_3 Si legano tramite due carboni β

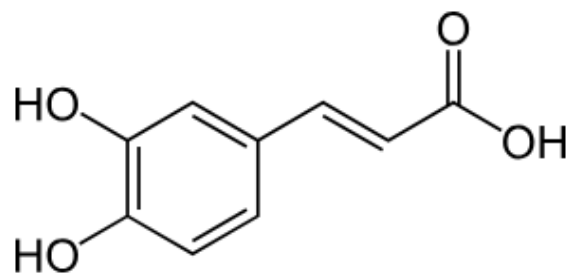
Struttura **base** dei lignani



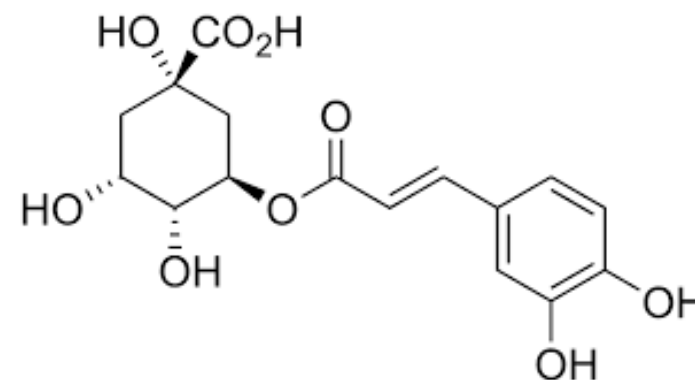
Acidi cinnamici e derivati



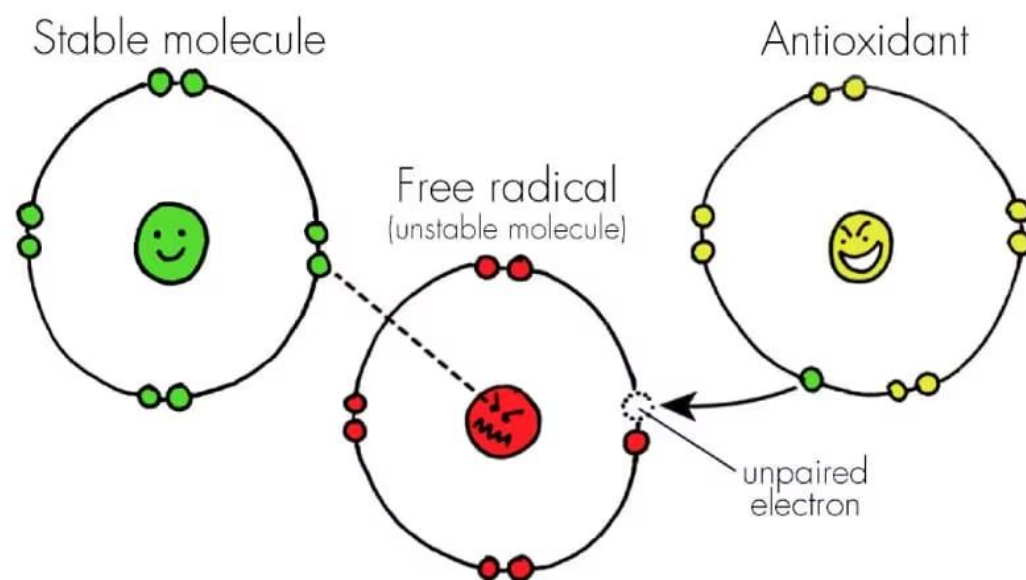
Acido cinnamico



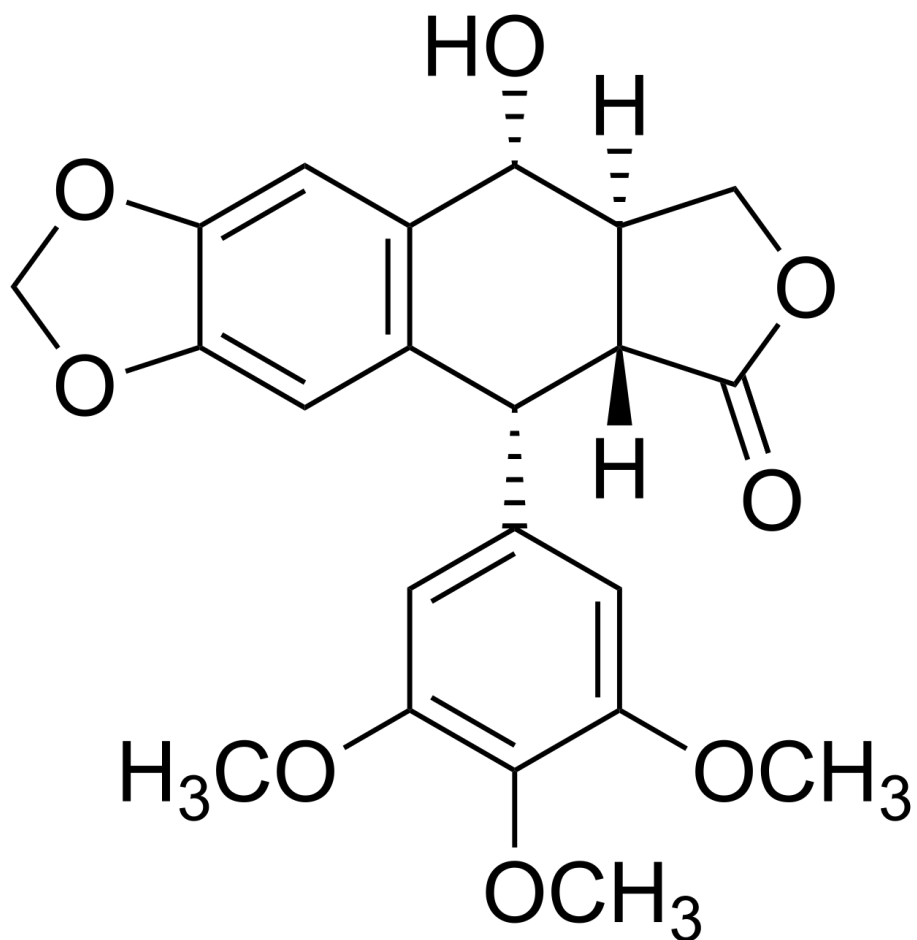
Acido caffeico



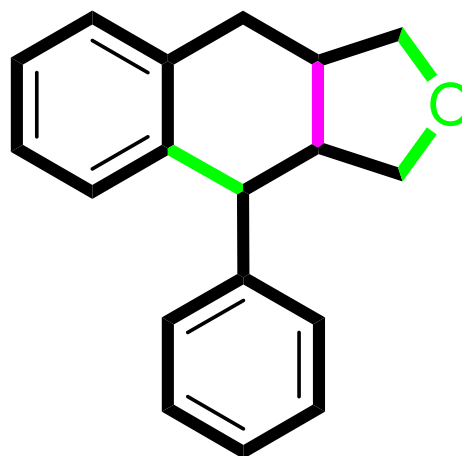
Acido clorogenico



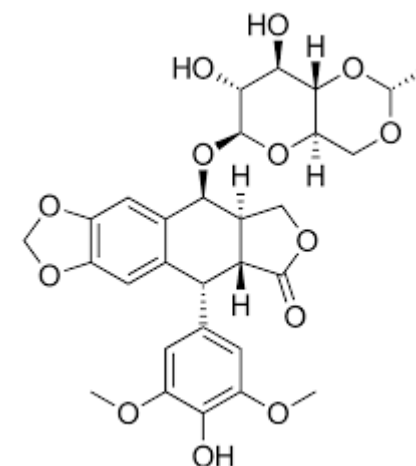
Lignani in campo farmaceutico



Podofillotossina

