

Use of Environmentally Friendly Synthesized Zero-valent Iron Nanoparticles (nZVI) for the Removal of Dyes from Water. A Review.

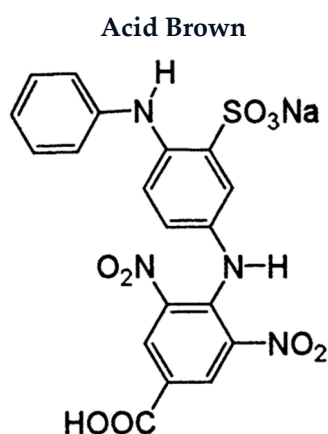
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Supplementary material

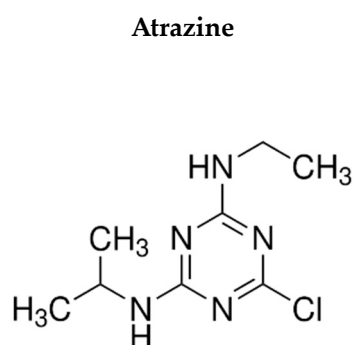
The chemical structures of the different dyes used in this review are illustrated bellow. For the sake of clarity, the dyes have been divided in two broad groups, following the well-known classification of dyes into “azo” and “non-azo” dyes. The common name, structure and IUPAC name of the different dyes is indicated for all of the dyes.

Table S1. Common names, chemical structure, and IUPAC names of the different dyes referred to in this work.

NON- AZO DYES

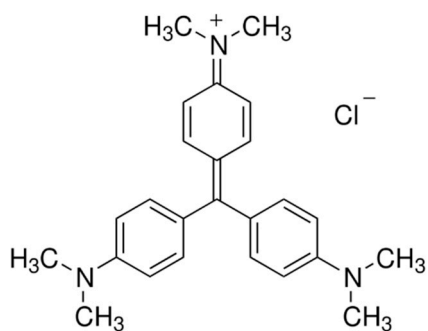


3,5-Dinitro-4-[[4-(phenylamino)-3-(sodiumsulfo)phenyl]amino]benzoic acid



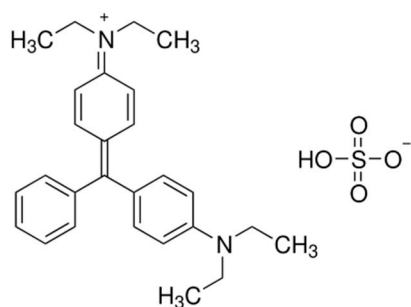
2-Chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine

Basic Violet 3 = Crystal Violet



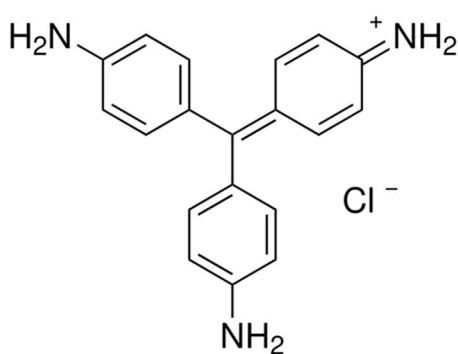
[4-[bis[4-(dimethylamino)phenyl]methylidene]cyclohexa-2,5-dien-1-ylidene]-dimethylazanium;chloride;hydrate

Brilliant Green



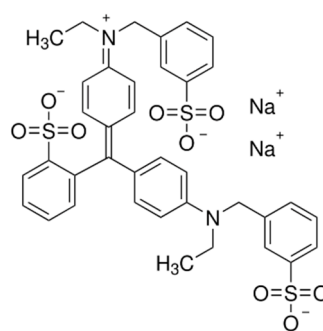
[4-[[4-(diethylamino)phenyl]-phenylmethylidene]cyclohexa-2,5-dien-1-ylidene]-diethylazanium;hydrogen sulfate

Fuchsin Basic



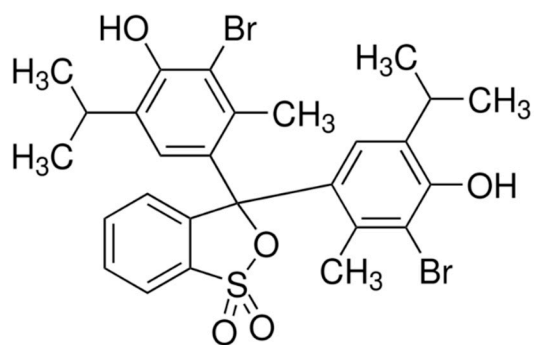
4-[(4-aminophenyl)-(4-imino-3-methylcyclohexa-2,5-dien-1-ylidene)methyl]aniline;hydrochloride

