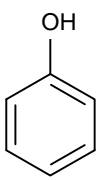
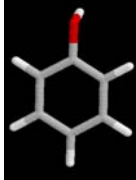


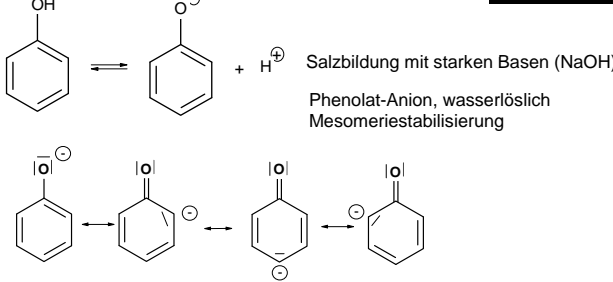
2. Phenole

Aromatische Hydroxyverbindungen

Allgemeine Eigenschaften:
Schwache Säuren
pKs 9.9

Salzbildung mit starken Basen (NaOH)
Phenolat-Anion, wasserlöslich
Mesomeriestabilisierung

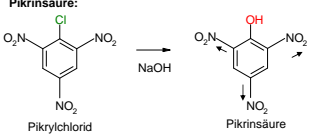


Technische Synthesen

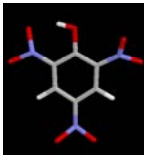
Herstellung

- Alkalische Extraktion von Steinkohlenteer
- DOW-Verfahren

Chlorbenzol $\xrightarrow[\text{300 bar}]{\text{NaOH, 360 }^\circ}$ Phenol

Pikrinsäure:


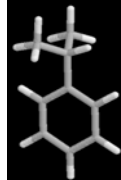
Pikrylchlorid $\xrightarrow{\text{NaOH}}$ Pikrinsäure



Pikrinsäure pKs 0.4!
- Cumolverfahren

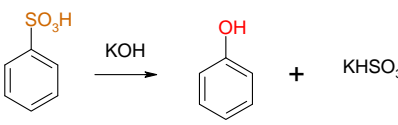
$\text{C}_6\text{H}_6 \xrightarrow{\text{CH}_3\text{CH}=\text{CH}_2} \text{C}_6\text{H}_5\text{C}(\text{CH}_3)_2 \xrightarrow{\text{O}_2} \text{C}_6\text{H}_5\text{C}(\text{CH}_3)_2\text{OOH} \xrightarrow{\text{H}^+} \text{C}_6\text{H}_5\text{OH} + \text{H}_3\text{C}-\text{C}(=\text{O})-\text{CH}_3$

Cumol \rightarrow Cumolhydroperoxid \rightarrow Aceton + Cumol



Herstellung

- Alkalischmelze von Sulfonaten

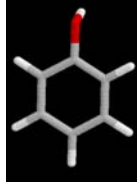


SO₃H $\xrightarrow{\text{KOH}}$ OH + KHSO₃
- "Phenolverkochung" von Diazoniumsalzen

Anilin $\xrightarrow{\text{HNO}_2}$ Benzoldiazoniumsalz $\xrightarrow{\text{H}_2\text{O} / \text{H}_2\text{SO}_4}$ Phenol + N₂↑

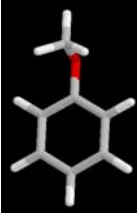
Phenol
Fp.: 43 °, Kp.: 183 °
Ätzend, giftig: 1 g ☠

Verwendung:
Phenoplaste



o-Kresol
Raumdesinfektion

Phenoether:
Methoxyphenol
Anisol



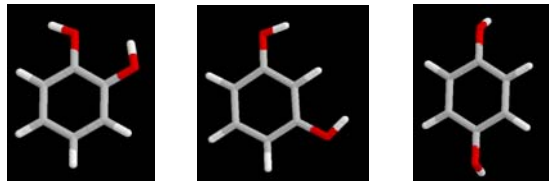
Mehrwertige Phenole

Zweiwertige Phenole
Licht-, Luft-, Schwermetallempfindlich

Brenzcatechin
1,2-Dihydroxybenzol

Resorcin
1,3-Dihydroxybenzol

Hydrochinon
1,4-Dihydroxybenzol



Enzymatische Bräunung:

Radikalreaktion durch Phenoloxidasen

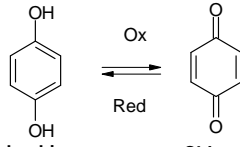
Phenoxyradikal

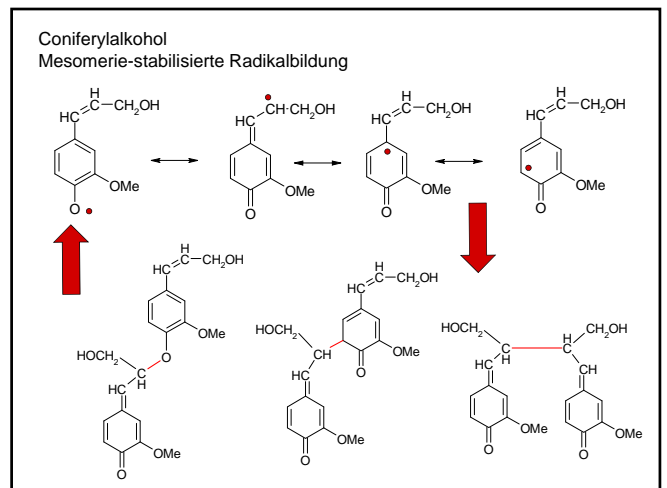
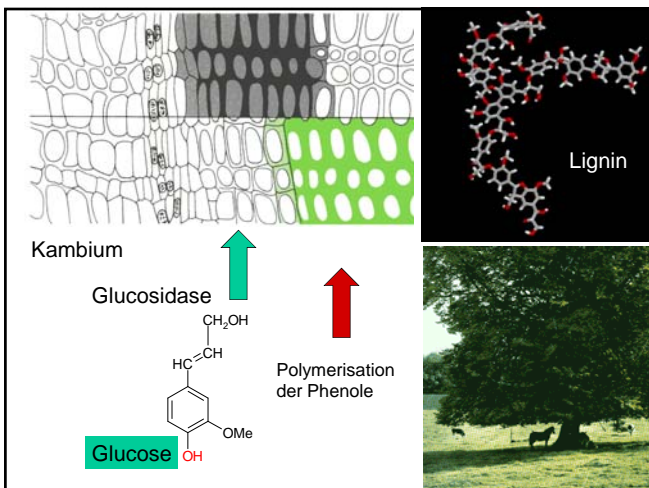
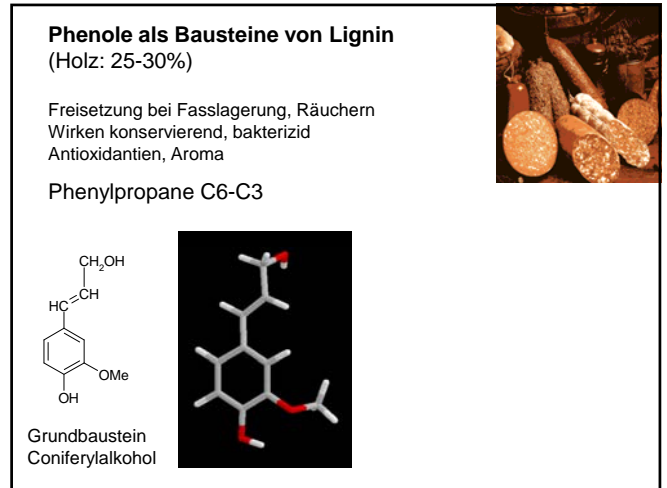