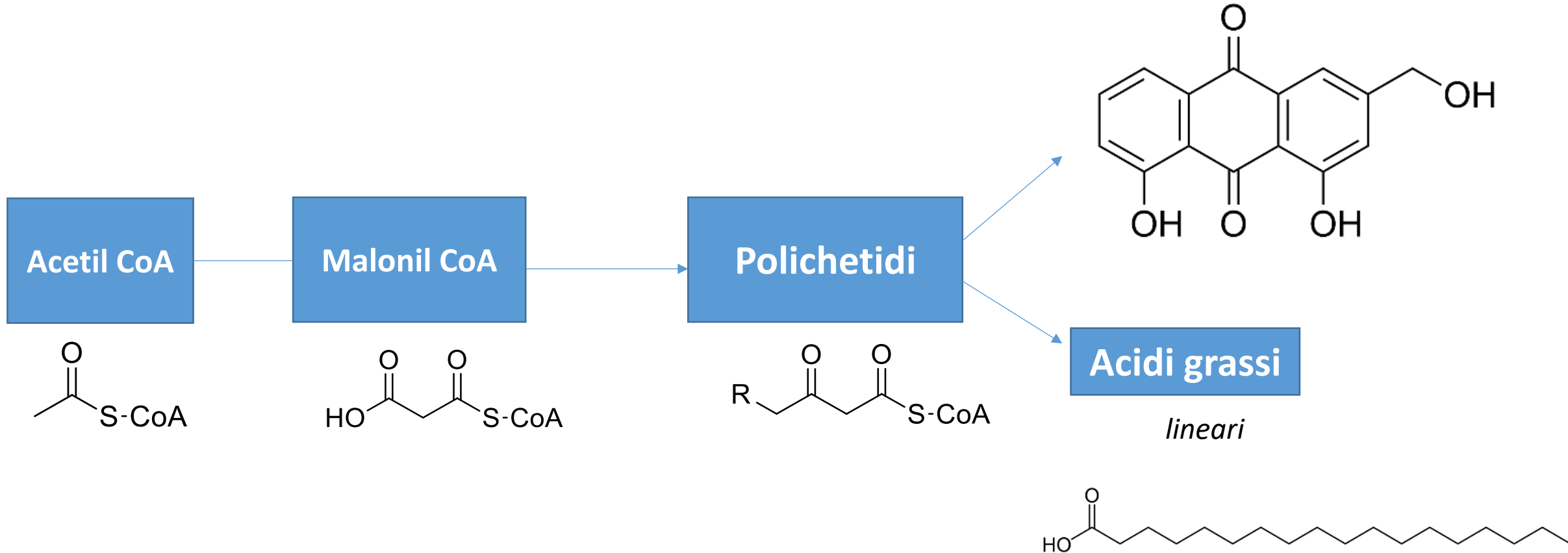


Trattamento condilomi

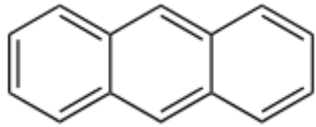


Etoposide (prodotto di semisintesi)
inibitore dell'enzima topoisomerasi II

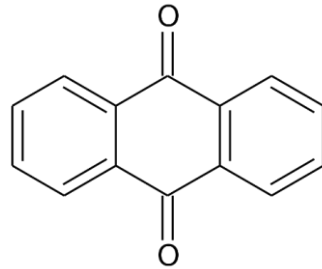
Via dell'AcCoA: formazione degli antranoidi



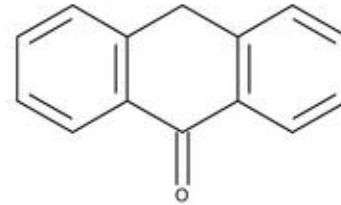
ANTRACHINONI, ANTRONI E DIANTRONI



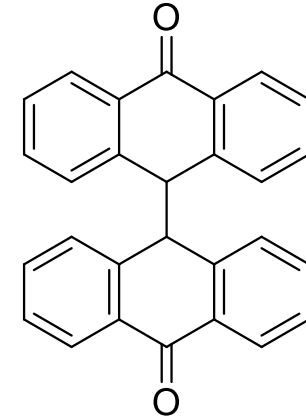
anthracene



scheletro antrachinone
(→emodina)