Brilliant Blue



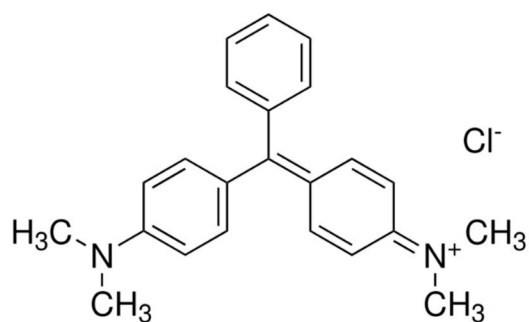
disodium;2-[[4-[ethyl-[(3-sulfonatophenyl)methyl]amino]phenyl]-[4-[ethyl-[(3-sulfonatophenyl)methyl]azaniumylidene]cyclohexa-2,5-dien-1-ylidene]methyl]benzenesulfonate

Bromothymol Blue



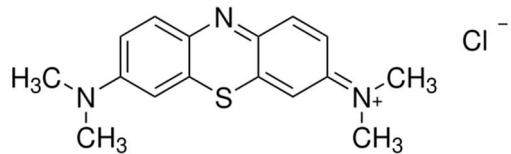
3,3-Bis[3-bromo-4-hydroxy-2-methyl-5-(propan-2-yl)phenyl]-2,1λ⁶-benzoxathiole-1,1(3H)-dione

Malachite Green



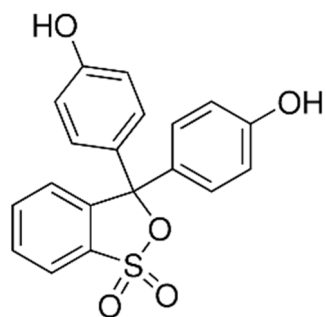
N,N,N',N'-Tetramethyl-4,4'-diaminotriphenylcarbenium chloride, 4

Methylene blue



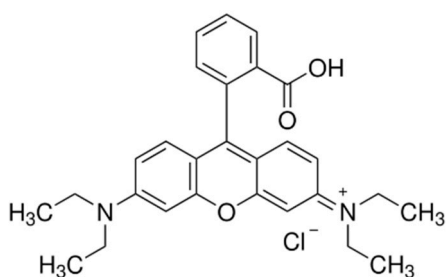
3,7-bis(Dimethylamino)phenazathionium chloride

Phenol Red



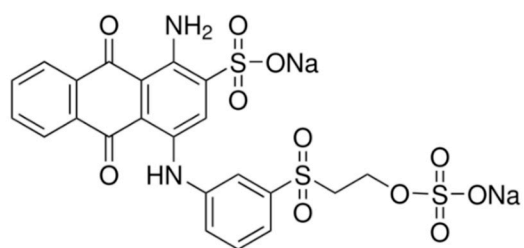
4-[3-(4-hydroxyphenyl)-1,1-dioxo-2,1λ⁶-benzoxathiol-3-yl]phenol

Rhodamine B



9-(2-Carboxyphenyl)-6-(diethylamino)-N,N-diethyl-3H-xanthen-3-iminium chloride

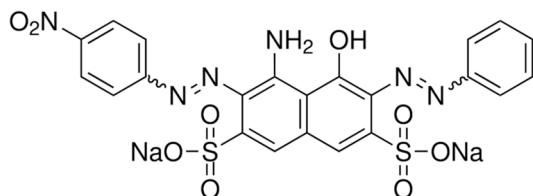
Remazol Brilliant Blue



disodium 1-amino-9,10-dioxo-4-({3-[2-(sulfonatooxy)ethanesulfonyl]phenyl}amino)-9,10-dihydroanthracene-2-sulfonate

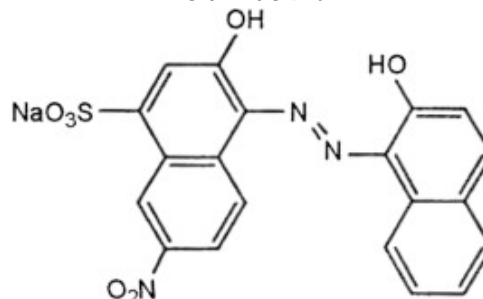
AZO DYES

Acid Black



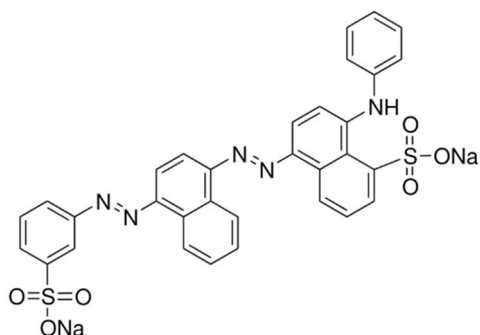
disodium;4-amino-5-hydroxy-3-[(4-nitrophenyl)diazenyl]-6-phenyldiazenylnaphthalene-2,7-disulfonate

