Chemicals Commonly Used in Biochemistry and Molecular Biology and Their Properties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Chemical Name</th>
<th>M.W.</th>
<th>Properties and Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACES</td>
<td>2-[(2-amino-2-oxyethyl)-amino]ethanesulfonic Acid</td>
<td>182.20</td>
<td>One of the several “Good” buffers.</td>
</tr>
</tbody>
</table>


**Acetaldehyde**

Acetaldehyde, Glacial 60.05 Solvent (particular use in the extraction of collagen from tissue), buffer component (used in urea-acetic acid electrophoresis). Use in endoscopy as mucous-resolving agent.


**Acetic Acid**


**Acetic Anhydride**

![Acetic Anhydride](image)

Acetic anhydride


**Acetone**

![Acetone](image)

Acetone


**Acetonitrile**


**Acetyl Chloride**


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**N-Acetylimidazole**

1-acetyl-1H-imidazole 110.12 Reagent for modification of tyrosyl residues in proteins.


**Acetylsalicylic Acid**

2-(acetoxy)benzoic acid 180.16 Analgesic, anti-inflammatory; mild acetylating agent.


**Acrylamide** 2-propenamide 71.08 Monomer unit of polyacrylamide in gels, hydrogels, hard polymers; environmental carcinogen; fluorescence quencher.


**Gamma (γ)-aminobutyric Acid (GABA)** 4-aminobutanoic 103.12 Neurotransmitter.

Amiloride  

\[
\text{Cl} \quad \text{N} \quad \text{N} \quad \text{O} \quad \text{NH} \quad \text{NH}_2 \quad \text{H}_2\text{N} \quad \text{N} \quad \text{H}_2\text{N} \quad \text{NH}_2
\]

Amiloride

2,5-diamino-N-(aminoiminomethyl)-6-chloropyrazine-carboxamide

229.63 Sodium ion channel blocker.


2-Aminopyridine  

\[
\alpha\text{-aminopyridine}
\]

94.12 Precursor for synthesis of pharmaceuticals and reagents; used to derivatize carbohydrates for analysis; blocker of K+ channels.


Ammonium Bicarbonate  

\[
\text{NH}_4\text{CO}_3
\]

79.06 Volatile buffer salt.

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ANS

[![Chemical Structure](attachment:image.png)](attachment:image.png)

**ANS**

1-anilino-8-naphthalenesulfonate, ANS

Fluorescent probe for protein conformation; considered a hydrophobic probe; study of molten globules.


Arachidonic Acid

[![Chemical Structure](attachment:image.png)](attachment:image.png)

**Arachidonic Acid**

5,8,11,14(all cis)-eicosatetraenoic Acid

Essential fatty acid; precursor of prostaglandins, thromboxanes, and leukotrienes.

Ascorbic Acid

Vitamin C; 3-oxo-L-gulofuranolactone

Nutrition, antioxidant (reducing agent); possible antimicrobial function.

Ascorbic acid Dehydroascorbic acid


Benzaldehyde

Benzoic

Aldehyde; Essential Oil of Almond

Intermediate in manufacture of pharmaceuticals, flavors; reacts with amino groups, semicarbazidizide.


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Benzamidine HCl

\[
\begin{align*}
\text{H}_2\text{N} & \quad \text{NH} \\
\end{align*}
\]

156.61 Inhibitor of tryp ticlike serine proteases.


Benzene

\[
\begin{align*}
\text{H}_2\text{N} & \quad \text{NH}_2 \\
\end{align*}
\]

78.11 Solvent; a xenobiotic.


Benzidine

\[
\begin{align*}
\text{H}_2\text{N} & \quad \text{NH}_2 \\
\end{align*}
\]

184.24 Precursor for azo dyes; mutagenic agent; forensic analysis for bloodstains based on reactivity with hemoglobin.


Biotin

Coenzyme R 244.31 Coenzyme function in

carboxylation reactions; growth factor; tight binding
to avidin used for affinity interactions.