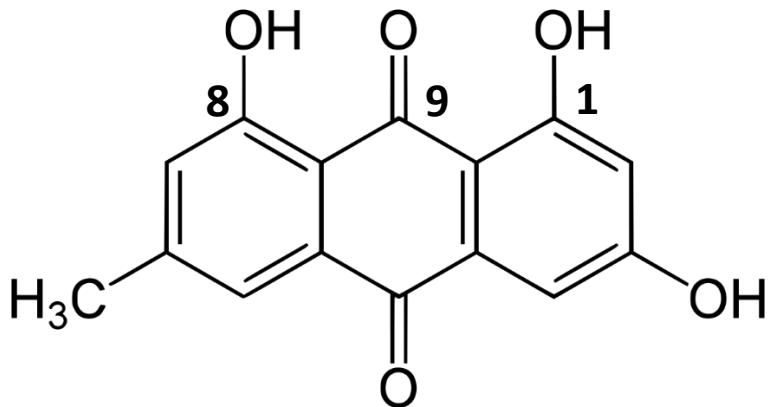


scheletro antrone
(→cascaroside)



Diantrone
(→ sennosidi)

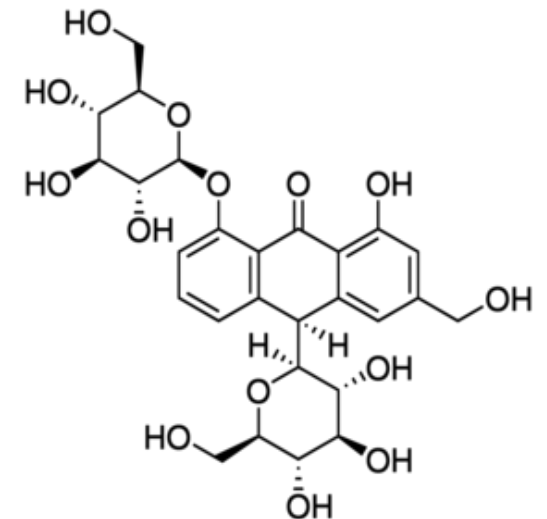
Composti aromatici *polifenolici* → 8 unità AcCoA



emodina

Caratteristiche strutturali di un antranoide

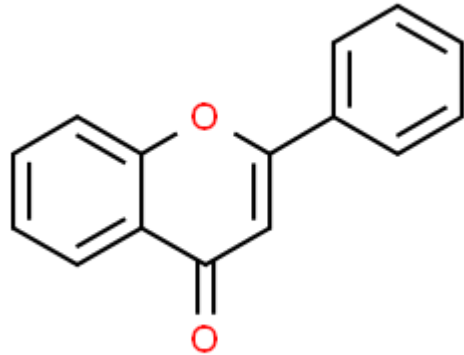
- ❖ OH in 1 e 8
- ❖ chetone in 9
- ❖ O-glicosidazione fenolica
- ❖ C-glicosidazione
- ❖ Colore (in funzione della coniugazione)



cascaroside A

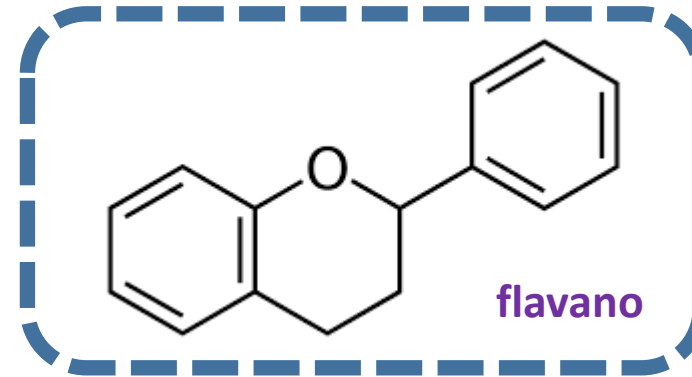
Biosintesi mista: formazione dei flavonoidi

FLAVUS = giallo Geissman e Hinreiner, 1952 classificare le sostanze correlabili al 2-fenilcromone



2-fenilcromone

Il colore dipende
dal grado di
insaturazione!!!!

