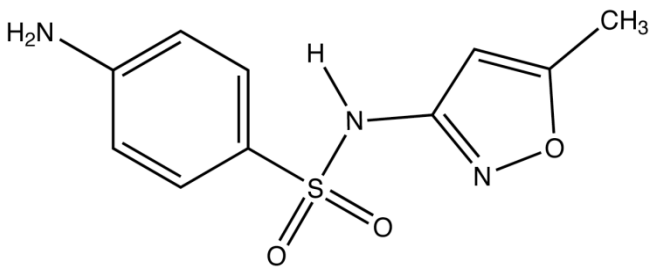
Miljø- og
Ligestillingsministeriet
Miljøstyrelsen

Fastsættelse af kvalitetskriterier for vandmiljøet

Sulfamethoxazol

CAS nr. 723-46-6



Vandkvalitetskriterium	$VKK_{ferskvand}$	0,59 µg/l
Vandkvalitetskriterium	$VKK_{saltvand}$	0,059 µg/l
Korttidsvandkvalitetskriterium	$KVKK_{ferskvand}$	2,68 µg/l
Korttidsvandkvalitetskriterium	$KVKK_{saltvand}$	0,536 µg/l
Sedimentkvalitetskriterium	$SKK_{ferskvand}$	Ikke relevant
Sedimentkvalitetskriterium	$SKK_{saltvand}$	Ikke relevant
Biota-kvalitetskriterium, sekundær forgiftning	$BKK_{sek.forgiftn.}$	Ikke relevant
Biota-kvalitetskriterium, human konsum	HKK	Ikke relevant

Februar 2025

Indholdsfortegnelse

Forord

Et kvalitetskriterium i vandmiljøet er det højeste koncentrationsniveau, ved hvilket der skønnes, ikke at forekomme uacceptable negative effekter på vandøkosystemer.

Miljøstyrelsen (MST) udarbejder kvalitetskriterier for kemikalier i vandsøjlen, i sediment, i dyr og planter (biota) og for human konsum.

Miljøstyrelsen bruger kvalitetskriterierne som det faglige grundlag til at kunne fastsætte miljøkvalitetskrav, hvorved der forstås den endelige koncentration af et bestemt forurenende stof i vand, sediment eller biota, som ikke må overskrides af hensyn til beskyttelsen af miljøet og menneskers sundhed.

Metodikken, der anvendes til udarbejdelse af miljøkvalitetskrav er harmoniseret i EU og baserer sig på vandrammedirektivet (EU, 2000), EU's vejledning til fastsættelse af kvalitetskriterier i vandmiljøet (EU, 2018) og Miljøstyrelsens vejledning til fastsættelse af vandkvalitetskriterier (Miljøstyrelsen, 2004). Metodikken er endvidere i overensstemmelse med EU's vejledning til risikovurdering under REACH forordningen (EU, 2008).

Den sidste litteratursøgning er foretaget den 31. januar 2024.

English Summary and conclusions

Derivation of environmental quality standards (EQS) for the aquatic environment is following the EU Guidance Document No. 27. Technical Guidance Document (TGD) for Deriving Environmental Quality Standards (EU, 2018).

Sulfamethoxazole is a widely used antibiotic. It is not readily biodegradable. It has a low potential for bioaccumulation and for sorption to sediment thus only quality criteria (QS) for water has been derived.

Ecotoxicity data are presented in appendix A. The Swiss Ecotox Centre (Eawag, 2015) has assessed most of the studies used in accordance to reliability and relevance, which have been implemented in this dossier.

AA-EQS for water
Validated data for chronic effects are available for 10 freshwater species (*Synechococcus leopolensis*, *Desmodesmus subspicatus*, *Pseudokirchneriella subcapitata*, *Cyclotella meneghiniana*, *Lemna gibba*, *Hydra attenuata*, *Brachionus calyciflorus*, *Ceriodaphnia dubia, Cyrinus carpio* and *Danio rerio*) representing the following eight taxonomic groups: cyanobacteria, green algae, diatoms, aquatic plants, cnidarian (hydrozoa), rotifer, crustacean and fish. For saltwater chronic data are only available for a mesocosm study with bacteria and algae. Therefore, data for freshwater and saltwater is combined.

The lowest chronic effect value is for the cyanobacteria *Synechococcus leopolensis* with a NOEC of 5.9 µg/l (96h, growth) (Ferrari et al., 2004). Following TGD table 3 (EU, 2018) an assessment factor (AF) of 10 is used, resulting in the following AA-EQS for freshwater:

AA-EQS$_{freshwater}$ = 5.9 µg/l / 10 = 0.59 µg/l

For saltwater the same effect value as for freshwater is used. Following TGD table 4 (EU, 2018) an AF of 100 is used, resulting in the following AA-EQS for saltwater:

AA-EQS$_{saltwater}$ = 5.9 µg/l / 100 = 0.059 µg/l

MAC-EQS for water
Validated data for acute effects are available for 16 freshwater species (*Microcystis aerognosa*, *Synechococcus leopolensis*, *Chlorella vulgaris*, *Desmodesmus subspicatus*, *Raphidocelis subcapitata*, *Scenedesmus vaculatus*, *Cyclotella meneghiniana*, *Lemna gibba*, *Brachionus calyciflorus*, *Ceriodaphnia dubia, Daphnia magna, Moina macropoda, Thamnocephalus platyrus, Xenopus laevis*, *Danio rerio* and *Oryzias latipes*) representing the following eight taxonomic groups: cyanobacteria, green algae, diatoms, aquatic plants, rotifer, crustacean, amphibian and fish. For saltwater acute data are available for five species (*Photobacterium phosphoreum*, *Vibrio fischeri*, *Skeletonema marinoi*, *Artemia salina* and *Branchionus koreanus*) representing the

following four taxonomic groups: bacteria, diatoms, crustacean and rotifer. The two datasets are combined.

The lowest chronic effect value is for the cyanobacteria *Synechococcus leopolensis* with an EC_{10} of 26.8 µg/l (96h, growth) (Ferrari et al., 2004). Following TGD table 5 (EU, 2018) an assessment factor (AF) of 100 is applied, but since mode of action for sulfamethoxazole is known and the most sensitive taxonomic groups is covered, the AF is lowered to 10, resulting in the following AA-EQS for freshwater:

MAC-EQS$_{freshwater}$ = 26.8 µg/l / 10 = 2.68 µg/l

For saltwater the same effect values as for freshwater is used. Following TGD table 6 (EU, 2018) an AF of 500 is applied, but since data is available for one additional marine group (rotifer) and since the mode of action is known for sulfamethoxazole the AF is lowered to 50, resulting in the following MAC-EQS for saltwater:

MAC-EQS$_{saltwater}$ = 26.8 µg/l / 50 = 0.536 µg/l

QS for sediment
No data has been found for sediment dwelling organisms. The criteria for deriving a QS for sediment is also not fulfilled since log K_{OC} and log K_{OW} is < 3.

QS for secondary poisoning
The criteria for deriving a QS for secondary poisoning is not fulfilled since the bioaccumulation potential for sulfamethoxazole is low (log K_{OW} < 3 and BCF < 100).

QS for human health
The criteria for deriving a QS for human consumption is not fulfilled since sulfamethoxazole has no harmonized relevant classifications.

QS$_{water}$ based on QS$_{sec.\ pois.}$ and QS$_{human\ health}$
Neither $QS_{sec.\ pois.}$ or $QS_{human\ health}$ is derived for sulfamethoxazole, therefore no converted QS_{water} value has been derived.

In conclusion, the following EQS for the aquatic environment have been derived for sulfamethoxazole:

AA-EQS$_{freshwater}$	= 0.59 µg/l
AA-EQS$_{saltwater}$	= 0.059 µg/l
MAC-EQS$_{freshwater}$	= 2.68 µg/l
MAC-EQS$_{saltwater}$	= 0.536 µg/l
QS$_{sediment,\ freshwater}$	Not relevant
QS$_{sediment,\ saltwater}$	Not relevant

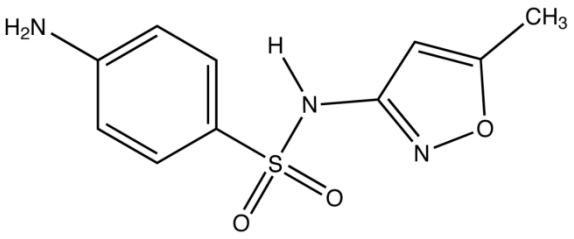
$QS_{sec.\ pois.}$	Not relevant
$QS_{human\ health}$	Not relevant

1 Indledning

Identiteten af sulfamethoxazol fremgår af tabel 1.1.