**Biuret**

\[
\begin{align*}
\text{Biuret} & \quad \text{Imidodicarbonic acid} \\
& \quad \text{Diamide} \\
& \quad \text{Prepared by heating urea, reaction with cupric ions in base yields red-purple (the biuret reaction); nonprotein nitrogen (NPN) nutritional source.}
\end{align*}
\]


**Blue Tetrazolium**

\[
\begin{align*}
\text{Tetrazolium Blue} & \quad 727.65 \\
\text{Tetrazole form} & \quad \text{Stain for cytotoxicity based on change to formazan on reduction. See nitro blue tetrazolium, which has similar chemistry and higher use.}
\end{align*}
\]

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Biochemistry and Molecular Biology Compendium


Boric Acid

\[
\begin{align*}
\text{HO} & \quad \text{OH} \\
\text{B} & \quad \text{OH}_4^-
\end{align*}
\]

\[
\text{B(OH)}_3 + 2\text{H}_2\text{O} \quad \text{B(OH)}_4^- + \text{H}_3\text{O}^+
\]

O-boric Acid 61.83 Buffer salt, manufacturing; complexes with carbohydrates and other polyhydroxyl compounds; therapeutic use as a topical antibacterial/antifungal agent.

BPNS-Skatole

\[
\text{H}_2\text{C} \quad \text{Br} \quad \text{S} \quad \text{NO}_2
\]

(2-[2′-nitrophenylsulfenyl]-3-methyl-3′-bromoindolenine)

Tryptophan modification, peptide-bond cleavage; derived from skatole, which is also known as boar taint.


Bromoacetic Acid

Bromoacetic Acid 138.95 Alkylating agent; reacts with various nucleophiles.

**p-Bromophenacyl Bromide**

![Chemical Structure](image)

*2-bromo-1-(4-bromophenyl)ethanone; 4-bromophenacyl Bromide*

Modification of various residues in proteins; reagent for identification of carboxylic acids; phospholipase A2 inhibitor.


**Bromophenol Blue**

![Chemical Structure](image)

Bromophenol Blue


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**Cacodylic Acid**

\[
\begin{align*}
\text{H}_3\text{C} & \quad \text{As} & \quad \text{OH} \\
\text{CH}_3 & \\
\text{Acacodylic acid} & \\
\text{Dimethylarsinic acid}
\end{align*}
\]


**Calcium Chloride**

\[
\text{CaCl}_2; \text{Various Hydrates}
\]

110.98 Anhydrous form as drying agent for organic solvents, variety of manufacturing uses; meat quality enhancement; therapeutic use in electrolyte replacement and bone cements; source of calcium ions for biological assays.


**Cetyl Pyridinium Chloride**

![Cetyl pyridinium chloride](image)


**CHAPS**

![CHAPS](image)


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Chloroform  
Trichloromethane 177.38  Used for extraction of lipids, usually in combination with methanol.


Cholesterol 386.66  The most common sterol in man and other higher animals. Cholesterol is essential for the synthesis of a variety of compounds including estrogens and vitamin D; also membrane component.


Cholic Acid 408.57  Component of bile; detergent.

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Citraconic Anhydride

Methylmaleic Anhydride 112.1 Reversible modification of amino groups.


Congo Red

CI Direct Red 28; 696.68 pH indicator, histological stain for collagen, amyloid, elastin.

Sodium Diphenyldiazobis-naphthalamine-sulfonate

**Coomassie Brilliant Blue G-250**

CI Acid Blue 90 854 Most often used for the colorimetric determination of protein.

![Coomassie Brilliant Blue G-250](image)


**Coomassie Brilliant Blue R-250**

CI Acid Blue 83 826 Most often used for the detection of proteins on solid matrices such as polyacrylamide gels.

![Coomassie Brilliant Blue R-250](image)

Coomassie Brilliant Blue RL

<table>
<thead>
<tr>
<th>CI Acid Blue 92:</th>
<th>695.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anazolene Sodium</td>
<td></td>
</tr>
</tbody>
</table>

**Cy2**

Fluorescent label used in proteomics and gene expression; use for internal standard.