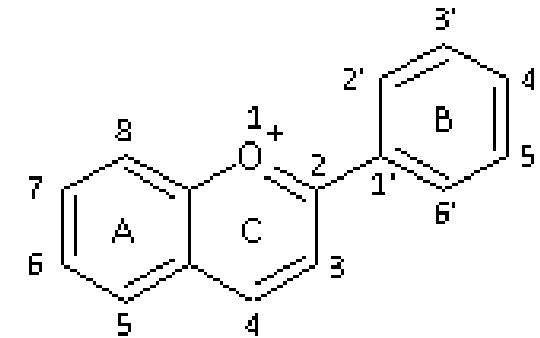
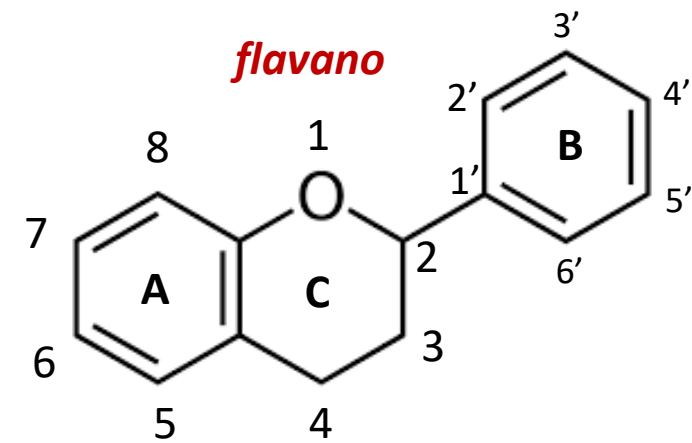
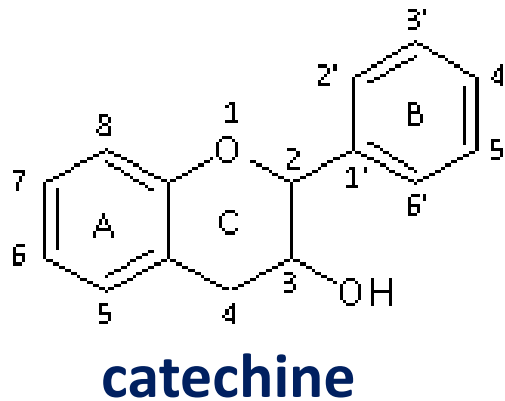
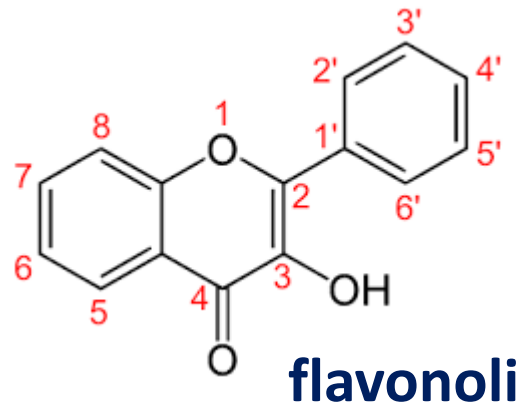
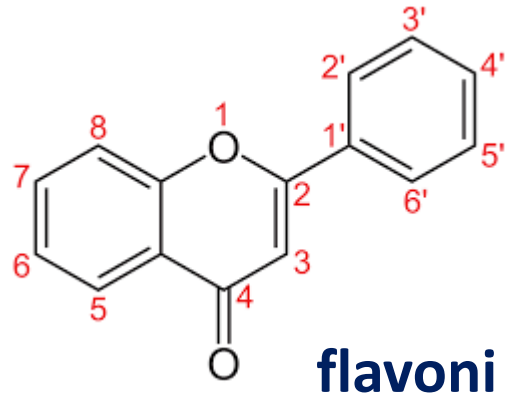


Struttura base
dei flavonoidi

C6C3C6

FLAVONOIDI: 12 sottoclassi

Stato di ossidazione di C2, C3, C4
Alcune delle sottoclassi



antocianine= glicosidi

Molto spesso i flavonoidi
si trovano sotto forma di
glicoside

STILBENI

C6-C3 + 3 AcCoA

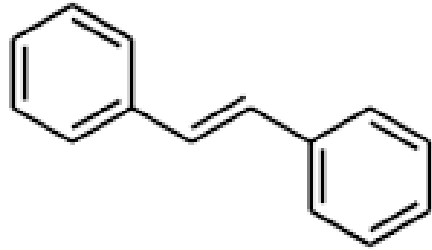


Intermedio C6-C3-C6

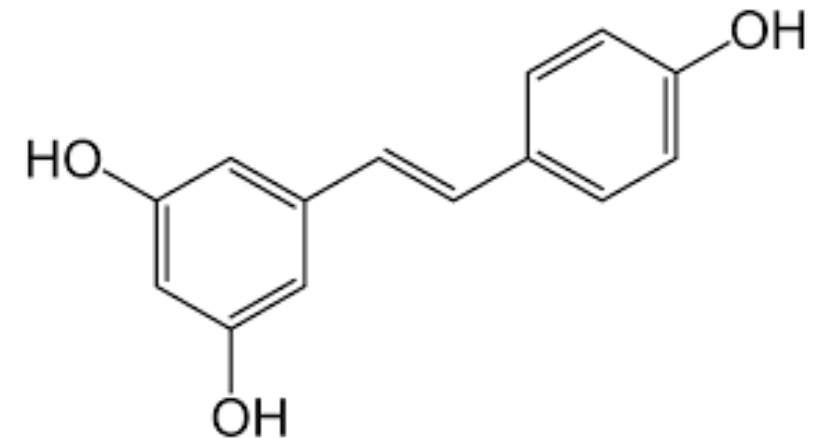


-CO₂

C6-C2-C6

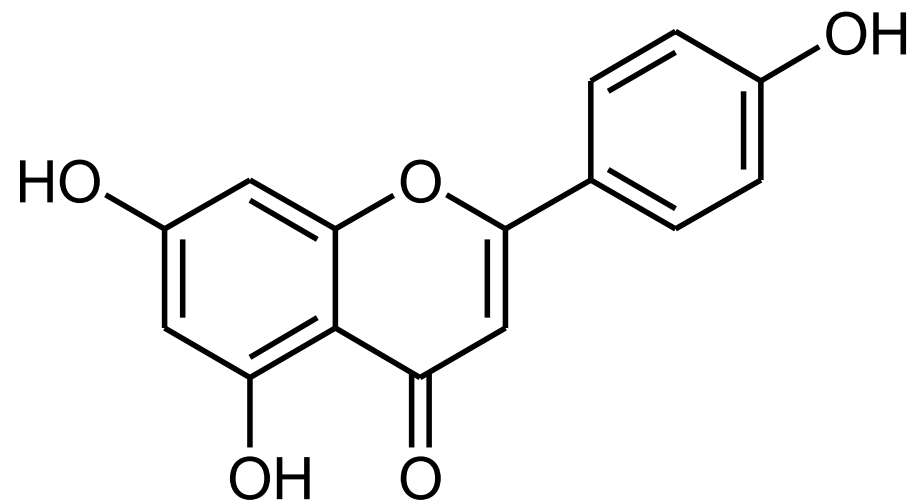
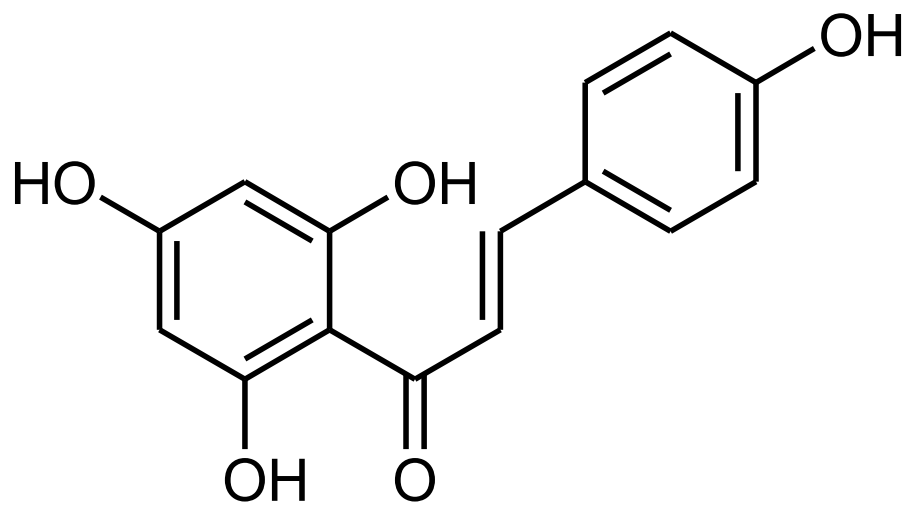