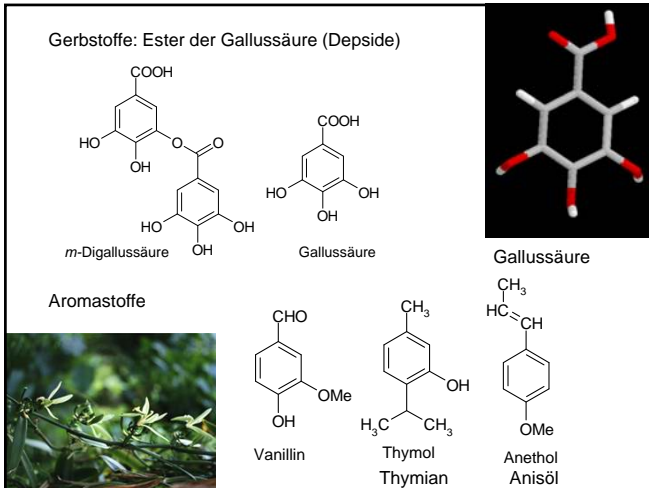
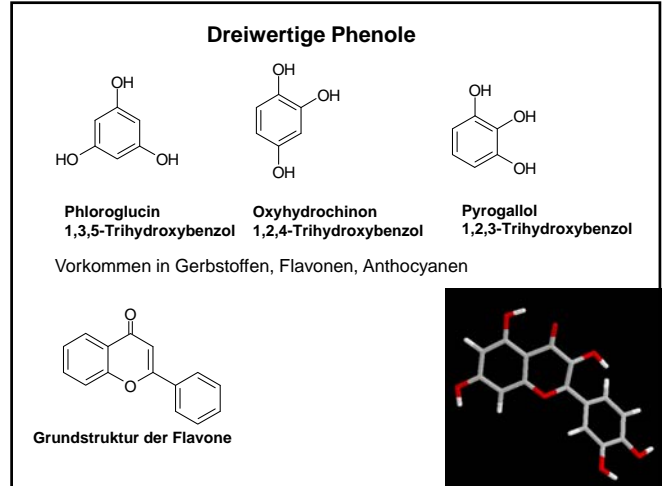
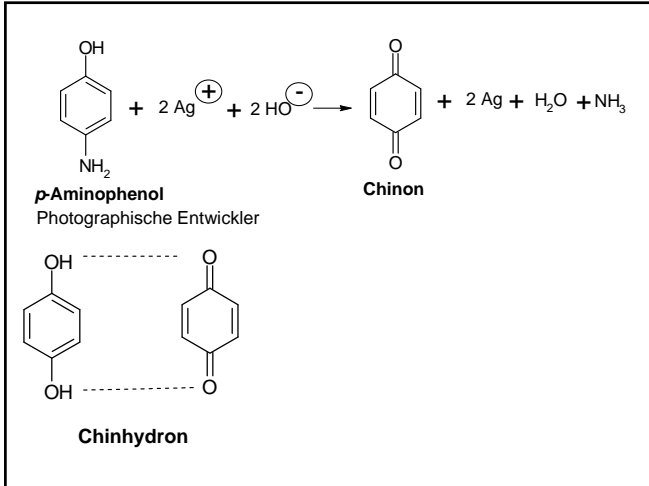
Hydrochinon $\xrightleftharpoons[\text{Red}]{\text{Ox}}$ Chinon + 2 H⁺ + 2 e⁻