Cy 3

Fluorescent label used in proteomics and gene expression; in combination with Cy 5 is used for FRET-based assays.


Cy 5

Fluorescent label used in proteomics and gene expression; also used in histochemistry.


Cyanine Dye (See glossary) Cy 2, Cy 3, and Cy 5 are cyanine dye derivatives.

α-Cyano-4-hydroxycinnamic Acid

4-HCCA; Cinnamate 189.2 Used as matrix substance for MALDI; transport inhibitor and enzyme inhibitor.

Alpha-cyano-4-hydroxycinnamic acid

Chemicals Commonly Used in Biochemistry and Molecular Biology and Their Properties

Cyanogen

C$_2$N$_2$; Ethanedinitrile 53.03 Protein crosslinking at salt bridges.


Cyanogen Bromide

CNBr; Bromide 105.9 Protein modification; cleavage of peptide bonds; coupled nucleophiles to polyhydroxyl matrices; environmental toxicon derived from monobromamine and cyanide.


**Cyanuric Chloride**

2,4,6-trichloro-1,3,5-triazine

184.41

Coupling of carbohydrates to proteins; more recently for coupling of nucleic acid to microarray platforms.


**1,2-Cyclohexylenedinitrilotetraacetic Acid**

Chelating agent suggested to have specificity for manganese ions; weaker for other metal ions such as ferric.


**Dansyl Chloride**

5-(dimethylamino)-1-naphthalene-sulfonyl Chloride

269.8 Fluorescent label for proteins; amino acid analysis.


Deoxycholic Acid

Deoxycholic Acid

Detergent, nanoparticles.

Deuterium Oxide

“Heavy Water” 20.03 Structural studies in proteins, enzyme kinetics; in vivo studies of metabolic flux.

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**DFP**

Diisopropylphosphorofluoridate; Isofluorophate 184.15 Classic cholinesterase inhibitor; inhibitor of serine proteases, some nonspecific reaction tyrosine.


**Dichloromethane**

Methylene Chloride 84.9 Lipid solvent; isolation of sterols, frequently used in combination with methanol.

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Diethyldithiocarbamate

Diethylpyrocarbonate (DEPC)


Diethylpyrocarbonate (DEPC)  Ethoxyformic Anhydride  Reagent for modification of proteins and DNA; used as a sterilizing agent; RNAse inhibitor for RNA purification; preservative for wine and fruit fluids.

**Dimedone**

Dimedone is originally described as a reagent for assay of aldehydes; used as a specific modifier of sulfenic acid.

**Dimethylformamide (DMF)**

Dimethylformamide is a solvent. Its structure is shown below.

**Dimethyl Suberimidate (DMS)**

Crosslinking agent.

Dimethyl Sulfate

126.1 Methylating agent; methylation of nucleic acids; used for a process called footprinting to identify sites of protein–nucleic acid interaction.


Dioxane

1,4-diethylene dioxide

1,4-Dioxane


**DMSO**

Dimethylsulfoxide 78.13 Solvent; suggested therapeutic use; effect on cellular function; cryopreservative.


EDC

1-ethyl-(3-dimethylamino propyl)-carbodiimide; 
N-(3-dimethylamino-propyl)-N'-ethyl-carbodiimide

191.7 (HCl)

Water-soluble carbodiimide for the modification of carboxyl groups in proteins; zero-length crosslinking proteins; activation of carboxyl groups for amidation reactions, as for the coupling of amino-nucleotides to matrices for DNA microarrays.


**EDTA**

Ethylenediaminetetraacetic Acid 292.24

Chelating agent; some metal ion-EDTA complexes (i.e., Fe**3+**-EDTA) function as chemical nucleases.

**Ellman’s Reagent**

![Ellman's Reagent](image)

Ellman’s reagent 5,5′-dithio-bis-[2-nitro-benzoic acid] 396.35

Reagent for determination of sulfydryl groups/disulfide bonds.