C6-C2-C6



resveratrolo





Calconi

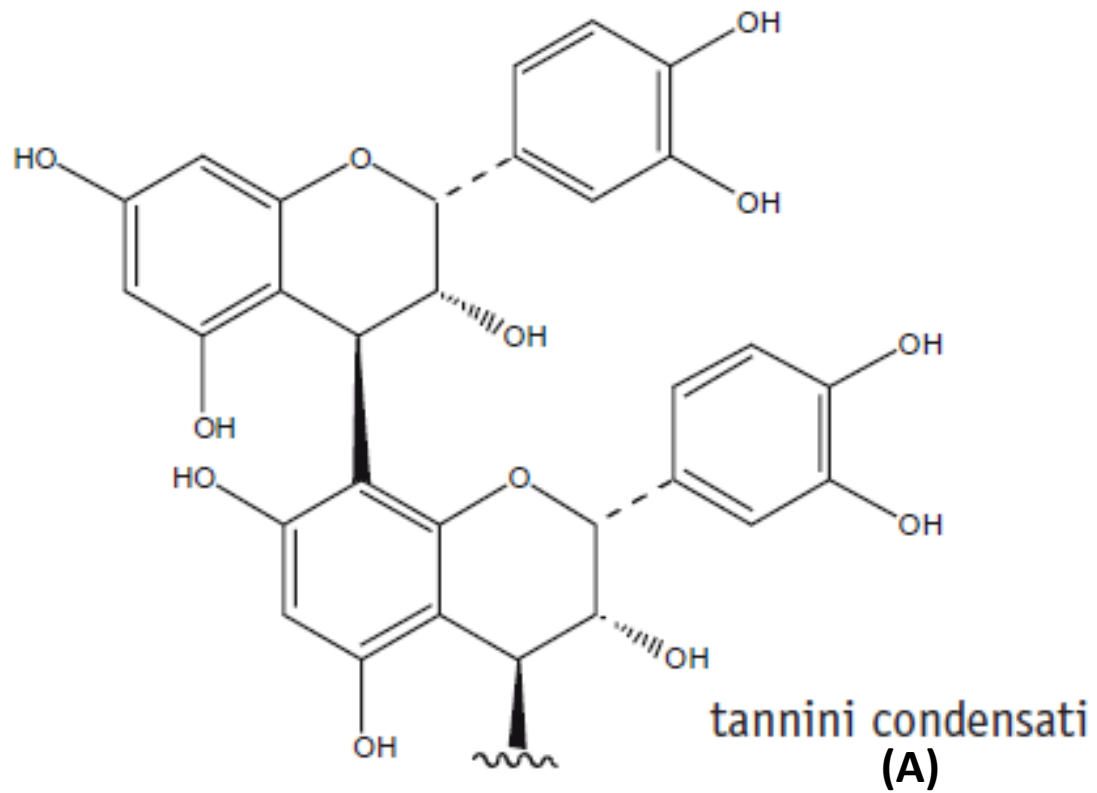
Precursori di Flavonoidi

TANNINI

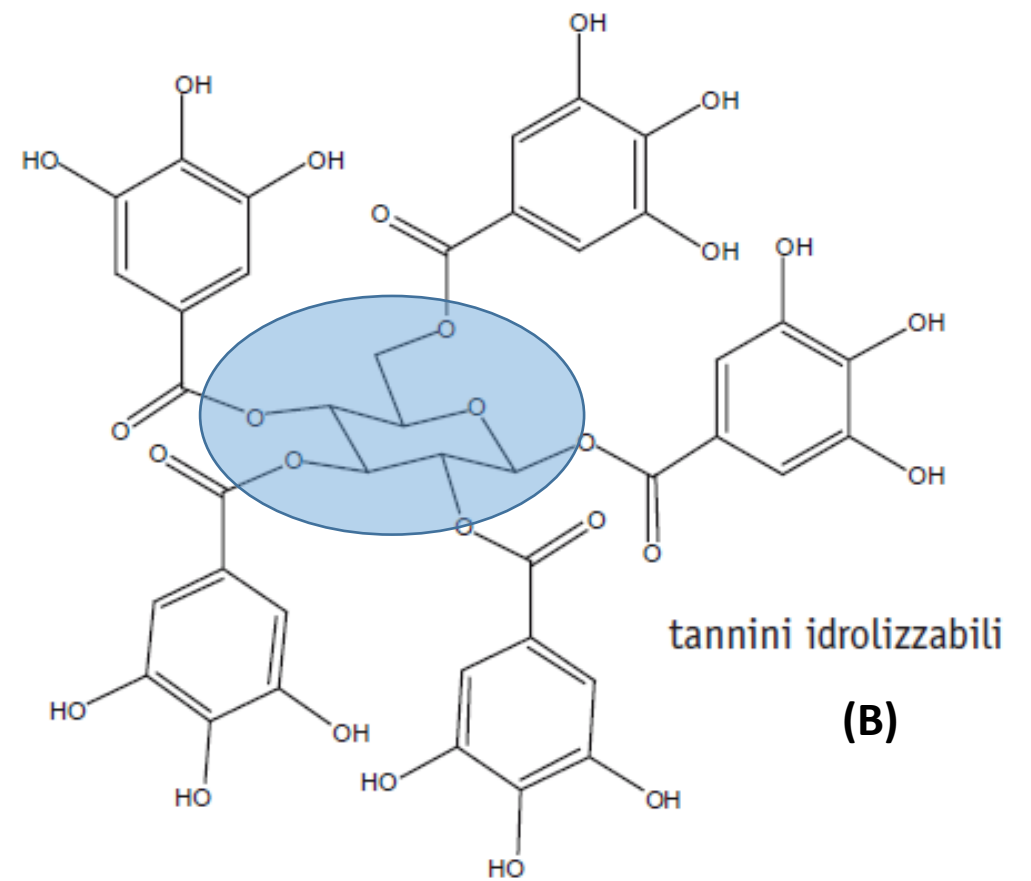
COMPOSTI CON PESO MOLECOLARE ALTO (500-20.000)

