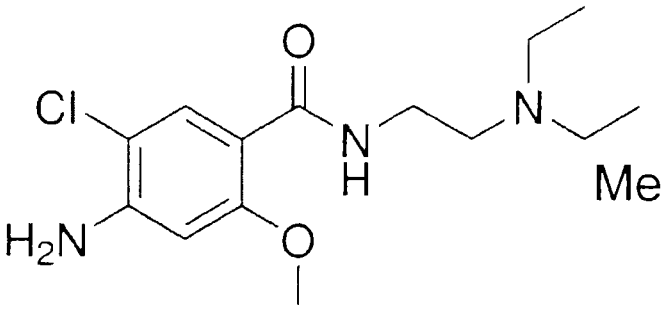
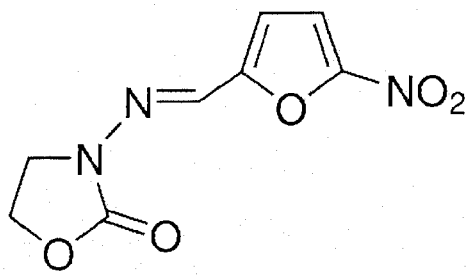


Metoclopramide

4-Amino-5-chloro-*N*-(2-(diethylamino)ethyl)-2-methoxybenzamide

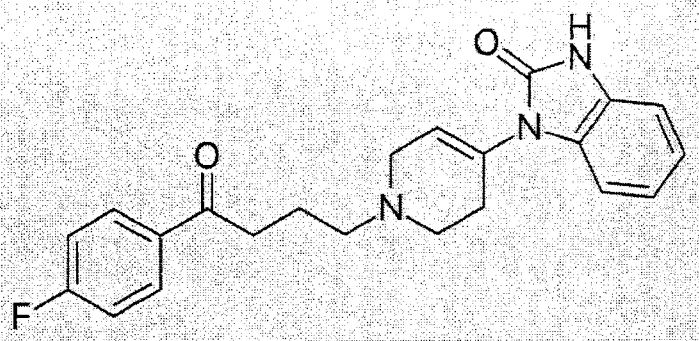
- It is commonly used to treat and prevent nausea and vomiting (antiemetic)
- The intermediate used for the synthesis of metochlopramide is 4-aminosalicylic acid



Furazolidone

3-{[(5-nitro-2-furyl)methylene]amino}-1,3-oxazolidin-2-one:

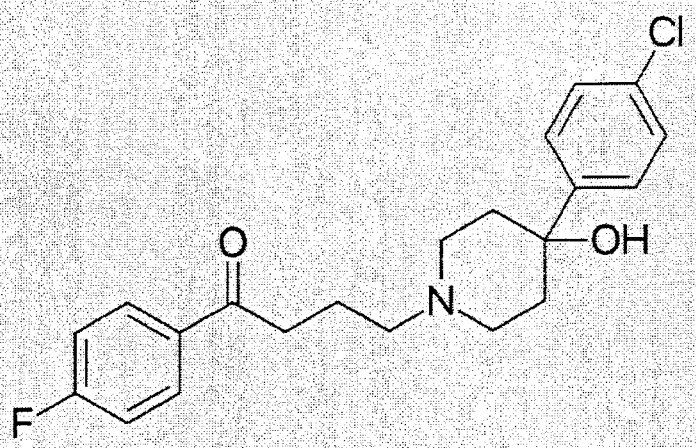
- antibacterial, antiprotozoal
- The intermediate used: furfural



Droperidol

3-[1-[4-(4-fluorophenyl)-4-oxobutyl]-5,6-dihydro-2*H*-pyridin-4-yl]-1*H*-benzimidazol-2-one