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Ethanolamine

\[
\begin{align*}
\text{H}_2\text{N} & \quad \text{H}_2 \\
\text{H} & \quad \text{C} \quad \text{OH} \\
\text{H}_2 & \quad \text{N}\quad \text{H}_2
\end{align*}
\]


**Ethidium Bromide**

\[
\begin{align*}
\text{H}_2\text{N} & \quad \text{N}^+ \quad \text{Br}^- \\
& \quad \text{H}_2\text{C} \quad \text{CH}_3
\end{align*}
\]

Ethidium bromide (Homidium Bromide)

3, 8-diamino-6-ethyl-5-phenylphenanthridium bromide


**Ethyl Alcohol**

\[
\begin{align*}
\text{H}_3\text{C} & \quad \text{H}_2 \\
\text{C} & \quad \text{OH}
\end{align*}
\]

Ethanol

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**Ethylene Glycol**

\[
\begin{align*}
\text{H}_2\text{C} & \text{OH} \\
\text{H} & \text{CH} \\
\text{H} & \text{CH} \\
\text{OH} & \\
\text{H} & \\
\end{align*}
\]

1,2-ethanediol 62.07 Solvent/cosolvent; increases viscosity (visogenic osmolyte); perturbant; cryopreservative.


**Ethyleneimine**

\[
\begin{align*}
\text{H}_2\text{C} & \text{NH} \\
\text{H}_2\text{C} & \\
\end{align*}
\]

Aziridine 43.07 Modification of sulfhydryl groups to produce amine functions; alkylating agent; reacts with carboxyl groups at acid pH; monomer unit for polyethylene amine, a versatile polymer.

**Ethylene Oxide**

![Ethylene oxide](image)

Oxirane 44.05 Sterilizing agent; starting material for ethylene glycol and other products such as nonionic surfactants.


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N-Ethylmaleimide  \( \text{1-ethyl-1H-pyrrole-2,5-dione} \)

Modification of sulfhydryl groups; basic building block for a number of reagents. Mechanism different from alkylating agent in that reaction involves a Michael addition.


Fluorescein  \( \text{332.31} \)

Fluorescent dye that can be combined with a reactive function group such as fluorescein isothiocyanate (FITC); used for fluorescent angiography with emphasis on ophthalmology.

**Formaldehyde**

![Formaldehyde structure](image)

**Methanol**

![Methanol structure](image)

Tissue fixation; protein modification; zero-length crosslinking; protein–nucleic acid interactions.

Formaldehyde

And higher polymers

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Chemicals Commonly Used in Biochemistry and Molecular Biology and Their Properties

Formic Acid

H_2C=O

Formic acid

H_2C(OH)NH_2

Formamide


Glutaraldehyde

Pentanedial

Protein modification; tissue fixation; sterilization agent approved by regulatory agencies; use with albumin as surgical sealant.

**Glutathione**

\[
\begin{align*}
\text{HO} & \quad \text{HN} & \quad \text{O} \\
\text{O} & \quad \text{HN} & \quad \text{SH} \\
\text{SH} & \quad \text{NH}_2 & \quad \text{OH}
\end{align*}
\]

γ-GluCysGly 307.32 Reducing agent; intermediate in phase II detoxification of xenobiotics.

**Glycine**

\[
\begin{align*}
\text{NH}_2 & \quad \text{CH} & \quad \text{OH} \\
\text{H}_3C & \quad \text{C} & \quad \text{O}
\end{align*}
\]

Aminoacetic Acid 75.07 Buffer component; protein-precipitating agent, excipient for pharmaceutical formulation.


**Glyoxal**

![Glyoxal](image)

**Glyoxal**


**Guanidine**

**Guanidine Hydrochloride (GuCl)**

**Guanidine Thiocyanate (GTIC)**

![Guanidine](image)


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HEPES

4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid

A “Good” buffer; reagent purity has been an issue; metal ion binding must be considered; there are buffer-specific effects that are poorly understood; component of tissue-fixing technique.

HEPES; 4-(2-hydroxyethyl)-1-piperazinethanesulfonic acid oo

Chemicals Commonly Used in Biochemistry and Molecular Biology and Their Properties

**Hydrazine**  
*NH₂*₄  32.05  Reducing agent; modification of aldehydes and carbohydrates; hydrazinolysis used for release of carbohydrates from protein; derivatives such as dinitrophenylhydrazine used for analysis of carbonyl groups in oxidized proteins; detection of acetyl and formyl groups in proteins.