Sulfamethoxazol hører under gruppen af sulfonamider, som er syntetiske antibiotika. De anvendes til en bred vifte af bakterielle infektioner herunder blærebetændelse, bronkitis og prostatitis hos mennesker. Sulfamethoxazol er effektiv over for både gram negative og positive bakterier og er ligeledes også anvendt til dyrehold og i akvakulturindustrien. Antibiotikummet virker bakteriostatisk ved at hæmme syntesen af folinsyre og derved hæmme bakteriens vækst og replikation. Oftest bliver sulfamethoxazol anvendt sammen med antibiotikummet trimethoprim, fordi denne kombination virker bakteriedræbende (Lægemiddelstyrelsen, 2022; Wang & Wang, 2018).

Tabel 1.1. Identitet af sulfamethoxazol

IUPAC navn	4-amino-N-(5-methyl-1,2-oxazol-3-yl)benzenesulfonamide
Strukturformel	
CAS nr.	723-46-6
EINECS nr.	211-963-3
Kemisk formel	$C_{10}H_{11}N_3O_3S$
SMILES	CC1=CC(=NO1)NS(=O)(=O)C2=CC=C(C=C2)N
Harmoniseret klassificering	Sulfamethoxazol har ingen harmoniserede klassificeringer.
Selvklassificering (C&L-fortegnelse, ECHA)	Aquatic Acute 1 (M=10); H400 (meget giftig for vandlevende organismer) Aquatic Chronic 1 (M=10); H410 (meget giftig med langvarige virkninger for vandlevende organismer) STOT SE 3; H335 (kan forårsage irritation af luftveje)

2 Fysisk kemiske egenskaber

De fysisk kemiske egenskaber for sulfamethoxazol fremgår af tabel 2.1.

Tabel 2.1. Fysisk kemiske egenskaber for sulfamethoxazol

Parameter	**Værdi**	**Reference**
Molekylevægt, M_w ($g \cdot mol^{-1}$)	253,28	PubChem
Smeltepunkt, T_m (ºC)	167	PubChem
Kogepunkt, T_b (ºC)	414,01 [a]	EPI Suite
Damptryk, P_v (Pa)	$9,2 \times 10^{-6}$ [b,c] $1,7 \times 10^{-5}$ [a]	PubChem EPI Suite (bilag A)
Henry's konstant, H ($Pa \cdot m^3 \cdot mol^{-1}$)	$6,5 \times 10^{-8}$ [d]	PubChem
Vandopløselighed, S_w ($mg \cdot L^{-1}$)	610 [e]	PubChem
Dissociationskonstant, pK_a	pKa1: 1,6 pKa2: 5,7	PubChem
Octanol/vand fordelingskoefficient, log K_{ow}	0,89	PubChem
Sediment/vand fordelingskoefficient, normaliseret til organisk karbon, K_{oc} ($L \cdot kg^{-1}$)	72 [a]	PubChem

[a] estimeret værdi
[b] omregnet fra $6,9 \times 10^{-8}$ mm Hg
[c] ved 25 ºC
[d] omregnet fra $6,4 \times 10^{-13}$ atm/mol/m^3
[e] ved 37 ºC

3 Skæbne i miljøet

3.1 Nedbrydelighed

Sulfamethoxazol er beskrevet som ikke let bionedbrydeligt (PubChem). Et sikkerhedsdatablad (SDS) fra firmaet Roche kommer frem til samme konklusion ved en test i aktivt slam følgende både OECD guideline nr. 301D og nr. 302B (Roche SDS, 2022). (Q)SAR beregninger fra Biowin (v4.10) (EPI Suite, bilag B), samt den danske (Q)SAR database (bilag C) forudsiger ligeledes at sulfamethoxazol ikke er let bionedbrydeligt.

Wang & Wang (2018) har lavet et review af mulighederne for mikrobiel nedbrygning i renseanlæg, da eksponering i miljøet bliver en større faktor med stigende anvendelse af antibiotika. Reviewet beskriver, at der ses succes for nedbrydning med forskellige mikroorganismer, eks. *Acinetobactor* sp., men noterer også at parametre som pH, temperatur, inkubationstid, øvrige kulstofkilder og koncentration af sulfamethoxazol kan påvirke nedbrydningen.

Sulfamethoxazol vurderes derfor generelt ikke at være let bionedbrydeligt.

3.2 Bioakkumulering

For sulfamethoxazol er der begrænset data for bioakkumulering. I et studiet af Zhao et al. (2015) er der fundet biokoncentrationsfaktorer (BCF) i lever og muskel for ferskvandsfisken *Cyprinus carpio* på 1,65 til 119,32 l/kg ved eksponeringskoncentrationer fra 0,06 til 6 µg/l, hvor højeste BCF blev fundet ved laveste koncentration.

Eksperimentelt data for bioakkumulering af sulfamethoxazol er begrænset, men vurderes af være lav ud fra en log K_{OW} på 0,89, hvilket indikerer at stoffet ikke har potentiale for at bioakkumulere i vandlevende organismer.

(Q)SAR beregninger fra BCFBAF (v3.01) estimerer en BCF-værdi på 3,16 L/kg vådvægt og en BCF-værdi ved Arnot-Gobas inklusiv biotransformering på 1,45 L/kg vådvægt (EPI Suite, bilag B).

Sulfamethoxazol vurderes derfor at have et lavt potentiale for at bioakkumulere.

3.3 Naturlig forekomst

Der er ikke fundet informationer, der indikerer at sulfamethoxazol forekommer naturligt i miljøet.

4 Toksicitetsdata

Der er generelt søgt efter data i øvrige landes datablade med miljøkvalitetskriterier, herunder er fundet et fra Tyskland og et fra Schweiz, i US-EPA's ECOTOX database og i den åbne litteratur. Data er sammenstillet i bilag A.

Studierne er troværdighedsvurderet ved anvendelse af CRED[1]-scores, hvor score 1 = troværdigt uden restriktioner, score 2 = troværdigt med restriktioner, score 3 = utroværdigt og score 4 = ikke muligt at tildele. Langt de fleste studier er vurderet i databladet udarbejdet af det Schweiziske center for anvendt økotoksikologi (Eawag, 2016). Den Schweiziske vurdering af økotoksicitetsstudier er medtaget og anvendt i udarbejdelsen af vandkvalitetskriterierne i nuværende datablad.

4.1 Toksicitet over for vandlevende organismer

Der er fundet valide kroniske effektværdier for 10 ferskvandslevende organismer (*Synechococcus leopolensis*, *Desmodesmus subspicatus*, *Pseudokirchneriella subcapitata*, *Cyclotella meneghiniana*, *Lemna gibba*, *Hydra attenuata*, *Brachionus calyciflorus*, *Ceriodaphnia dubia, Cyrinus carpio* og *Danio rerio*), som repræsenterer de otte taksonomiske grupper; cyanobakterier, grønalger, kiselalger, højere planter, nældedyr, hjuldyr, krebsdyr og fisk. Der er ikke fundet kroniske effektværdier for saltvandslevende arter.

Der er fundet valide akutte effektværdier for 16 ferskvandlevende arter (*Microcystis aerognosa*, *Synechococcus leopolensis*, *Chlorella vulgaris*, *Desmodesmus subspicatus*, *Raphidocelis subcapitata*, *Scenedesmus vaculatus*, *Cyclotella meneghiniana*, *Lemna gibba*, *Brachionus calyciflorus*, *Ceriodaphnia dubia, Daphnia magna, Moina macropoda, Thamnocephalus platyrus, Xenopus laevis*, *Danio rerio* og *Oryzias latipes*), som repræsenterer de otte taksonomiske grupper cyanobakterier, grønalger, kiselalger, højere planter, hjuldyr, krebsdyr, padder og fisk. For de saltvandslevende organismer er der fundet valide akutte effektværdier for fem arter (*Photobacterium phosphoreum*, *Vibrio fischeri*, *Skeletonema marinoi*, *Artemia salina* og *Branchionus koreanus*), som repræsenterer de fire taksonomiske grupper; bakterier, kiselalger, krebsdyr og hjuldyr.

De akutte og kroniske data er præsenteret i tabellerne i bilag A.

Ud fra det sammenstillede data i bilag A ses det, at særligt grupperne cyanobakterier, alger og højere planter er mere sensitive end øvrige taksonomiske grupper gældende for både det akutte og kroniske datasæt. For de nævnte tre grupper er de laveste effektværdier præsenteret ved hhv. *Synechococcus leopolensis* med en EC_{50} på 26,8 µg/l og NOEC på 5,9 µg/l (Ferrari et al., 2004), *Pseudokirchneriella subcapitata* med en EC_{50} på 146 µg/l og NOEC på 90 µg/l (Ferrari et al., 2004) og *Lemna gibba* med en EC_{50} på 81 µg/l og en EC_{10} på 11 µg/l (Brain et al., 2004).