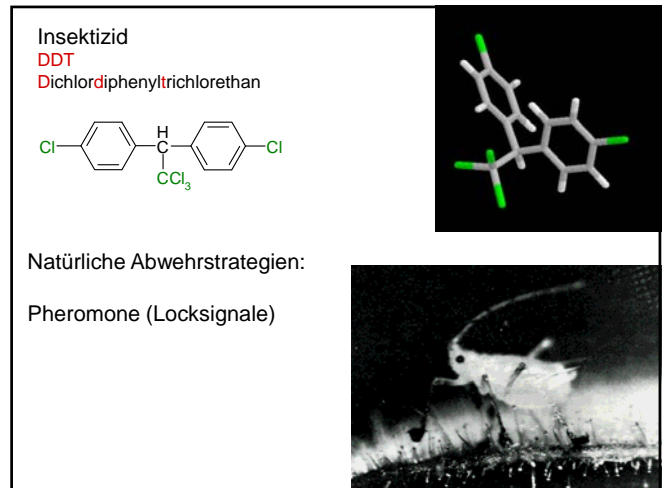
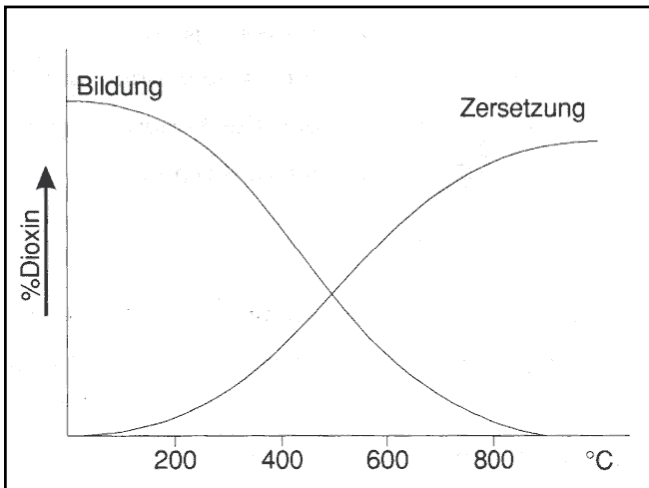
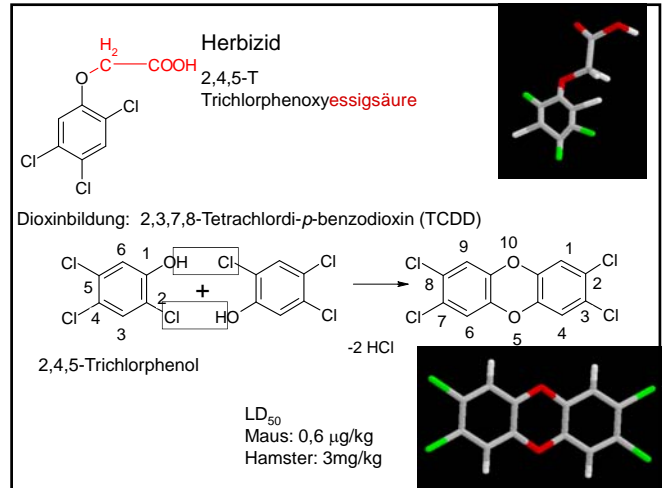
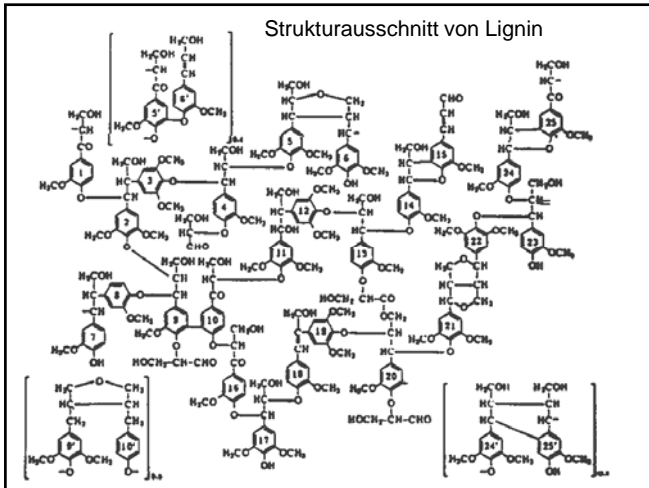
Wirkt reduzierend (Antioxidans)

Bestandteil von Coenzymen der Atmungskette:
Ubichinon
Plastochinon

Nicht aromatisch (konjugiertes Keton)
Chromophor







Seitenansicht

Draufsicht

"Periplasma" (P): o-Diphenole
"Cytoplasma" (C): Polyphenoloxidase
Peroxidase
Protein

1. „Fixierung“ eines Insekts an der Blattoberfläche durch chemische Reaktion mit Chitin
2. Freisetzung eines Alarmpheromon
3. Freisetzung eines Lockpheromons einer Raubmilbe