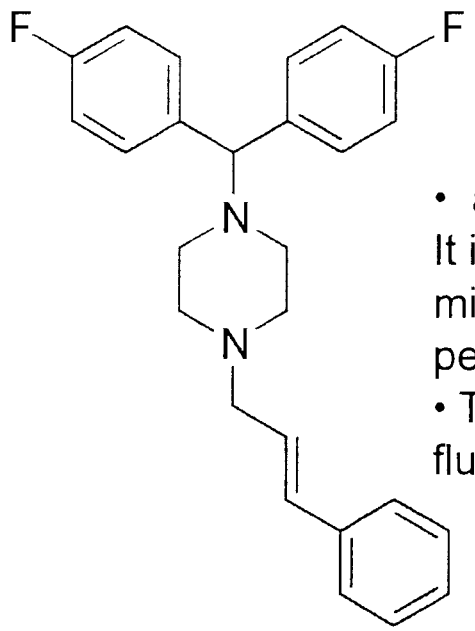
- An antidopaminergic drug used as an antiemetic and antipsychotic
- The intermediate: flurobenzene



Haloperidol

4-[4-(4-Chlorophenyl)-4-hydroxypiperidin-1-yl]-1-(4-fluorophenyl)butan-1-one

- Typical antipsychotic medication
- The intermediate is: flurobenzene



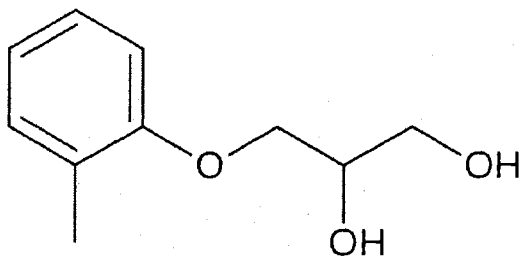
Flunarizin

- a calcium antagonist .

It is effective in the prophylaxis of migraine, vertigo of central and peripheral origin

- The intermediate is: flurobenzene

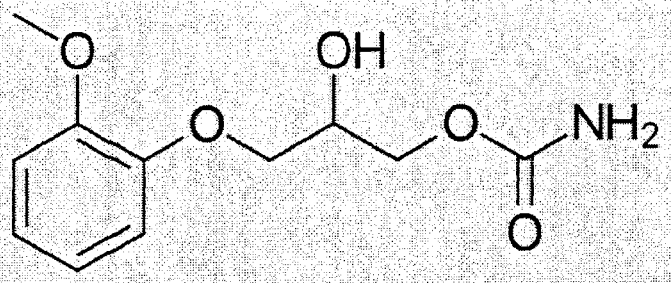
1-[*bis*(4-fluorophenyl)methyl]-4-[(2*E*)-3-phenylprop-2-en-1-yl] piperazine



Mephenesin

- Central muscle relaxant
- The intermediate: Glycide

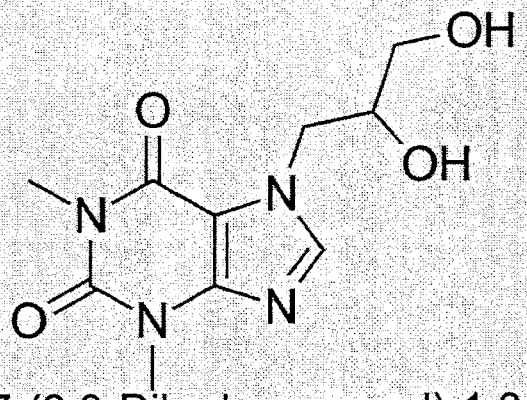
3-(2-methylphenoxy)propane-1,2-diol



Methocarbamol

(*RS*)-2-hydroxy-3-(2-methoxyphenoxy)propyl carbamate

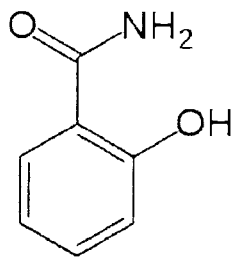
Methocarbamol is a central muscle relaxant used to treat skeletal muscle spasms, Under the trade name Robaxin



Diprophylline

7-(2,3-Dihydroxypropyl)-1,3-dimethyl-3,7-dihydro-1*H*-purine-2,6-dione

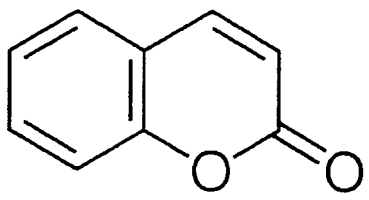
Diprophylline is bronchodilator and vasodilator effects.
It is used in the treatment of respiratory disorders like asthma, cardiac dyspnea ضيق تنفس, and bronchitis.