[1] Forkortelse for *Criteria for Reporting and Evaluation ecotoxicity Data*.

4.2 Toksicitet over for sedimentlevende organismer

Der er ikke fundet toksicitetsdata over for sedimentlevende organismer.

4.3 Toksicitet over for pattedyr og fugle

Der er ikke fundet toksikologiske studier, som indikerer at sulfamethoxazol er særligt toksisk over for fugle og pattedyr. (Q)SAR forudsigelser fra den danske (Q)SAR database (bilag C) forudsiger LD_{50}-værdier for mus og rotter på hhv. 1700 og 4700 mg/kg/dag ved oral optagelse.

4.4 Toksicitet over for mennesker

Der er ikke fundet informationer, der indikerer toksicitet over for mennesker. Dertil er der heller ej fundet en ADI[2], TDI[3] eller RfD[4] for stoffet, forventeligt da det er et antibiotikum, som doseres i en given mængde i relevante behandlingsperioder.

[2] Forkortelse for *Acceptabel Daglig Indtagelse*.
[3] Forkortelse for *Tolerabelt Daglig Indtag*.
[4] Forkortelse for *Reference Dosis*.

5 Andre effekter

Der er ikke fundet indikationer vedrørende andre effekter, såsom hormonforstyrrelser.

6 Udledning af vandkvalitetskriterium

Kvalitetskriterierne er fastsat i overensstemmelse med EU's Guidance Document no. 27: Technical Guidance Document (TGD) for Deriving Environmental Quality Standards (EU, 2018).

6.1 Vandkvalitetskriterium (VKK)

Som beskrevet i afsnit 4.1 foreligge der kroniske effektværdier for 10 ferskvandslevende arter repræsenterende otte taksonomiske grupper. Den laveste kroniske effektværdi er for cyanobakterien *Synechococcus leopoliensis* med en 96 timers NOEC[5] for vækst på 5,9 µg/l (Ferrari et al., 2004) (markeret med fed i bilag A).

Der haves, som nævnt, kroniske effektværdier for otte taksonomiske grupper, som også inkluderer basissættet (alger, krebsdyr og fisk), dertil også specielle grupper som hjuldyr og nældedyr. Derved anvendes der, jævnfør tabel 3 i TGD (EU, 2018), en usikkerhedsfaktor (UF) på 10. VKK for ferskvand bliver derved:

$\mathbf{VKK_{ferskvand}}$ = 5,9 µg/l / 10 = 0,59 µg/l

For saltvand er der kun kronisk data for et enkelt mesokosmos studie med bakterier og alger, hvorved ferskvandsdata også anvendes. Jævnfør tabel 4 i TGD (EU, 2018) anvendes en UF på 100 på laveste kroniske effektværdi. VKK for saltvand bliver derved:

$\mathbf{VKK_{saltvand}}$ = 5,9 µg/l / 100 = 0,059 µg/l

6.2 Korttidsvandkvalitetskriterium (KVKK)

Som beskrevet i afsnit 4.1 foreligger der akutte effektværdier for 16 ferskvandslevende arter repræsenterende otte taksonomiske grupper, og for saltvand foreligger der data for fem arter repræsenterende fire taksonomiske grupper. Laveste akutte effektværdi for ferskvand er for cyanobakterien *Synechococcus leopoliensis* med en 96 timers EC_{50}[6] for vækst på 26,8 µg/l (Ferrari et al., 2004) (markeret med fed i bilag A).

Da der haves data for otte taksonomiske grupper, som også inkluderer basissættet (alger, krebsdyr og fisk), anvendes der jævnfør tabel 5 i TGD (EU, 2018) en UF på 100 som udgangspunkt. UF kan sænkes til 10, hvis standardafvigelsen for de $\log_{10}$ transformerede data er under 0,5, eller hvis mode of action er kendt, og de mest sensitive arter er at finde i datasættet. For det aktuelle datasæt er standardafvigelsen 1,1 (både for ferskvandsdata alene og for det samlede datasæt), men mode of action for sulfamethoxazol er kendt (bakteriedræbende), og dertil er datasættet repræsenteret af flere

[5] Forkortelse for *No Observable Effect Concentration*, dvs. laveste koncentration, hvorved der ikke ses en effekt.
[6] Den effektkoncentration, hvorved 50% af organismerne påvirkes.

sensitive grupper herunder cyanobakterier, alger og højere planter. Derved sænkes UF til 10, og KVKK for ferskvand bliver derved:

$KVKK_{ferskvand}$ = 26,8 µg/l / 10 = 2,68 µg/l

For saltvand er der som nævnt data for fire grupper, men basissættet er ikke opfyldt, da der ikke haves data for fisk. Kombineres saltvandsdata med ferskvandsdata er basissættet opfyldt, og en UF på 500, jævnfør tabel 6 i TGD (EU, 2018) anvendes for udgangspunkt, da der også haves data for en speciel marin gruppe; hjuldyr. Dog er mode of action kendt for sulfamethoxazol, og datasættet dækker også sensitive grupper, herunder bakterier, hvorved UF sættes til 50. KVKK for saltvand bliver derved:

$KVKK_{saltvand}$ = 26,8 µg/l / 50 = 0,536 µg/l

6.3 Kvalitetskriterium for sediment (SKK)

Jævnfør afsnit 4.2 er der ikke fundet data for toksiciteten af sulfamethoxazol over for sedimentlevende arter. Dertil er der ikke indikatorer på, at stoffet ophobes i sediment, da værdierne for K_{OC} og log K_{OW} angivet i tabel 2.1 er under tærskelværdierne på hhv. 1000 og 3. Kriterierne for at fastsætte et kvalitetskriterium for sediment er derfor ikke opfyldt.

6.4 Kvalitetskriterium for biota, sekundær forgiftning ($BKK_{sek.forgiftn.}$)

Jævnfør afsnit 4.3 er der kun fundet få data (estimeret) for toksiciteten af sulfamethoxazol over for pattedyr, og ingen data for fugle, men det fundne data indikerer ikke et behov for at udarbejde kvalitetskriterier for sekundær forgiftning. Dertil er der heller ikke indikationer på at sulfamethoxazol bioakkumulerer, da log K_{OW} angivet i tabel 2.1 og de estimerede BCF-værdier angivet i afsnit 3.2 er under tærskelværdierne på hhv. 3 og 100. Kriterierne for at fastsætte et kvalitetskriterium for sekundær forgiftning er derfor ikke opfyldt.

6.5 Kvalitetskriterium for human konsum af vandlevende organismer (HKK)

Der er jævnfør afsnit 4.4 ikke fundet data, der indikerer toksicitet over for mennesker. Sulfamethoxazol har heller ingen harmoniserede klassificeringer, som opfylder de angivne triggers jævnfør afsnit 2.4.3.2 i TGD (EU, 2018).

6.6 Vandkvalitetskriterium baseret på $BKK_{sek.forgiftn.}$ og HKK

Jævnfør TGD (EU, 2018) skal der laves en tilbageregning fra biotakvalitetskriterierne ($BKK_{sek.forgiftn.}$ og HKK) til en vandkoncentration, for at se om vandkvalitetskriteriet fastsat for direkte effekter, også beskytter for sekundær forgiftning gennem fødekæden, samt beskytter mod forgiftning ved human konsum af fiskeriprodukter.

Der er ikke fastsat nogen kvalitetskriterier for biota, hvorved en tilbageregning ikke er relevant.

6.7 Bidrag af sulfamethoxazol til antimikrobiel resistens

Med den stigende anvendelse af antibiotika er der generelt bekymring for spredning af antibiotikaresistente bakterier og gener i miljøet, såvel som i mennesker og dyr. Ved beregning af overstående vandkvalitetskriterier inddrages økotoksikologiske studier, men her tages der ikke højde for resistens. VKK for ferskvand og saltvand på hhv. 0,6 og 0,06 µg/l for sulfamethoxazol er baseret på NOEC-værdien på 5,9 µg/l (*Synechococcus leopoliensis*, 96 timer, vækst) med en usikkerhedsfaktor på hhv. 10 og 100.