MOLTO DIFFUSI: Gimnosperme, Angiosperme dicotiledoni

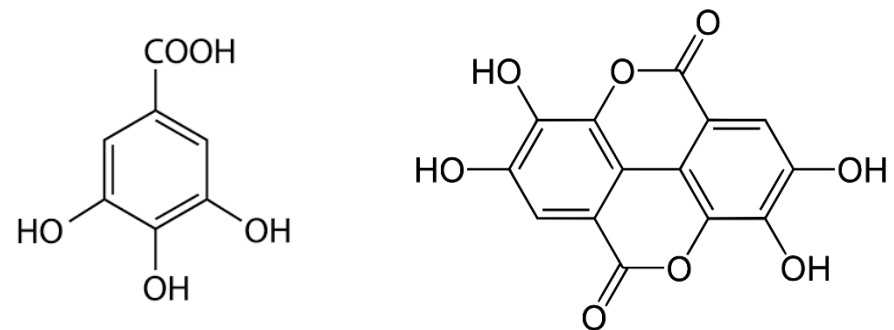
POCO DIFFUSI: Angiosperme monocotiledoni



Condensazione di due o più catechine (A) o antocianidine tramite legami C-C (polimeri di flavonoidi, da 2 a 50)



Zucchero esterificato con acido gallico (gallotannini-B) o con acido ellagico (ellagitannini)



TANNINI IDROLIZZABILI

Angiosperme

Gimnosperme

Felci

TANNINI CONDENSATI

Angiosperme

Questa differente distribuzione è il risultato di un'evoluzione biosintetica: l'acido ellagico/l'acido gallico sono derivati diretti del principale precursore dei composti fenolici, l'acido scichimico, del quale ricorda strettamente la struttura; si tratta quindi di uno dei primi cammini di derivazione biosintetica.

Invece i tannini condensati sono il risultato della polimerizzazione di molecole derivate da un cammino biogenetico più complesso di tipo misto, progressivamente affermatosi a seguito dell'abbandono delle forme di difesa legate alla produzione di lignina.

GLICOSIDI

GLICOSIDE

MOLECOLA NON ZUCCHERINA + UNITÀ SACCARIDICA

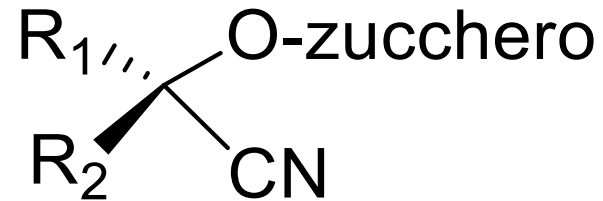


AGLICONE (O GENINA) + GLICONE

GLUCOSIDE

AGLUCONE + GLUCONE (glucosio)

GLICOSIDI CIANOGENICI



- Glucosio
- Disaccaride (es. amigdalina)
- $R_1 = H$ o CH_3
- $R_2 =$ alifatico o aromatico

PER IDROLISI acida o enzimatica LIBERANO **HCN**

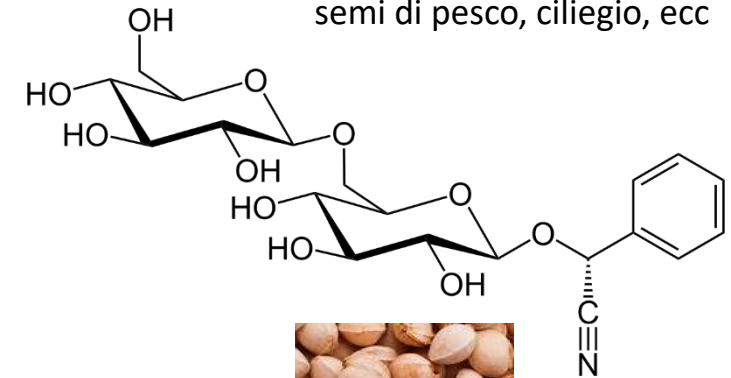
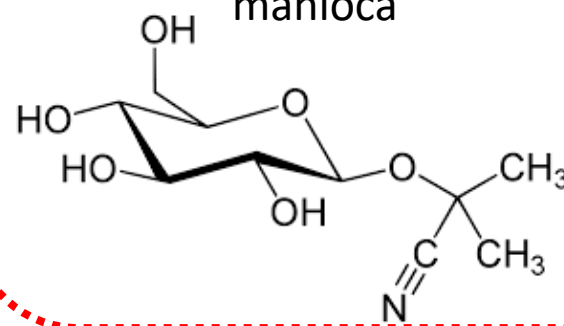