Salicylamide

o-hydroxybenzamide

analgesic and antipyretic

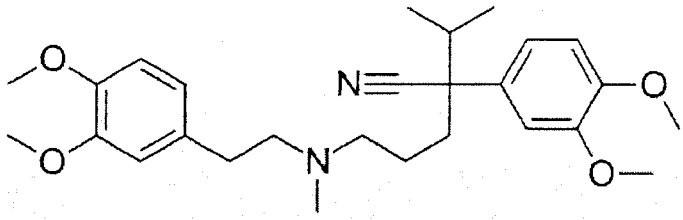


Coumarin

2*H*-chromen-2-one

(مفرغ لحمض اليوريك) Uricosuric effect

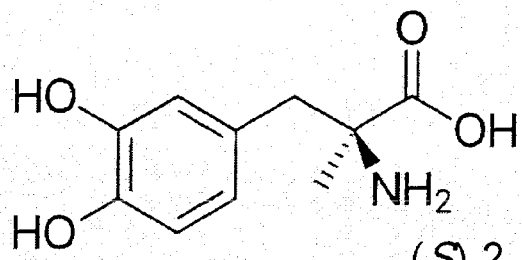
precursor reagent in the synthesis of a number of synthetic anticoagulant (warfarin…)



Verapamil

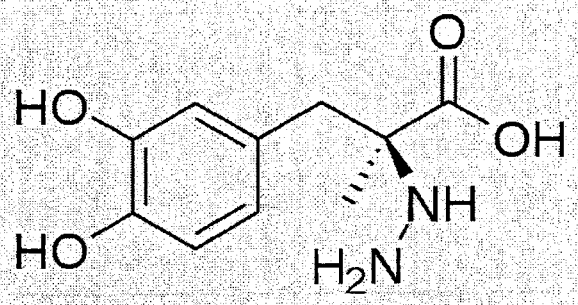
Calcium channel antagonist

(*RS*)-2-(3,4-Dimethoxyphenyl)-5-{[2-(3,4-dimethoxyphenyl)ethyl]-(methyl)amino}-2-prop-2-ylpentanenitrile



Methyldopa

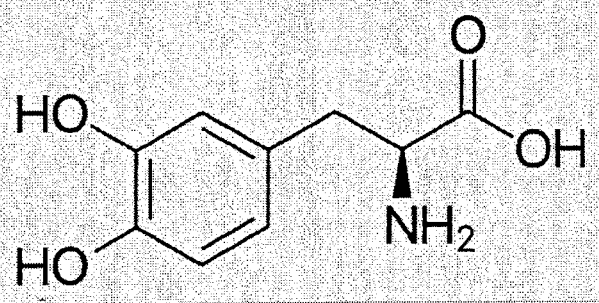
(*S*)-2-amino-3-(3,4-dihydroxyphenyl)-2-methyl-propanoic acid



Carbidopa

(2*S*)-3-(3,4-dihydroxyphenyl)-2-hydrazino-2-methyl propanoic acid

inhibits aromatic-L-amino-acid decarboxylase (DOPA decarboxylase or DDC)



Levodopa

(*S*)-2-Amino-3-(3,4-dihydroxyphenyl)propanoic acid

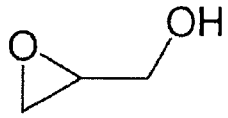
DOPA is used to increase dopamine concentrations in the treatment of Parkinson's disease