I en publicering fra 2016 har Bengtsson-Palme & Larsson (2016) udledt PNEC [7] for en række antibiotika baseret på MIC [8] fra European Committee on Antimicrobial Susceptibility Testing database (EUCAST). Bestemmelsen af PNEC-MIC er baseret på antagelsen om, at den selektive koncentration af antibiotika skal være lavere end koncentrationen, som hæmmer væksten af bakterier. PNEC-MIC er derfor bestemt ved anvendelse af den laveste MIC-værdi og en usikkerhedsfaktor på 10 i betragtningen af, at den selektive koncentration skal være lavere end den hæmmende koncentration. For at beskytte både miljøet og menneskers sundhed anbefales det at anvende den laveste af de to kriterier (AMR Alliance, 2018; Tell et al., 2019).

For sulfamethoxazol er PNEC-MIC bestemt til 16 µg/L, hvilket er højere end VKK for både ferskvand og saltvand, hvilket betyder, at VKK formodentlig også sikrer beskyttelse ift. resistens. Dog bør det noteres at PNEC-MIC værdien udledt af Bengtsson-Palme & Larsson (2016) ikke tager højde for multiresistente bakterier og heller ikke bakterier, der eksponeres for et mix af forskellige antibiotika. Som nævnt tidligere, så anvendes sulfamethoxazol ofte sammen med det andet antibiotikum trimethoprim. Bengtsson-Palme & Larsson (2016) har også udledt en PNEC-MIC for kombinationen af de to antibiotika på 0,5 µg/l (samme værdi sat for trimethoprim alene), hvilket er under VKK sat for sulfamethoxazol alene.

[7] Forkortelse for *Predicted No Effect Level*. Den koncentration, hvor man ikke forventer at se effekter.
[8] Forkortelse for *Minimum Inhibitory Concentrations*. Angiver den laveste koncentration, der hæmmer organismens vækst.

7 Konklusion

Følgende kvalitetskriterier for vandmiljøet er udregnet for sulfamethoxazol:

Vandkvalitetskriterium

$VKK_{ferskvand}$	0,59 µg/l
$VKK_{saltvand}$	0,059 µg/l

Korttidsvandkvalitetskriterium

$KVKK_{ferskvand}$	2,68 µg/l
$KVKK_{saltvand}$	0,536 µg/l

Sedimentkvalitetskriterium

$SKK_{ferskvand}$	Ikke relevant
$SKK_{saltvand}$	Ikke relevant

Biotakvalitetskriterium, sekundær forgiftning

$BKK_{sek.forgiftn.}$	Ikke relevant

Biotakvalitetskriterium, human konsum

HKK	Ikke relevant

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Bilag A

Toksicitet over for vandorganismer (EC_x, LC_x, NOEC, osv.)

Ferskvandsorganismer

Akut toksicitet

	Målt	Varighed	Effekt	Værdi µg/l	Reference	Troværdighed (1-4)
Bakterier						
Pseudomonas putida	Nej	n.a.	IC_{50}, vækst	256.000	Al-Ahmad et al., 1999	3 [a]
Cyanobakterier						
Anabaena flos-aquae	n.a.	72 timer	E_rC_{50}, vækstudbytte	21.610	Maletzki et al., 2014	4 [b]
Anabaena flos-aquae	n.a.	72 timer	E_rC_{50}, vækstrate	190.000	Roche SDS, 2022	4
Anabaena flos-aquae	n.a.	72 timer	E_yC_{50}, vækstudbytte	155	Roche SDS, 2022	4
Microcystis aeroginosa	Nej	24 timer	EC_{50}, fotosyntese-hæmning	550	Van der Grinten et al., 2010	2 [a]
Synechococcus leopolensis	n.a.	72 timer	E_rC_{50}, vækstrate	7.440	Roche SDS, 2022	4
Synechococcus leopolensis	n.a.	72 timer	E_yC_{50}, vækstudbytte	176	Roche SDS, 2022	4
Synechococcus leopolensis	Nej	96 timer	EC_{50}, vækstudbytte	**26,8**	Ferrari et al., 2004	2
Grønalger						
Chlorella vulgaris	n.a.	48 timer	EC_{50}, vækst	1.520	Baran et al., 2006	4 [a]
Chlorella vulgaris	Ja	48 timer	EC_{50}, vækst	980	Borecka et al., 2016	2 [a]
Chlorella vulgaris	Ja	72 timer	EC_{50}, vækst	1.510	Borecka et al., 2016	2 [a]
Desmodesmus subspicatus	n.a.	72 timer	EC_{50}, vækst biomasse	3.160	Liebig, 2005	2 [a]
Desmodesmus subspicatus	n.a.	96 timer	EC_{50}, vækstrate	4.960	Liebig, 2005	2 [a]
Raphidocelis subcapitata [c]	Nej	24 timer	EC_{50}, fotosyntese-hæmning	>9.000	Van der Grinten et al., 2010	3 [a]
Raphidocelis subcapitata [c]	Nej	72 timer	EC_{50}, vækst	1.120	Minguez et al., 2014	2 [a]
Raphidocelis subcapitata [c]	Ja	72 timer	EC_{50}, vækst biomasse	1.530	Eguchi et al., 2004	2 [a]
Raphidocelis subcapitata [c]	Nej	72 timer	IC_{50}, vækstudbytte	1.900	Yang et al., 2008	2 [a]
Raphidocelis subcapitata [c]	n.a.	72 timer	E_bC_{50}, biomasse	810	Roche SDS, 2022	4

Raphidocelis subcapitata [c]	n.a.	72 timer	E_rC_{50}, vækstrate	3.400	Roche SDS, 2022	4
Raphidocelis subcapitata [c]	n.a.	96 timer	EC_{50}, vækst	13.400	Blaise et al., 2008	4 [a]
Raphidocelis subcapitata [c]	Nej	96 timer	EC_{50}, vækst	146	Ferrari et al., 2004	2
Raphidocelis subcapitata [c]	Nej	96 timer	LOEC, vækst	2.500	Liu et al., 2011	2 [a]
Scenedesmus vacuolatus	Nej	24 timer	EC_{50}, celletal / reproduktion	1.540	Bialk-Bielinska et al., 2011	2 [a]
Kiselalger						
Cyclotella meneghiniana	Nej	96 timer	EC_{50}, vækst	2.400	Ferrari et al., 2004	2
Højere planter						
Lemna gibba	Nej	7 dage	EC_{50}, vækst, vådvægt	81	Brain et al., 2004	2 [a]
Lemna gibba	Nej	7 dage	EC_{50}, vækstrate, antal blade	249	Brain et al., 2004	2 [a]
Lemna minor	Nej	7 dage	EC_{50}, biomasse	210	Bialk-Bielinska et al., 2011	2 [a]
Nældedyr						
Hydra attenuata	n.a.	96 timer	LC_{50}, dødelighed	19.300	Blaise et al., 2006	4 [a]
Hydra attenuata	Nej	96 timer	LC_{50}, dødelighed	>100.000	Quinn et al., 2008	3 [a]
Hjuldyr						
Brachionus calyciflorus	Nej	24 timer	LC_{50}, dødelighed	26.270	Isidori et al., 2005	2 [a]
Krebsdyr						
Ceriodaphnia dubia	Nej	48 timer	EC_{50}, dødelighed	>100.000	Ferrari et al., 2004	2
Ceriodaphnia dubia	Nej	48 timer	EC_{50}, immobilitet	15.510	Isidori et al., 2005	2 [a]
Daphnia magna	Nej	24 timer	EC_{50}, immobilitet	25.200	Isidori et al., 2005	2 [a]
Daphnia magna	Nej	48 timer	EC_{50}, dødelighed	>100.000	Ferrari et al., 2004	2
Daphnia magna	Nej	48 timer	EC_{50}, immobilitet	98.010	Minguez et al., 2014	2 [a]
Daphnia magna	Nej	48 timer	EC_{50}, immobilitet	125.000	Leibig et al., 2005	2 [a]
Daphnia magna	Nej	48 timer	EC_{50}, immobilitet	123.100	Park & Choi, 2008	2 [a]