TOSSICITÀ

STRATEGIA CONTRO GLI ERBIVORI



LINAMARINA
manioca



AMIGDALINA

semi di pesco, ciliegio, ecc



Alcune parti di piante ne sono particolarmente ricche e, quindi, sono possibile fonte di avvelenamenti:

- Semi del mandorlo (varietà amara)
- Semi di albicocco

(fam. **Rosaceae**)

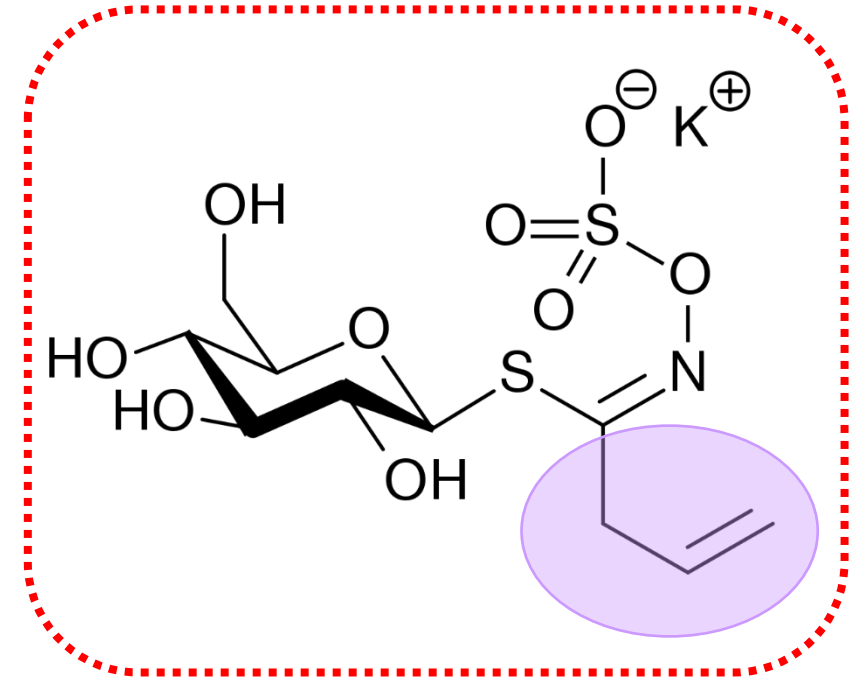
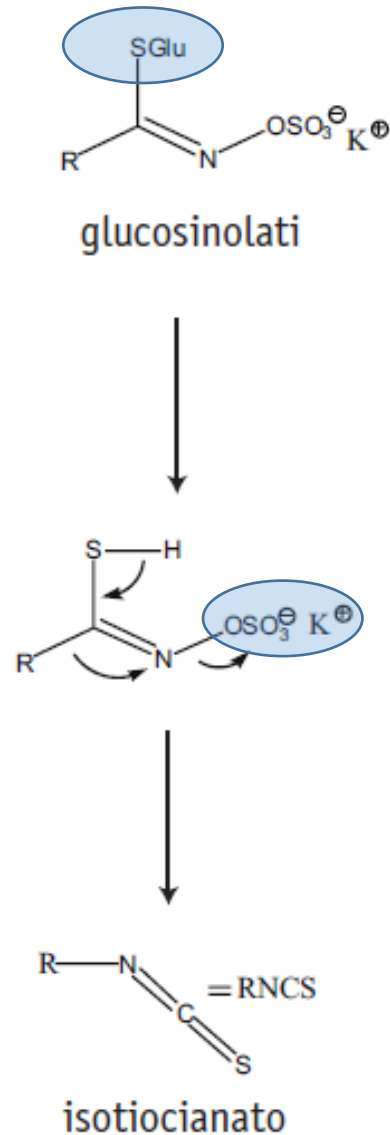
GLICOSIDI SOLFORATI (o glucosinati)

Enzima: **mirosina**

- eliminazione dello zucchero
- eliminazione del solfato
- formazione dell'aglicone che riarrangia ad **ISOTIOCIANATO**



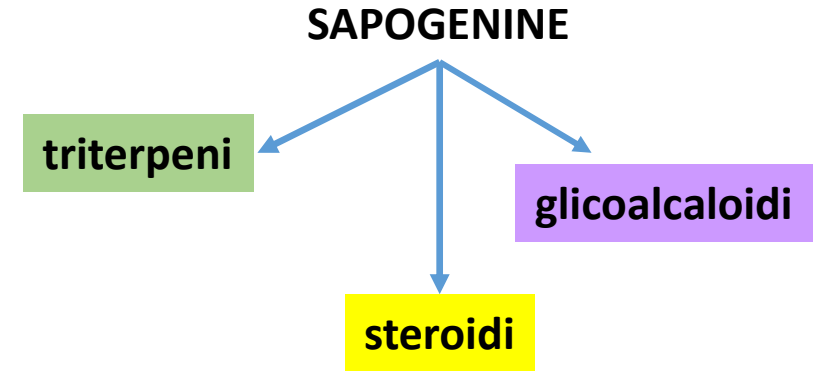
Proprietà aromatiche,
rubefacenti e
antimicrobiche



Angiosperme dicotiledoni:
principalmente *Brassicaceae*

SAPONINE

- ✓ ZUCCHERI + AGLICONI (DETTI SAPOGENINE)
- ✓ IN ACQUA, FORMANO SCHIUME
- ✓ A dosi alte le saponine steroidee → rapida emolisi
le saponine triterpeniche → lenta emolisi



