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Phenols and phenolic glycosides

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Phenols probably constitute the largest group of plant secondary metabolites. Widespread in Nature, and to be found in most classes of natural compounds having aromatic moieties, they range from simple structures with one aromatic ring to highly complex polymeric substances such as tannins and lignins. Phenols are important constituents of some medicinal plants and in the food industry they are utilized as colouring agents, flavourings, aromatizers and antioxidants. This chapter mainly deals with those phenolic classes of pharmaceutical interest, namely: (1) simple phenolic compounds, (2) tannins, (3) coumarins and their glycosides, (4) anthraquinones and their glycosides, (5) naphthoquinones, (6) flavone and related flavonoid glycosides, (7) anthocyanidins and anthocyanins, (8) lignans and lignin. The biosynthetic origin of some of these compounds involving the shikimic acid pathway is shown in Fig. 21.2. Phenols may also have aromatic rings derived by acetate condensation (Fig. 18.9.).

SIMPLE PHENOLIC COMPOUNDS

Catechol (*o*-dihydroxybenzene) occurs free in kola seeds and in the leaves of *Gaultheria* spp. and its derivatives are the urushiol phenols of the poison oak and poison ivy (q.v.). Derivatives of resorcinol (*m*-dihydroxybenzene) constitute the narcotic principles of cannabis and the glucoside arbutin involves quinol (hydroquinone, *p*-dihydroxybenzene). The taenicidal constituents of male fern, the bitter principles of hops and the lipophilic components of hypericum (q.v.) are phloroglucinol derivatives.

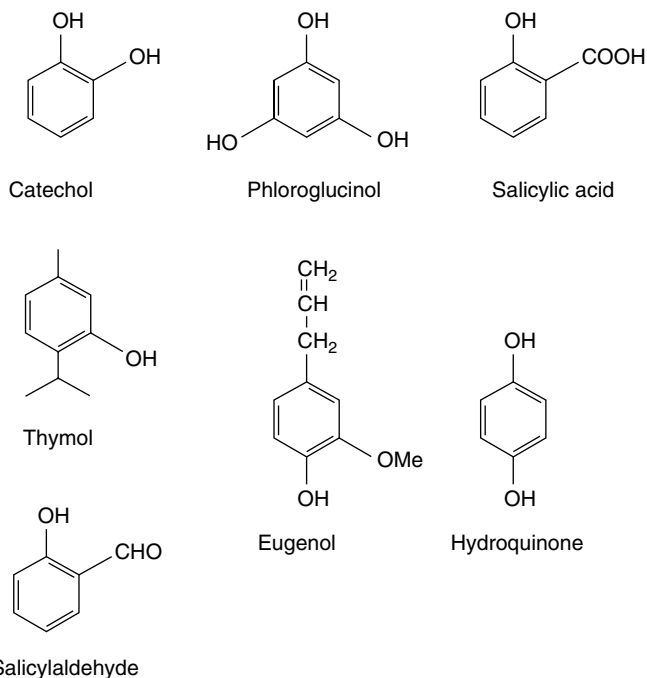


Fig. 21.1
Simple phenolic compounds.

The phenolic compounds in this group often also possess alcoholic, aldehydic and carboxylic acid groups; they include eugenol (a phenolic phenylpropane), vanillin (a phenolic aldehyde) and various phenolic acids, such as salicylic, ferulic and caffeic acids. Glycoside formation is common, and the widely distributed glycoside coniferin and other derivatives of phenolic cinnamic alcohols are precursors of lignin. Some of the best-known simple phenolic glycosides are listed in Table 21.1.