Daphnia magna	Nej	48 timer	EC_{50}, immobilitet	205.200	Jung et al., 2008	3 [a]
Daphnia magna	Nej	48 timer	EC_{50}, immobilitet	234.180	Lu et al., 2013	4 [a]
Daphnia magna	Nej	48 timer	EC_{50}, immobilitet	189.200	Kim et al., 2007	2 [a]
Daphnia magna	n.a.	48 timer	EC_{50}, immobilitet	75.000	Roche SDS, 2022	4 [a]
Daphnia magna	Nej	96 timer	EC_{50}, immobilitet	177.300	Kim et al., 2007	2 [a]
Moina macropoda	Nej	48 timer	EC_{50}, immobilitet	70.400	Park & Choi, 2008	2 [a]
Thamnocephalus platyrus	Nej	24 timer	LC_{50}, dødelighed	35.360	Isidori et al., 2005	2 [a]
Thamnocephalus platyrus	n.a.	24 timer	LC_{50}, dødelighed	>250.000	Blaise et al., 2006	4 [a]
Padder						
Lymnodynastes peronii	Nej	96 timer	EC_{50}, dødelighed	672.220	Melvin et al., 2012	4 [a]
Xenopus laevis	n.a.	96 timer	NOEC, embryodødelighed	>100.000	Richards et al., 2006	2 [a]
Xenopus laevis	n.a.	96 timer	EC_{50}, embryonale ændringer	>100.000	Richards et al., 2006	2 [a]
Fisk						
Danio rerio	Nej	48 timer	LC_{50}, embryodødelighed	>100.000	Leibig et al., 2005	2 [a]
Danio rerio	Nej	48 timer	EC_{50}, embryo teratogenese	>100.000	Leibig et al., 2005	2 [a]
Oryzias latipes	Nej	96 timer	LC_{50}, dødelighed	562.500	Kim et al., 2007	1 [a]

[a] Troværdighedsvurdering angivet i Eawag (2015).
[b] Ikke publiceret data angivet i Nendza (2014).
[c] Tidligere kendt som *Pseudokirchneriella subcapitata* og *Selenastrum capricornutum*.

Ferskvandsorganismer
Kronisk toksicitet

	Målt	Varighed	Effekt	Værdi µg/l	Reference	Troværdighed (1-4)
Cyanobakterier						
Anabaena flos-aquae	n.a.	72 timer	NOEC, vækstrate	100	Maletzki et al., 2014	4 [a]
Anabaena flos-aquae	n.a.	72 timer	EC_{10}, vækstrate	104	Roche SDS, 2022	4
Synechococcus leopoliensis	n.a.	72 timer	EC_{10}, vækstrate	66	Roche SDS, 2022	4
Synechococcus leopoliensis	Nej	96 timer	NOEC, vækst	**5,9**	Ferrari et al., 2004	2
Grønalger						
Desmodesmus subspicatus	Nej	96 timer	LOEC, vækst	<2.500	Liebig, 2005	2 [b]
Desmodesmus subspicatus	Nej	96 timer	NOEC, vækst	<2.500	Liebig, 2005	2 [b]
Raphidocelis subcapitata [c]	Ja	72 timer	NOEC, vækst	614	Eguchi et al., 2004	2 [b]
Raphidocelis subcapitata [c]	Nej	72 timer	LOEC, vækst	800	Yang et al., 2008	2 [b]
Raphidocelis subcapitata [c]	Nej	72 timer	NOEC, vækst	<500	Yang et al., 2008	2 [b]
Raphidocelis subcapitata [c]	n.a.	72 timer	NOE_bC, vækst	220	Roche SDS, 2022	4
Raphidocelis subcapitata [c]	n.a.	72 timer	NOE_rC, vækst	450	Roche SDS, 2022	4
Raphidocelis subcapitata [c]	Nej	96 timer	NOEC, vækst	90	Ferrari et al., 2004	2
Raphidocelis subcapitata [c]	Nej	96 timer	EC_{50}, vækstudbytte	520	Isidori et al., 2005	2 [a]
Kiselalger						
Cyclotella meneghiniana	Nej	96 timer	NOEC, vækst	1.250	Ferrari et al., 2004	2
Højere planter						
Lemna gibba	Nej	7 dage	EC_{10}, vækst (biomasse)	17	Brain et al., 2004	2 [b]
Lemna gibba	Nej	7 dage	EC_{10}, vækstrate	11	Brain et al., 2004	2 [b]
Nældedyr						
Hydra attenuata	Nej	96 timer	LOEC, morfologiske ændringer	10.000	Quinn et al., 2008	2 [b]
Hydra attenuata	Nej	96 timer	NOEC,	5.000	Quinn et al., 2008	2 [b]

			morfologiske ændringer			
Hjuldyr						
Brachionus calyciflorus	Nej	48 timer	NOEC, reproduktion	25.000	Ferrari et al., 2004	2
Brachionus calyciflorus	Nej	48 timer	EC_{50}, vækst	9.630	Isidori et al., 2005	2 [b]
Krebsdyr						
Ceriodaphnia dubia	Nej	7 dage	NOEC, reproduktion	250	Ferrari et al., 2004	2
Daphnia magna	n.a.	21 dage	NOEC	5.000	Roche SDS, 2022	4
Daphnia magna	n.a.	21 dage	EC_{10}	1.730	Roche SDS, 2022	4
Daphnia magna	Nej	30 dage	NOEC, overlevelse, vækst og reproduktion	>100	Flaherty & Dodson, 2005	3 [b]
Fisk						
Cyrinus carpio	Nej	48 dage	NOEC, dødelighed, vækst	≥6	Zhao et al., 2015	1 [b]
Danio rerio (early lifestage)	Nej	10 dage	NOEC, dødelighed	>8.000	Ferrari et al., 2004	2
Danio rerio	Nej	21 dage	NOEC	≥533 [d]	Madureira et al., 2011	3 [b]

[a] Ikke publiceret data angivet i Nendza (2014).
[b] Troværdighedsvurdering angivet i Eawag (2015).
[c] Tidligere kendt som *Pseudokirchneriella subcapitata* og *Selenastrum capricornutum*.
[d] Der er kun testet ved én koncentration på en række forskellige sublethale parametre.

Saltvandsorganismer
Akut toksicitet

	Målt	Varighed	Effekt	Værdi µg/l	Reference	Troværdighed (1-4)
Bakterier						
Photobacterium phosphoreum	n.a.	15 min	EC_{50}, lyshæmning	42.600 [a]	Zou et al., 2012	2 [b]
Vibrio fischeri	Nej	5 min	EC_{50}, lyshæmning	74.200	Kim et al., 2007	2 [b]
Vibrio fischeri	Nej	15 min	EC_{50}, lyshæmning	>100.000	Bialk-Bielinska et al., 2011	2 [b]
Vibrio fischeri	Nej	15 min	EC_{50}, lyshæmning	78.100	Kim et al., 2007	2 [b]
Vibrio fischeri	Nej	30 min	EC_{50}, lyshæmning	23.300	Isidori et al., 2005	2 [b]
Vibrio fischeri	Nej	30 min	EC_{50}, lyshæmning	>280	Van der Grinten et al., 2010	2 [b]
Vibrio fischeri	Nej	30 min	EC_{50}, lyshæmning	>84.000	Ferrari et al., 2004	2
Kiselalger						
Skeletonema marinoi	Nej	72 timer	EC_{50}, vækst	5.350	Minguez et al., 2014	2 [b]
Krebsdyr						
Artemia salina	Nej	48 timer	EC_{50}, immobilitet	>100.000	Minguez et al., 2014	2 [b]
Hjuldyr						
Branchionus koreanus	Nej	24 timer	LC_{50}, dødelighed	276.100	Rhee et al., 2012	2 [b]
Branchionus koreanus	Nej	24 timer	NOEC, dødelighed	197.500	Rhee et al., 2012	2 [b]

[a] Værdien er ikke direkte angivet i studiet, men omregnet i Eawag (2015).
[b] Troværdighedsvurdering angivet i Eawag (2015).

Saltvandsorganismer
Kronisk toksicitet
Ingen data.

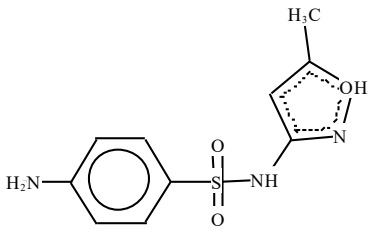
Mesokosmos
Saltvandsorganismer
Kronisk toksicitet

	Målt	Varighed	Effekt	Værdi µg/l	Reference	Troværdighed (1-4)
Marint perifytsamfund [a]	Nej	96 timer	LOEC, metabolisk ydeevne	82 [b]	Johansson et al., 2014	2 [c]
Marint perifytsamfund [a]	Nej	96 timer	EC_{10}, metabolisk ydeevne	52 [b]	Johansson et al., 2014	2 [c]
Marint perifytsamfund [a]	Nej	96 timer	NOEC, metabolisk ydeevne	35 [b]	Johansson et al., 2014	2 [c]

[a] Et samfund bestående af forskellige bakterier og alger.
[b] Er omregnet fra nmol/l ved anvendelse af molvægten på 253,28 g/mol.
[c] Troværdighedsvurdering angivet i Eawag (2015).