NO somministrazione parentale

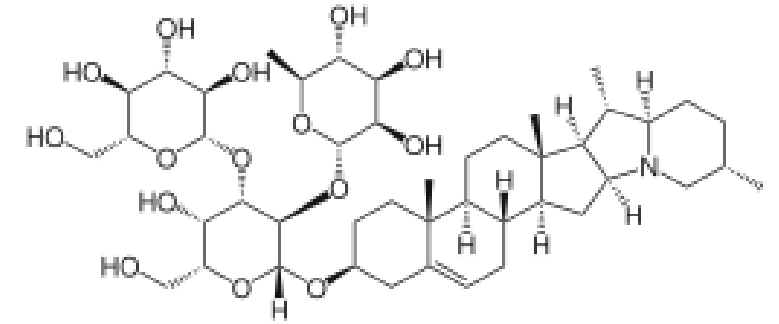
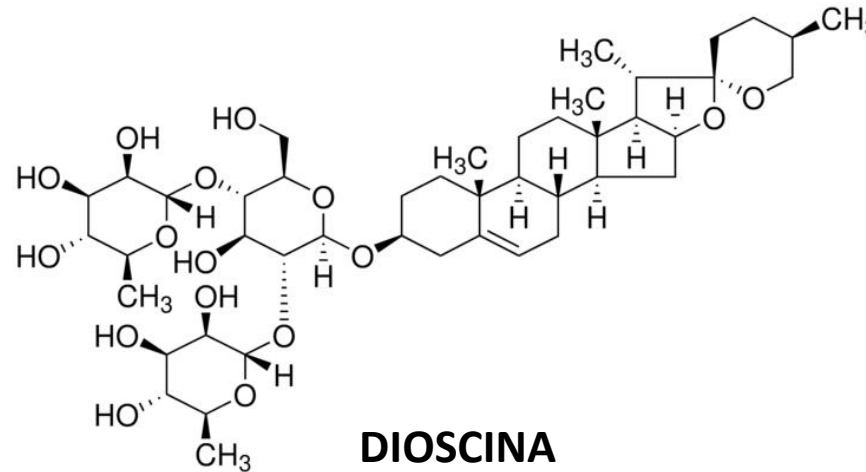
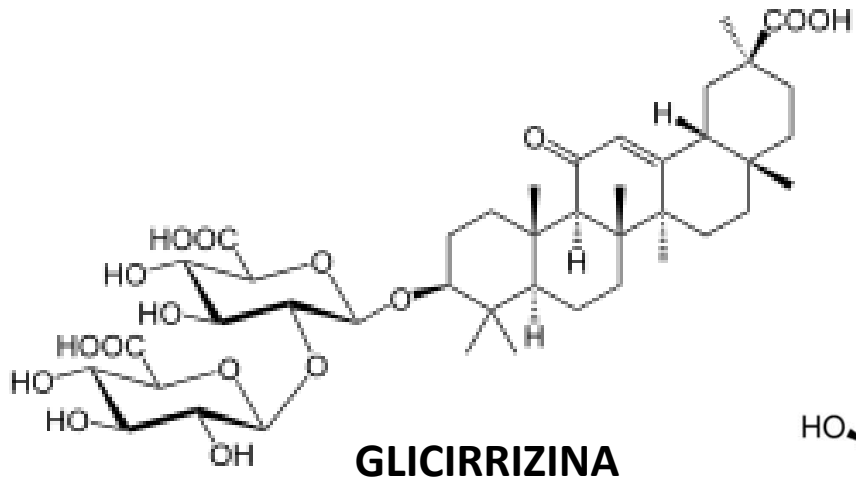
CLASSIFICAZIONE IN BASE ALLA NATURA DELL'AGLICONE (SAPOGENINA)

SAPOGENINE

triterpeni

glicoalcaloidi

steroidi



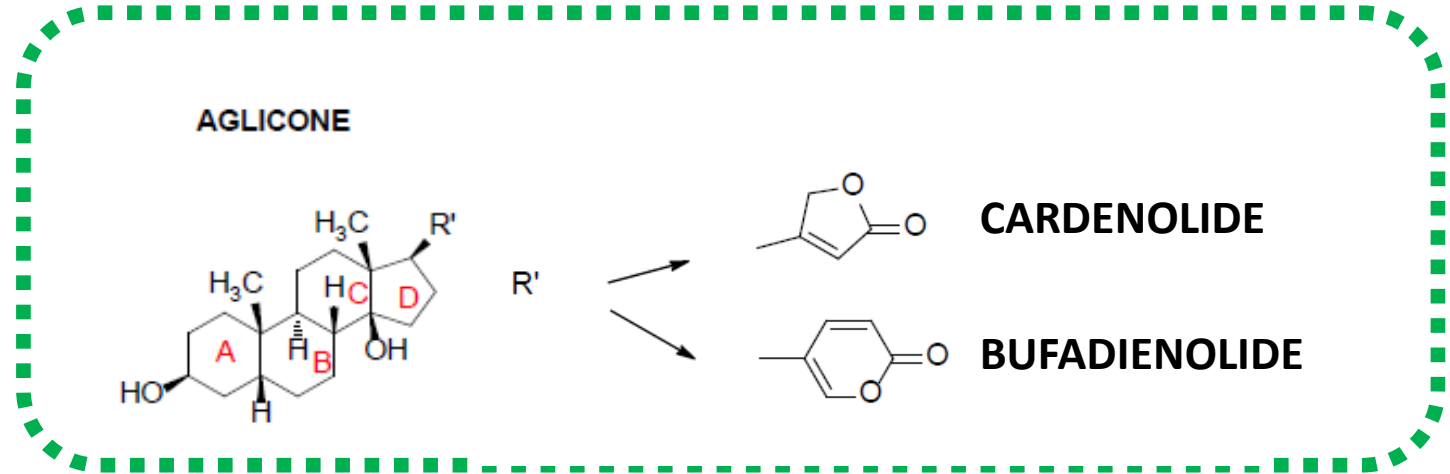
Effetti gastrointestinal e neurologici (nausea, diarrea, vomito, crampi, mal di testa e vertigini. Può causare delle emorragie, specie alla retina

SEMISINTESI

TOSSICITA'

GLICOSIDI CARDIOATTIVI

- Struttura steroidea
- R' = lattone insaturo
- O-glicosilazione in 3
- Porzione zuccherina: 1 o più zuccheri



BUFADIENOLIDI (anello lattonico 6 termini)



Genere *Bufo*

CARDENOLIDI (anello lattonico 5 termini)