Total Synthesis of Drugs, Important Pharmaceutical intermediate

Table 4-Important pharmaceutical intermediates

Intermediate	use
Acetanilide	sulfonamides
4-aminosalicylic acid	metoclopramide
Pyrocatechol	catecholamines, Guaiacol, Vanillin
Furfural	furazolidone
Fluorobenzene	droperidol,,flunarizine,haloperidol
Glycide	mephenesine, methocarbamol, diprophylline
4-nitrobenzoic acid	procaine, procainamide
Salicylic acid	acetylsalisylic acid, salicylamide,coumarins
Veratrole	carbidopa, methyldopa, papaverine, verapamile
Vanillin	levodopa

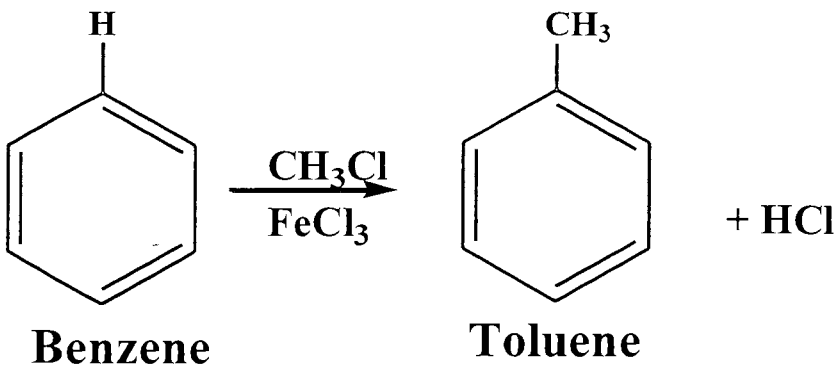
Glycide (Glycidol): 2,3-Epoxy-1-propanol