Bilag B – Epi Suite resultater

EPI Suite Results For CAS 000723-46-6




```
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
------------------------------ EPI SUMMARY (v4.11) --------------------------
Physical Property Inputs:
Log Kow (octanol-water):   ------
Boiling Point (deg C)  :   ------
Melting Point (deg C)  :   ------
Vapor Pressure (mm Hg) :   ------
Water Solubility (mg/L):   ------
Henry LC (atm-m3/mole) :   ------

KOWWIN Program (v1.68) Results:
===============================

Log Kow(version 1.68 estimate): 0.48

Experimental Database Structure Match:
Name     :  SULFAMETHOXAZOLE
CAS Num  :  000723-46-6
Exp Log P:  0.89
Exp Ref  :  HANSCH,C ET AL. (1995)

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
-------+-----+-----------------------------------------+---------+--------
TYPE   | NUM |        LOGKOW FRAGMENT DESCRIPTION      |  COEFF  |  VALUE
-------+-----+-----------------------------------------+---------+--------
Frag   |  1  |  -CH3    [aliphatic carbon]             | 0.5473  |  0.5473
Frag   |  9  |  Aromatic Carbon                        | 0.2940  |  2.6460
Frag   |  2  |  -N    [aliphatic N, one aromatic attach]|-0.9170  | -1.8340
Frag   |  1  |  -SO2-N   [aromatic attach]             |-0.2079  | -0.2079
```

```
Frag  |  1  |  Aromatic Oxygen                              |-0.0423  | -0.0423
Frag  |  1  |  Aromatic Nitrogen [5-member ring]            |-0.5262  | -0.5262
Factor|  1  |  Oxazole ring (non-fused)  correction         |-0.3279  | -0.3279
Const |     |  Equation Constant                            |         |  0.2290
-------+-----+-----------------------------------------------+---------+--------
Log Kow   =   0.4840
```

```
MPBPVP (v1.43) Program Results:
===============================
Experimental Database Structure Match:
Name     :  SULFAMETHOXAZOLE
CAS Num  :  000723-46-6
Exp MP (deg C):  167
Exp BP (deg C):  ---
Exp VP (mm Hg):  ---

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
------------------------ SUMMARY MPBVP v1.43 --------------------


Boiling Point:  414.01 deg C (Adapted Stein and Brown Method)

Melting Point:  349.84 deg C (Adapted Joback Method)
Melting Point:  128.08 deg C (Gold and Ogle Method)
Mean Melt Pt :  238.96 deg C (Joback; Gold,Ogle Methods)
Selected MP:  172.43 deg C (Weighted Value)

Vapor Pressure Estimations (25 deg C):
(Using BP: 414.01 deg C (estimated))
(Using MP: 167.00 deg C (exp database))
VP:  2.09E-008 mm Hg (Antoine Method)
:  2.79E-006 Pa  (Antoine Method)
VP:  1.3E-007 mm Hg (Modified Grain Method)
:  1.74E-005 Pa  (Modified Grain Method)
VP:  3.08E-007 mm Hg (Mackay Method)
:  4.11E-005 Pa  (Mackay Method)
Selected VP:  1.3E-007 mm Hg (Modified Grain Method)
:  1.74E-005 Pa (Modified Grain Method)
Subcooled liquid VP:  3.79E-006 mm Hg (25 deg C, Mod-Grain method)
:  0.000505 Pa  (25 deg C, Mod-Grain method)

-------+-----+--------------------+----------+---------
TYPE   | NUM |  BOIL DESCRIPTION  |  COEFF   |  VALUE
-------+-----+--------------------+----------+---------
Group |  1  |  -CH3              |   21.98  |   21.98
Group |  1  |  >NH (nonring)     |   45.28  |   45.28
Group |  5  |  CH (aromatic)     |   28.53  |  142.65
Group |  4  |  -C (aromatic)     |   30.76  |  123.04
Group |  1  |  -NH2 (to arom)    |   86.63  |   86.63
Group |  1  |  N (aromatic)      |   39.88  |   39.88
Group |  1  |  >S(=O)(=O)        |  171.58  |  171.58
Group |  1  |  O (aromatic)      |   15.00  |   15.00
*   |     |  Equation Constant |          |  198.18
=============+====================+==========+=========
```

```
RESULT-uncorr|  BOILING POINT in deg Kelvin  |  844.22
RESULT- corr |  BOILING POINT in deg Kelvin  |  687.17
|  BOILING POINT in deg C       |  414.01
---------------------------------------------------

-------+-----+--------------------+----------+---------
TYPE   | NUM |  MELT DESCRIPTION  |  COEFF   |  VALUE
-------+-----+--------------------+----------+---------
Group |  1   |  -CH3              |   -5.10  |   -5.10
Group |  1   |  >NH (nonring)     |   52.66  |   52.66
Group |  5   |  CH (aromatic)     |    8.13  |   40.65
Group |  4   |  -C (aromatic)     |   37.02  |  148.08
Group |  1   |  -NH2 (to arom)    |   66.89  |   66.89
Group |  1   |  N (aromatic)      |   68.40  |   68.40
Group |  1   |  >S(=O)(=O)        |  150.00  |  150.00
Group |  1   |  O (aromatic)      |   23.05  |   23.05
*   |      |  Equation Constant |          |  122.50
============+====================+==========+=========
RESULT    |  MELTING POINT in deg Kelvin  |  667.13
RESULT-limit|  MELTING POINT in deg Kelvin  |  623.00
|  MELTING POINT in deg C       |  349.84
---------------------------------------------------



Water Sol from Kow (WSKOW v1.42) Results:
=========================================

Water Sol: 3942 mg/L

Experimental Water Solubility Database Match:
Name     :  SULFAMETHOXAZOLE
CAS Num  :  000723-46-6
Exp WSol :  610 mg/L (37 deg C)
Exp Ref  :  YALKOWSKY,SH & DANNENFELSER,RM (1992)

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
---------------------------------- WSKOW v1.42 Results ------------------------
Log Kow  (estimated)  :  0.48
Log Kow (experimental):  0.89
Cas No: 000723-46-6
Name  : SULFAMETHOXAZOLE
Refer : HANSCH,C ET AL. (1995)
Log Kow used by Water solubility estimates:  0.89

Equation Used to Make Water Sol estimate:
Log S (mol/L) = 0.796 - 0.854 log Kow - 0.00728 MW + Correction
(used when Melting Point NOT available)

Correction(s):         Value
--------------------   -----
No Applicable Correction Factors

Log Water Solubility  (in moles/L) :  -1.808
Water Solubility at 25 deg C (mg/L):  3942
```

WATERNT Program (v1.01) Results:
==========

Water Sol (v1.01 est): 869.45 mg/L

Experimental Water Solubility Database Match:
Name : SULFAMETHOXAZOLE
CAS Num : 000723-46-6
Exp WSol : 610 mg/L (37 deg C)
Exp Ref : YALKOWSKY,SH & DANNENFELSER,RM (1992)

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28

TYPE	NUM	WATER SOLUBILITY FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	-CH3 [aliphatic carbon]	-0.3213	-0.3213
Frag	5	Aromatic Carbon (C-H type)	-0.3359	-1.6793
Frag	4	Aromatic Carbon (C-substituent type)	-0.5400	-2.1598
Frag	1	-SO2-N [aromatic attach]	-1.2003	-1.2003
Frag	1	Aromatic Oxygen	0.3668	0.3668
Frag	1	Aromatic Nitrogen [5-member ring]	0.5265	0.5265
Frag	1	-N [multi aliphatic N, 1 aromatic attach]	1.7539	1.7539
Const		Equation Constant		0.2492

Log Water Sol (moles/L) at 25 dec C = -2.4644
Water Solubility (mg/L) at 25 dec C = 869.45

ECOSAR Program (v1.11) Results:
==========
ECOSAR Version 1.11 Results Page

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
CAS Num:
ChemID1:
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
Log Kow: 0.484 (EPISuite Kowwin v1.68 Estimate)
Log Kow: (User Entered)
Log Kow: 0.89 (PhysProp DB exp value - for comparison only)
Melt Pt: (User Entered for Wat Sol estimate)
Melt Pt: 167.00 (deg C, PhysProp DB exp value for Wat Sol est)
Wat Sol: 1382 (mg/L, EPISuite WSKowwin v1.43 Estimate)
Wat Sol: (User Entered)
Wat Sol: 610 (mg/L, PhysProp DB exp value)