**Hydrogen Peroxide**  
*H₂O₂*  34.02  Oxidizing agent; bacteriocidal agent.

**Hydroxylamine**  
*H₃NO*  33.03

**8-Hydroxyquinoline**  
8-quinolinol  145.16  Metal chelator.

8-hydroxyquinoline

**Imidazole**  
1,3-diazole  69.08  Buffer component.

**Indole**  
2,3-benzopyrrole  117.15

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Indole-3-acetic Acid

Indoleacetic Acid; 175.19 Plant growth regulator.
Heteroauxin


Iodoacetamide

2-iodoacetamide 184.96 Alkylating agents that react with a variety of nucleophiles in proteins and nucleic acids. Reaction is more rapid than the bromo or chloro derivatives.

Iodoacetic Acid

185.95


2-Iminothiolane (Traut’s Reagent) 137.63 Introduction of sulfydryl group by modification of amino group; sulfydryl groups could then be oxidized to form cystine, which served as cleavable protein crosslink.


Isatoic Anhydride

3,1-benzoxazine-2,4(1H)-dione 163.13 Fluorescent reagents for amines and sulfydryl groups; amine scavenger.


Isoamyl Alcohol

Isopentyl Alcohol; 88.15 Solvent.

H3C
CH
OH
Isopropyl alcohol

Isopropanol

2-propanol 60.10 Solvent; precipitation agent for purification of plasmid DNA; reagent in stability test for identification of abnormal hemoglobins.

**Isopropyl-β-D-thiogalactoside**

![Diagram of Isopropyl-β-D-thiogalactopyranoside](image)

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPTG, Isopropyl-β-D-thiogalactopyranoside</td>
<td>238.3</td>
</tr>
</tbody>
</table>

“Gratuitous” inducer of the lac operon.


<table>
<thead>
<tr>
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</table>

“Gratuitous” inducer of the lac operon.
Maleic Anhydride

<table>
<thead>
<tr>
<th>Chemical Structure</th>
<th>Function</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Maleic Anhydride" /></td>
<td>2,5-furandione 98.06</td>
<td>Modification of amino groups in proteins. The dimethyl derivative (dimethylmaleic anhydride) is used for ribosome dissociation; monomer for polymer.</td>
</tr>
</tbody>
</table>


2-Mercaptoethanol

<table>
<thead>
<tr>
<th>Chemical Structure</th>
<th>Function</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="2-Mercaptoethanol" /></td>
<td>β-mercaptoethanol 78.13</td>
<td>Reducing agent; used frequently in the reduction and alkylation of proteins for structural analysis and for preservation of oxidation-sensitive enzymes.</td>
</tr>
</tbody>
</table>


(3-Mercaptopropyl)trimethoxysilane


MES

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**Methanesulfonic Acid**

96.11 Protein hydrolysis for amino acid analysis; deprotection during peptide synthesis; hydrolysis of protein substituents such as fatty acids.


**Methanol**

32.04 Solvent.

**Methylethyl Ketone (MEK)**

72.11 2-butanal; 2-butanol: Solvent; with acid for cleavage of heme moiety of hemeproteins for preparation of apoproteins.

Methylglyoxal

Pyruvaldehyde; 2-oxo-propanal

72.06

Derived from oxidative modification of triose phosphate during glucose metabolism; model for glycation of proteins; reacts with amino groups in proteins and nucleic acids; involved in advanced glycation endproducts.


Methyl Methane-thiosulfonate (MMTS)

S-methyl Methanethiosulfonate

126.2

Modification of sulfydryl groups.