Acid Black 194



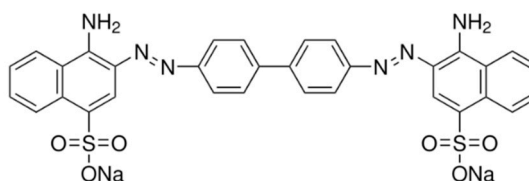
sodium;3-hydroxy-4-[(2-hydroxynaphthalen-1-yl)diazenyl]-7-nitronaphthalene-1-sulfonate

Acid Blue 113



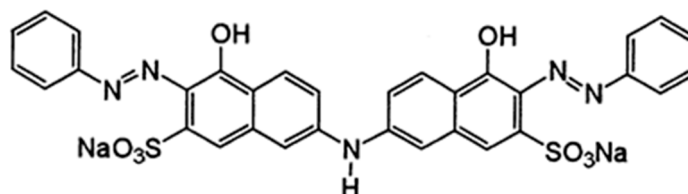
disodium;8-anilino-5-[[4-[(3-sulfonatophenyl)diazenyl]naphthalen-1-yl]diazenyl]naphthalene-1-sulfonate

Congo Red



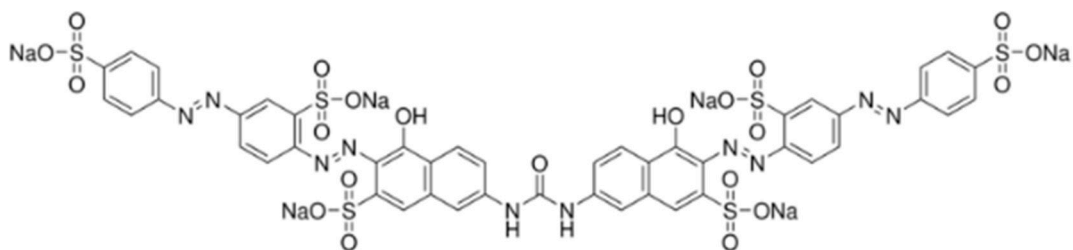
disodium 4-amino-3-[4-[4-(1-amino-4-sulfonato-naphthalen-2-yl)diazenylphenyl]phenyl]diazenyl-naphthalene-1-sulfonate

Direct Red 31



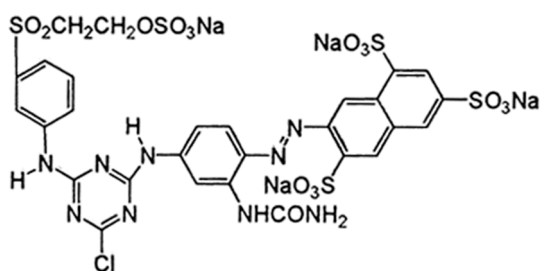
Disodium 7,7'-iminobis[4-hydroxy-3-(phenylazo)naphthalene-2-sulphonate]

Direct Red 80



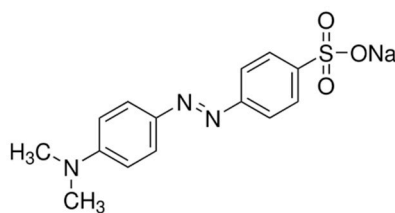
hexasodium;4-hydroxy-7-[[5-hydroxy-7-sulfonato-6-[[2-sulfonato-4-[(4-sulfonatophenyl)diazenyl]phenyl]diazenyl]naphthalen-2-yl]carbamoylamino]-3-[[2-sulfonato-4-[(4-sulfonatophenyl)diazenyl]phenyl]diazenyl]naphthalene-2-sulfonate

Golden Yellow 145



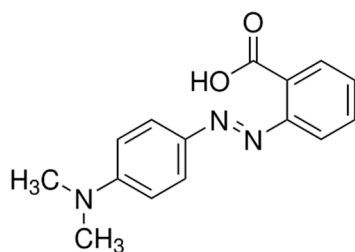
tetrasodium;7-[[2-(carbamoylamino)-4-[[4-chloro-6-[3-(2-sulfonatoethoxyethyl)sulfonyl]anilino]-1,3,5-triazin-2-yl]amino]phenyl]diazenyl]naphthalene-1,3,6-trisulfonate

Methyl Orange



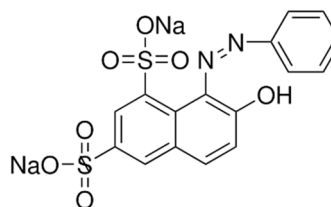
4-[4-(Dimethylamino)phenylazo]benzenesulfonic acid sodium salt