Values used to Generate ECOSAR Profile

Log Kow: 0.484 (EPISuite Kowwin v1.68 Estimate)
Wat Sol: 610 (mg/L, PhysProp DB exp value)

```
-------------------------------------
ECOSAR v1.11 Class-specific Estimations
-------------------------------------
Anilines (Unhindered)
Amides
Predicted
ECOSAR Class                  Organism            Duration  End Pt   mg/L (ppm)
==========================  ==================  ========  ======   ==========
Anilines (Unhindered)      : Fish                96-hr     LC50      410.762
Anilines (Unhindered)      : Daphnid             48-hr     LC50        1.872
Anilines (Unhindered)      : Green Algae         96-hr     EC50        6.615
Anilines (Unhindered)      : Fish                          ChV         2.337
Anilines (Unhindered)      : Daphnid                       ChV         0.086
Anilines (Unhindered)      : Green Algae                   ChV        10.402

Amides                     : Fish                96-hr     LC50      918.307 *
Amides                     : Daphnid             48-hr     LC50     2033.010 *
Amides                     : Green Algae         96-hr     EC50       20.823
Amides                     : Fish                          ChV         0.639
Amides                     : Daphnid                       ChV        41.918
Amides                     : Green Algae                   ChV        10.318
Amides                     : Fish (SW)           96-hr     LC50      798.762 *
Amides                     : Mysid (SW)          96-hr     LC50       31.313

==========================  ==================  ========  ======   ==========
Neutral Organic SAR        : Fish                96-hr     LC50     4783.171 *
(Baseline Toxicity)        : Daphnid             48-hr     LC50     2361.154 *
: Green Algae         96-hr     EC50      985.988 *
: Fish                          ChV       396.378
: Daphnid                       ChV       155.969
: Green Algae                   ChV       189.057

Note:  * = asterisk designates: Chemical may not be soluble enough to
measure this predicted effect. If the effect level exceeds the
water solubility by 10X, typically no effects at saturation (NES)
are reported.


------------------------------
Class Specific LogKow Cut-Offs
------------------------------
If the log Kow of the chemical is greater than the endpoint specific cut-offs
presented below, then no effects at saturation are expected for those endpoints.

Anilines (Unhindered):
----------------------
Maximum LogKow: 6.0 (Fish 96-hr LC50)
Maximum LogKow: >3 (Daphnid 48-h LC50)
Maximum LogKow: >4 (Green Algae 96-hr EC50 and ChV)
Maximum LogKow: >4.3 (Fish ChV)
Maximum LogKow: >2.4 (Daphnid ChV)

Amides :
-------
Maximum LogKow: >8.5 (LC50)
Maximum LogKow: >8.0 (EC50,ChV)
```

Baseline Toxicity SAR Limitations:

Maximum LogKow: 5.0 (Fish 96-hr LC50; Daphnid LC50)
Maximum LogKow: 6.4 (Green Algae EC50)
Maximum LogKow: 8.0 (ChV)

HENRYWIN (v3.20) Program Results:
==========

Bond Est : 9.56E-013 atm-m3/mole (9.69E-008 Pa-m3/mole)
Group Est: Incomplete

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28

HENRYWIN v3.20 Results

CLASS		BOND CONTRIBUTION DESCRIPTION	COMMENT	VALUE
HYDROGEN	3	Hydrogen to Carbon (aliphatic) Bonds		-0.3590
HYDROGEN	5	Hydrogen to Carbon (aromatic) Bonds		-0.7715
HYDROGEN	3	Hydrogen to Nitrogen Bonds		3.8505
FRAGMENT	1	C-Car		0.1619
FRAGMENT	8	Car-Car		2.1105
FRAGMENT	1	Car-Nar		1.6282
FRAGMENT	1	Car-S		0.6345
FRAGMENT	1	N-S	ESTIMATE	0.0000
FRAGMENT	1	Car-Oar		0.2419
FRAGMENT	2	Car-N		1.4608
FRAGMENT	2	O=S (sulfone-type)	ESTIMATE	2.1000
FRAGMENT	1	Nar-Oar	ESTIMATE	0.7000
FACTOR	1	-SO2-N- group		-1.3500
RESULT		BOND ESTIMATION METHOD for LWAPC VALUE	TOTAL	10.408

HENRYs LAW CONSTANT at 25 deg C = 9.56E-013 atm-m3/mole
= 3.91E-011 unitless
= 9.69E-008 Pa-m3/mole

GROUP	CONTRIBUTION DESCRIPTION	COMMENT	VALUE
1	NH2 (Car)	ESTIMATE	4.00
1	Car (N)(Car)(Car)	ESTIMATE	-0.50
1	CH3 (X)		-0.62
5	Car-H (Car)(Car)		0.55
1	Car (Car)(Car)(S)		-0.25
	MISSING Value for: Car (Oar)(Car)(C)		
	MISSING Value for: Car (N)(Nar)(Car)		
	MISSING Value for: NH (S)(Car)		
	MISSING Value for: S (=O)(=O)(Car)(N)		
	MISSING Value for: Nar (Oar)(Car)		
	MISSING Value for: Oar (Car)(Nar)		

```
--------+------------------------------------------------+------------+--------
RESULT |  GROUP ESTIMATION METHOD for LOG GAMMA VALUE  | INCOMPLETE |  3.18
--------+------------------------------------------------+------------+--------


For Henry LC Comparison Purposes:
Exper Database:  none available
User-Entered Henry LC:  not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC:  1.099E-011 atm-m3/mole  (1.114E-006 Pa-m3/mole)
VP:   1.3E-007 mm Hg (source: MPBPVP)
WS:   3.94E+003 mg/L (source: WSKOWWIN)



Log Octanol-Air (KOAWIN v1.10) Results:
=======================================

Log Koa: 11.298

SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
-------------------------- KOAWIN v1.10 Results -------------------------

Log Koa (octanol/air) estimate:  11.298
Koa (octanol/air) estimate:  1.986e+011
Using:
Log Kow:  0.89  (exp database)
HenryLC:  9.56e-013  atm-m3/mole (HenryWin est)
Log Kaw:  -10.408  (air/water part.coef.)

LogKow  : 0.89 (exp database)
LogKow  : 0.48 (KowWin estimate)
Henry LC: --- atm-m3/mole(exp database)
Henry LC: 9.56e-013 atm-m3/mole (HenryWin bond estimate)

Log Koa (octanol/air) estimate:  10.888 (from KowWin/HenryWin)



BIOWIN (v4.10) Program Results:
==============================
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
-------------------------- BIOWIN v4.10 Results --------------------------

Biowin1 (Linear Model Prediction)    :  Does Not Biodegrade Fast
Biowin2 (Non-Linear Model Prediction):  Does Not Biodegrade Fast
Biowin3 (Ultimate Biodegradation Timeframe):  Weeks-Months
Biowin4 (Primary  Biodegradation Timeframe):  Days-Weeks
Biowin5 (MITI Linear Model Prediction)    :  Does Not Biodegrade Fast
Biowin6 (MITI Non-Linear Model Prediction):  Does Not Biodegrade Fast
Biowin7 (Anaerobic Model Prediction):  Does Not Biodegrade Fast
Ready Biodegradability Prediction:  NO
```

TYPE	NUM	Biowin1 FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	Aromatic amine [-NH2 or -NH-]	-0.2338	-0.2338
Frag	1	Alkyl substituent on aromatic ring	0.0547	0.0547
MolWt	*	Molecular Weight Parameter		-0.1206
Const	*	Equation Constant		0.7475
RESULT		Biowin1 (Linear Biodeg Probability)		0.4479

TYPE	NUM	Biowin2 FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	Aromatic amine [-NH2 or -NH-]	-1.9070	-1.9070
Frag	1	Alkyl substituent on aromatic ring	0.5771	0.5771
MolWt	*	Molecular Weight Parameter		-3.5965
RESULT		Biowin2 (Non-Linear Biodeg Probability)		0.1281

A Probability Greater Than or Equal to 0.5 indicates --> Biodegrades Fast
A Probability Less Than 0.5 indicates --> Does NOT Biodegrade Fast

TYPE	NUM	Biowin3 FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	Aromatic amine [-NH2 or -NH-]	-0.1349	-0.1349
Frag	1	Alkyl substituent on aromatic ring	-0.0749	-0.0749
MolWt	*	Molecular Weight Parameter		-0.5597
Const	*	Equation Constant		3.1992
RESULT		Biowin3 (Survey Model - Ultimate Biodeg)		2.4297

TYPE	NUM	Biowin4 FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	Aromatic amine [-NH2 or -NH-]	-0.1084	-0.1084
Frag	1	Alkyl substituent on aromatic ring	-0.0685	-0.0685
MolWt	*	Molecular Weight Parameter		-0.3654
Const	*	Equation Constant		3.8477
RESULT		Biowin4 (Survey Model - Primary Biodeg)		3.3054