Drug Synthesis
الاصطناع (التخليق) الدوائي

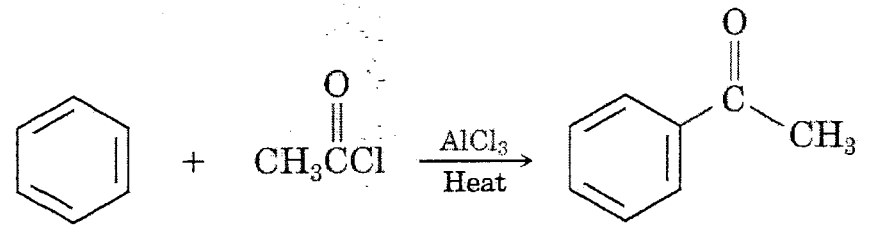
3. Electrophilic aromatic substitutions

Alkylation reaction

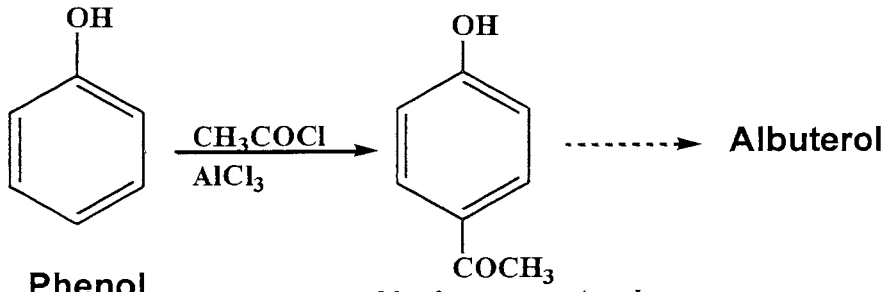


- Deactivated rings don't undergo alkylation reactions

Acylation reaction

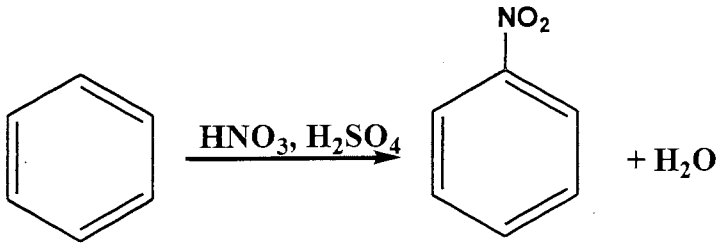


Benzene **Acetyl chloride** **Acetophenone (95%)**

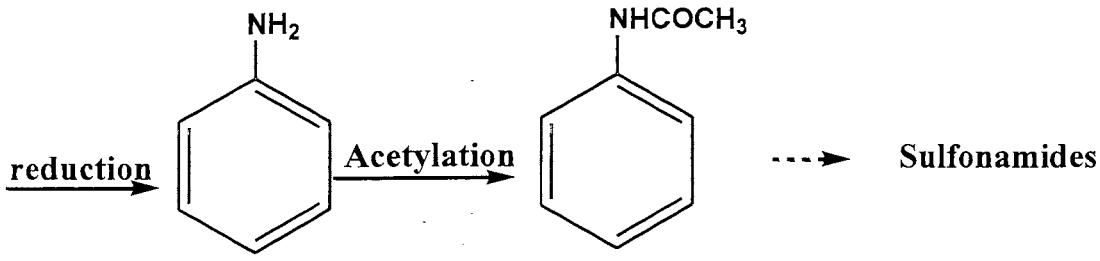


Phenol p-Hydroxyacetophenone

Nitration reaction

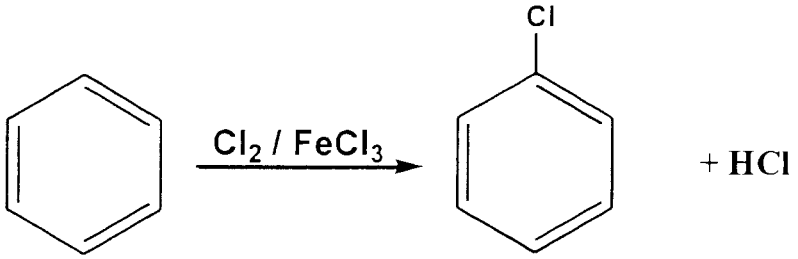


Benzene Nitrobezene

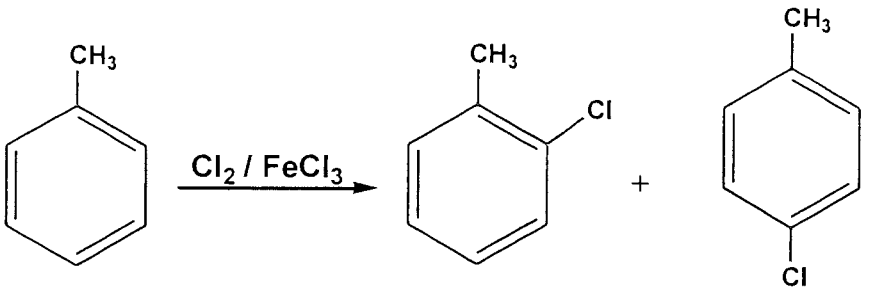


Aniline Acetanilide