Methyl Red



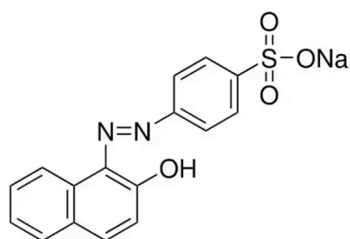
2-[[4-(dimethylamino)phenyl]diazenyl]benzoic acid

Orange G



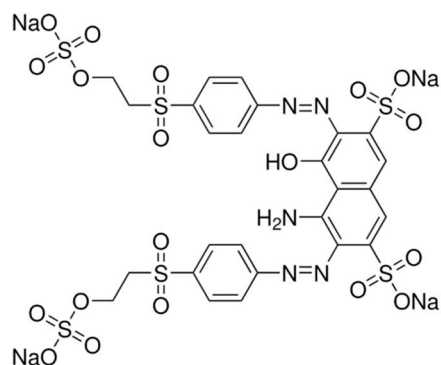
disodium;7-hydroxy-8-phenyldiazenylnaphthalene-1,3-disulfonate

Orange II



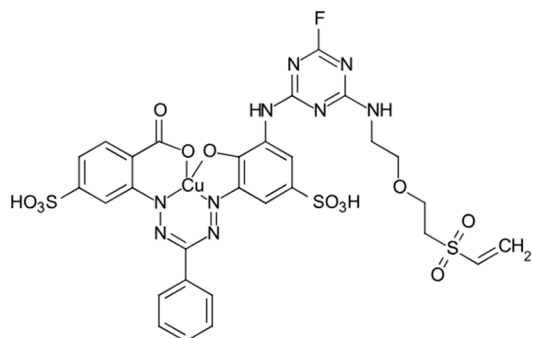
sodium;4-[2-(2-oxonaphthalen-1-ylidene)hydrazinyl]benzenesulfonate

Reactive Black 5



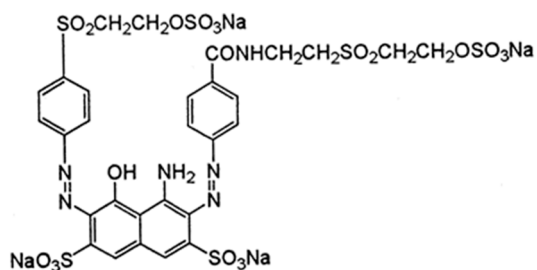
tetrasodium;4-amino-5-hydroxy-3,6-bis[[4-(2-sulfonatooxyethylsulfonyl)phenyl]diazenyl]naphthalene-2,7-disulfonate

Reactive Blue 235



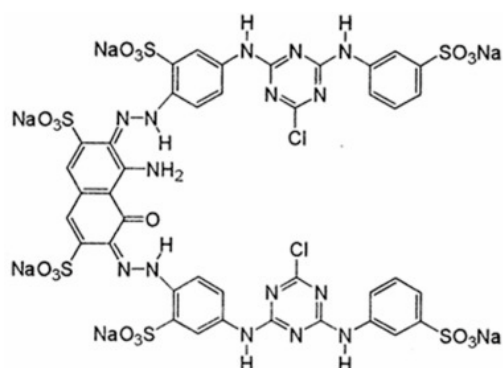
((Z)-1-(2-carboxy-5-sulphophenyl)-2-(((E)-(3-((4-fluoro-6-((2-((vinylsulfonyl)methoxy)ethyl)amino)-1,3,5-triazin-2-yl)amino)-2-hydroxy-5-sulphophenyl)diazenyl)methylene)hydrazinyl)copper

Reactive Blue 238



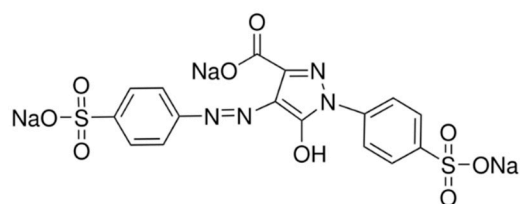
"3-Amino-5-hydroxy-6-(3-(2-(2-(sulfonatooxy)ethylsulfonyl)ethylcarbamoyl)phenylazo)-3-(4-(2-(sulfonatooxy)ethylsulfonyl)phenylazo)naphthalene-2,7-disulfonate de tetrasodium

Reactive Green-19



Hexasodium (3Z)-5-amino-6-[(E)-[4-({4-chloro-6-[(3-sulfonatophenyl)amino]-1,3,5-triazin-2-yl}amino)-2-sulfonatophenyl]diazenyl]-3-[[4-({4-chloro-6-[(3-sulfonatophenyl)amino]-1,3,5-triazin-2-yl}amino)-2-sulfonatophenyl]hydrazono}-4-oxo-3,4-dihydro-2,7-naphthalenedisulfonate

Tartrazine



trisodium;5-oxo-1-(4-sulfonatophenyl)-4-[(4-sulfonatophenyl)diazenyl]-4H-pyrazole-3-carboxylate