**N-Methylpyrrolidone**

1-methyl-2-pyrrolidone

99.13 Polar solvent; transdermal transport of drugs.

Chemicals Commonly Used in Biochemistry and Molecular Biology and Their Properties

MOPS

\[
\begin{align*}
\text{H}_2\text{C} & \quad \text{N} \\
\text{H}_2\text{C} & \quad \text{C} \\
\text{N} & \quad \text{O} \\
\text{CH}_3 & \quad \text{O} \\
\end{align*}
\]

3-(N-morpholino)propanesulfonic acid; 4-morpholinepropanesulfonic acid

A “Good” buffer.

Betaine

\[
\begin{align*}
\text{N} & \quad \text{H}_2\text{N} \\
\text{H}_2\text{N} & \quad \text{OH} \\
\end{align*}
\]

1-Carboxy-N,N,N-trimethylamino inner salt

3-(1-Pyridino)-1-[propanesulfonate]


NBS

\[
\begin{align*}
\text{N} & \quad \text{H}_2\text{N} \\
\text{OH} & \quad \text{OH} \\
\end{align*}
\]

N-bromosuccinimide; 1-bromo-2,5-pyrrolidinedione

Protein modification reagent; bromination of olefins; analysis of a variety of other compounds.

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**Neutral Red**

\[
\text{Neutral red dye}\quad N^8-N^9\text{-trimethyl-2,8-phenazinediamine}
\]

\[
\text{Monohydrochloride; CI 50040}
\]

**NHS**

\[
\begin{align*}
\text{N-hydroxysuccinimide} & \quad 111.1 \\
\text{N-hydroxy-1-hydroxy-2,5-pyrrolinedione} & \quad \text{Use in preparation of active esters for modification of amino groups (with carbodiimide); structural basis for reagents for amino group modification.}
\end{align*}
\]

**Ninhydrin**

1-H-indene-1,2,3-trione

Monohydrate

Ninhydrin

178.14

Reagent for amino acid analysis; reagent for modification of arginine residues in proteins; reaction with amino groups and other nucleophiles such as sulfhydryl groups.

Nitric Acid

\[ \text{HNO}_3 \quad 63.01 \quad \text{Strong acid.} \]

**p-Nitroaniline (PNA)**

\[
\begin{align*}
\text{p-nitroaniline} & : & \text{4-nitroaniline} & : & 138.13 & \text{Signal from cleavage of chromogenic substrate.} \\
\text{p-nitrophenol} & : & \text{4-nitrophenol} & : & 139.11 & \text{Popular signal from indicator enzymes such as alkaline phosphatase.}
\end{align*}
\]

**2-Nitrobenzylsulfenyl Chloride**

\[
\begin{align*}
\text{2-Nitrobenzylsulfenyl chloride} & : & \text{o-nitrophenylsulfenyl Chloride} & : & 189.6 & \text{Modification of tryptophan in proteins.}
\end{align*}
\]

Nitro Tetrazolium Blue


n-Octanol

1-Octanol

1-Octanoic acid

Partitioning between octanol and water is used to determine lipophilicity; a factor in QSAR studies.

Octoxynol

\[
\text{Octoxynol, } n = 5–15
\]

Peroxynitrite

Petroleum Ether

Mixture of Pentanes and Hexanes

N/A

Perchloric Acid

\(\text{HClO}_4\)

100.5

Oxidizing agent.

1,10-Phenanthroline Monohydrate

\(o\)-phenanthroline

Hydrate

198.21

Chelating agent; inhibitor for metalloproteinases; use in design of synthetic nucleases and proteases.


Phenol

Hydroxybenzene; 94.11 Solvent; nucleic acid purifier.

Phenyl

Hydroxide


Phenoxyethanol

2-phenoxyethanol 138.16 Biochemical preservative; preservative in personal care products.

**Phenylglyoxal**

Phenylglyoxal 

Phenylglyoxal Hydrate 134.13 Modification of arginine residues.


**Phosgene**

Phosgene

Carbonyl Chloride; Carbon Oxchloride 98.92 Reagent for organic synthesis; preparation of derivatives for analysis.


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**Picric Acid**

2,4,6-trinitrophenol


**Polysorbate**

*Nonionic detergent; surfactant.*

**Polyvinylpyrrolidone (PVP)**

*Pharmaceutical; excipient; phosphate analysis.*

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Pyridine

![Pyridine structure](image)

Pyridine Azine 79.10 Solvent.