Halogenation reaction

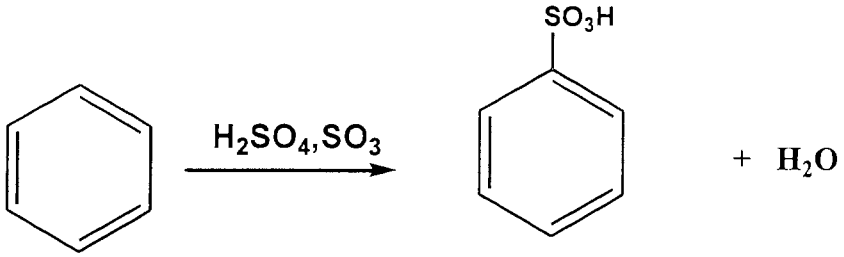


Benzene Chlorobenzene



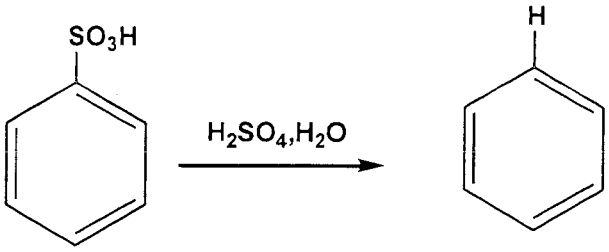
Toluene o-Chlorotoluene p-Chlorotoluene

Sulfonation reaction



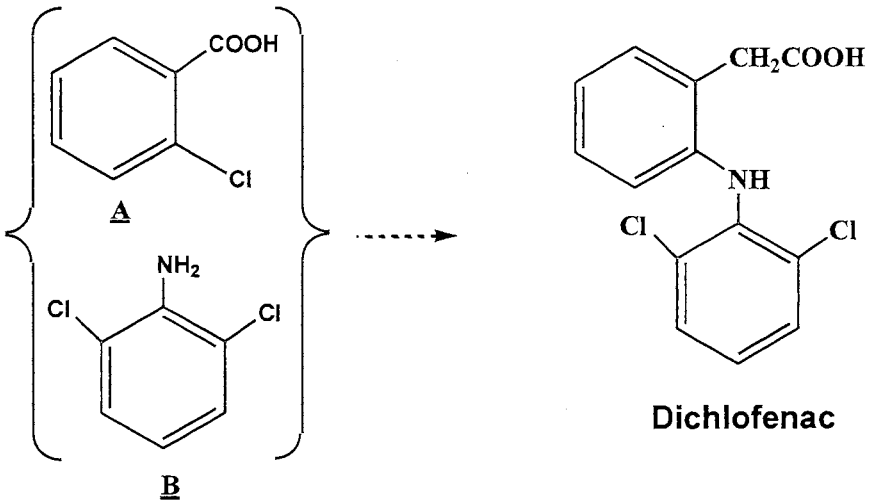
Benzenesulfonic acid

.Reversible reaction (Hydrolysis of benzensulfonic acid)



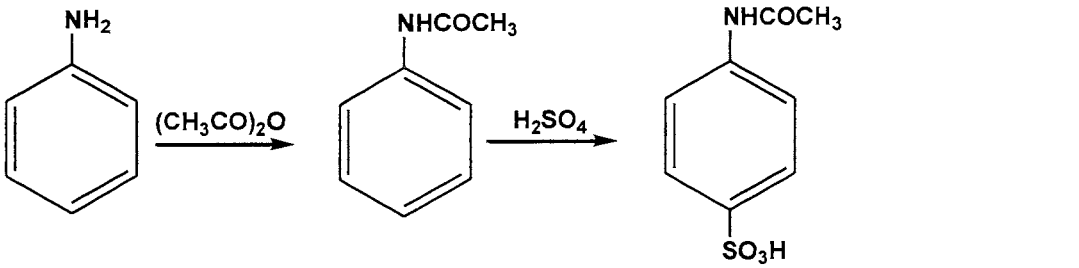
Worked problem

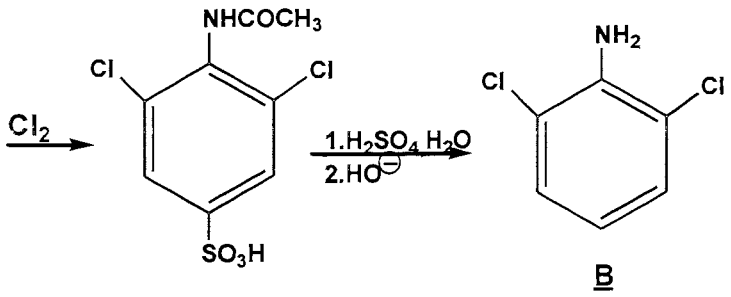
Preparation of intermediates A & B used for the synthesis of Diclofenac



Worked problem

Preparation of 2,5-dichloroaniline (starting material for Diclofenac)





2,6-Dichloroaniline