Pyridoxal-5-phosphate (PLP)

![Pyridoxal phosphate structure](image)

Pyridoxal-5-phosphate (PLP) 247.14 Selective modification of amino groups in proteins; affinity label for certain sites based on phosphate group.

**Sodium Borohydride**

NaBH₄ 37.83 Reducing agent for Schiff bases; reduction of aldehydes; other chemical reductions.

## Sodium Chloride

<table>
<thead>
<tr>
<th>Salt; NaCl</th>
<th>Ionic strength; physiological saline.</th>
</tr>
</thead>
</table>

## Sodium Cholate

| 430.55   | Detergent. |


## Sodium Cyanoborohydride

| NaBH₃ (CN) | 62.84 | Reducing agent; considered more selective than NaBH₄. |


## Sodium Deoxycholate

| Desoxycolic Acid, Sodium Salt | 414.55 | Detergent; potential therapeutic use with adipose tissue. |


**Sodium Dodecylsulfate**

Sodium Lauryl Sulfate, SDS, lauryl sulfate, sodium salt


**Sodium Metabisulfite**

Sodium Bisulfite 190.1 Mild reducing agent; converts unmethylated cytosine residues to uracil residues (DNA methylation).


**Succinic Anhydride**

Butanedioic Anhydride; 2,5-diketotetrahydrofuran

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**Sucrose**

342.30 Osmolyte; density gradient centrifugation.


**Sulfuric Acid**

\[ \text{H}_2\text{SO}_4 \]

98.1 Strong acid; component of piranha solution with hydrogen peroxide.

**TES**

\[ \text{N-Tris}(\text{hydroxy})\text{methyl} \]

Methyl-2-aminoethane-sulfonic acid

229.3 A “Good” buffer.


**Tetrabutylammonium Chloride**

277.9 Ion-pair reagent for extraction and HPLC.


**Tetrahydrofuran**

Trimethylene Oxide 72.1 Solvent; template for combinatorial chemistry.


**Tetraphenylphosphonium Bromide**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Molecular Mass</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetraphenylphosphonium bromide</td>
<td>419.3</td>
<td>Membrane-permeable probe; determination of metal ions.</td>
</tr>
</tbody>
</table>


**Thioflavin T**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Molecular Mass</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thioflavin T</td>
<td>CI49005</td>
<td>Basic Yellow 1, Dye for measurement of amyloid in tissue.</td>
</tr>
</tbody>
</table>

Biochemistry and Molecular Biology Compendium


Thionyl Chloride

Sulfurous

Preparation of acyl Oxochloride

chlorides.


Thiophosgene

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**TNBS**

Trinitrobenzenesulfonic Acid 293.2

Reagent for the determination of amino groups in proteins; also reacts with sulfydryl groups and hydrazides; used to induce animal model of colitis.

TNM

Tetranitromethane 196.03 Modification of tyrosine residues in proteins; crosslinking a side reaction as a reaction with cysteine; antibacterial and antiviral agent.

Chemicals Commonly Used in Biochemistry and Molecular Biology and Their Properties


**Trehalose** 342.3

A nonreducing sugar that is found in a variety of organisms where it is thought to protect against stress such as dehydration; there is considerable interest in the use of trehalose as a stabilizer in biopharmaceutical proteins.


**Trichloroacetic Acid** 163.4

Protein precipitant.


### Triethanolamine

- **pKa approx. 9.5**
- **Buffer; transdermal transfer reagent.**

### Triethylamine

- **N,N-diethylethanamine**
- **101.2** Ion-pair reagent; buffer.

### Trifluoroacetic Acid

- **114.0** Ion-pair reagent; HPLC; peptide synthesis.


Tris-(2-carboxyethyl) phosphine

\[ \text{TCEP} \]

Vinyl Pyridine

4-vinylpyridine 105.1 Modification of cysteine residues in protein.

Water

Hydrogen Oxide 18.0 Solvent.

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Urea

Carbamide 60.1 Chaotropic agent.

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