Result Classification: 5.00 -> hours 4.00 -> days 3.00 -> weeks
(Primary & Ultimate) 2.00 -> months 1.00 -> longer

TYPE	NUM	Biowin5 FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	Aromatic amine [-NH2 or -NH-]	-0.1577	-0.1577
Frag	1	Aromatic-CH3	0.0415	0.0415
Frag	5	Aromatic-H	0.0082	0.0411
MolWt	*	Molecular Weight Parameter		-0.7535
Const	*	Equation Constant		0.7121
RESULT		Biowin5 (MITI Linear Biodeg Probability)		-0.1165

```
============+=============================================+=========+=========

------+-----+---------------------------------------------+---------+---------
TYPE | NUM |       Biowin6 FRAGMENT DESCRIPTION          |  COEFF  |  VALUE
------+-----+---------------------------------------------+---------+---------
Frag |  1  |  Aromatic amine   [-NH2  or  -NH-]          | -1.2264 | -1.2264
Frag |  1  |  Aromatic-CH3                               |  0.3072 |  0.3072
Frag |  5  |  Aromatic-H                                 |  0.1201 |  0.6007
MolWt|  *  |  Molecular Weight Parameter                 |         | -7.3118
============+=============================================+=========+=========
RESULT   |Biowin6 (MITI Non-Linear Biodeg Probability)|         |  0.0060
============+=============================================+=========+=========

A Probability Greater Than or Equal to 0.5 indicates --> Readily Degradable
A Probability Less Than 0.5 indicates --> NOT Readily Degradable


------+-----+---------------------------------------------+---------+---------
TYPE | NUM |       Biowin7 FRAGMENT DESCRIPTION          |  COEFF  |  VALUE
------+-----+---------------------------------------------+---------+---------
Frag |  1  |  Aromatic amine   [-NH2  or  -NH-]          | -0.2778 | -0.2778
Frag |  1  |  Alkyl substituent on aromatic ring         | -0.1145 | -0.1145
Frag |  1  |  Aromatic-CH3                               | -0.2573 | -0.2573
Frag |  5  |  Aromatic-H                                 | -0.0954 | -0.4772
Const|  *  |  Equation Constant                          |         |  0.8361
============+=============================================+=========+=========
RESULT   |   Biowin7 (Anaerobic Linear Biodeg Prob)   |         | -0.2907
============+=============================================+=========+=========

A Probability Greater Than or Equal to 0.5 indicates --> Biodegrades Fast
A Probability Less Than 0.5 indicates --> Does NOT Biodegrade Fast

Ready Biodegradability Prediction: (YES or NO)
----------------------------------------------
Criteria for the YES or NO prediction:  If the Biowin3 (ultimate survey
model) result is "weeks" or faster (i.e. "days", "days to weeks", or
"weeks" AND the Biowin5 (MITI linear model) probability is >= 0.5, then
the prediction is YES (readily biodegradable).  If this condition is not
satisfied, the prediction is NO (not readily biodegradable).  This method
is based on application of Bayesian analysis to ready biodegradation data
(see Help).  Biowin5 and 6 also predict ready biodegradability, but for
degradation in the OECD301C test only; using data from the Chemicals
Evaluation and Research Institute Japan (CERIJ) database.



BioHCwin (v1.01) Program Results:
================================
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
-------------------------- BioHCwin v1.01 Results --------------------------

NO Estimate Possible ... Structure NOT a Hydrocarbon
(Contains atoms other than C, H or S (-S-))
```

```
AEROWIN Program (v1.00) Results:
================================
Sorption to aerosols (25 Dec C)[AEROWIN v1.00]:
Vapor pressure (liquid/subcooled):  0.000505 Pa (3.79E-006 mm Hg)
Log Koa (Koawin est  ): 11.298
Kp (particle/gas partition coef. (m3/ug)):
Mackay model           :  0.00594
Octanol/air (Koa) model:  0.0488
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model     :  0.177
Mackay model           :  0.322
Octanol/air (Koa) model:  0.796


AOP Program (v1.92) Results:
============================
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
------------------- SUMMARY (AOP v1.92): HYDROXYL RADICALS (25 deg C) --------
Hydrogen Abstraction       =   0.1360 E-12 cm3/molecule-sec
Reaction with N, S and -OH =   0.0000 E-12 cm3/molecule-sec
Addition to Triple Bonds   =   0.0000 E-12 cm3/molecule-sec
Addition to Olefinic Bonds =   0.0000 E-12 cm3/molecule-sec
**Addition to Aromatic Rings = 200.0000 E-12 cm3/molecule-sec
Addition to Fused Rings    =   0.0000 E-12 cm3/molecule-sec

OVERALL OH Rate Constant = 200.1360 E-12 cm3/molecule-sec
HALF-LIFE =     0.053 Days (12-hr day; 1.5E6 OH/cm3)
HALF-LIFE =     0.641 Hrs
.......................  ** Designates Estimation(s) Using ASSUMED Value(s)
------------------- SUMMARY (AOP v1.91): OZONE REACTION (25 deg C) -----------

******  NO OZONE REACTION ESTIMATION ******
(ONLY Olefins and Acetylenes are Estimated)

Experimental Database:  NO Structure Matches
Fraction sorbed to airborne particulates (phi):
0.249 (Junge-Pankow, Mackay avg)
0.796 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation



KOCWIN Program (v2.00) Results:
===============================
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
---------------------------  KOCWIN v2.00 Results  ---------------------------

Koc Estimate from MCI:
----------------------
First Order Molecular Connectivity Index  ...........  :  7.971
Non-Corrected Log Koc (0.5213 MCI + 0.60)  ..........  :  4.7552
```

```
Fragment Correction(s):
2   Nitrogen to non-fused aromatic ring ...  : -1.0450
1   Miscellaneous  S(=O)  group  ..........  : -1.2980
Corrected Log Koc  ................................. :  2.4121

Estimated Koc:  258.3  L/kg   <==========

Koc Estimate from Log Kow:
-------------------------
Log Kow  (experimental DB)  ........................ :  0.89
Non-Corrected Log Koc (0.55313 logKow + 0.9251)  .... :  1.4174
Fragment Correction(s):
2   Nitrogen to non-fused aromatic ring ...  : -0.0432
1   Miscellaneous  S(=O)  group  ..........  :  0.1614
Corrected Log Koc  ................................. :  1.5356

Estimated Koc:  34.33  L/kg   <==========



HYDROWIN Program (v2.00) Results:
================================
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
--------------------------- HYDROWIN v2.00 Results ---------------------------


Currently, this program can NOT estimate a hydrolysis rate constant for
the type of chemical structure entered!!

ONLY Esters, Carbamates, Epoxides, Halomethanes (containing 1-3 halogens),
Specific Alkyl Halides & Phosphorus Esters can be estimated!!

When present, various hydrolyzable compound-types will be identified.
For more information, (Click OVERVIEW in Help  or  see the User's Guide)

*****   CALCULATION NOT PERFORMED   *****



BCFBAF Program (v3.01) Results:
==============================
SMILES : Cc1cc(NS(=O)(=O)c2ccc(N)cc2)no1
CHEM   : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-
MOL FOR: C10 H11 N3 O3 S1
MOL WT : 253.28
-------------------------------- BCFBAF v3.01 --------------------------------
Summary Results:
Log BCF (regression-based estimate):  0.50  (BCF = 3.16 L/kg wet-wt)
Biotransformation Half-Life (days) :  0.0621  (normalized to 10 g fish)
Log BAF (Arnot-Gobas upper trophic):  0.17  (BAF = 1.47 L/kg wet-wt)

Log Kow (experimental):  0.89
Log Kow used by BCF estimates:  0.89

Equation Used to Make BCF estimate:
```

Log BCF = 0.50

Correction(s): Value
Correction Factors Not Used for Log Kow < 1

Estimated Log BCF = 0.500 (BCF = 3.162 L/kg wet-wt)

==========
Whole Body Primary Biotransformation Rate Estimate for Fish:
==========

TYPE	NUM	LOG BIOTRANSFORMATION FRAGMENT DESCRIPTION	COEFF	VALUE
Frag	1	Aromatic amine [-NH2 or -NH-]	-0.2890	-0.2890
Frag	1	Alkyl substituent on aromatic ring	0.1781	0.1781
Frag	1	Aromatic-CH3	-0.0872	-0.0872
Frag	5	Aromatic-H	0.2664	1.3319
Frag	1	Benzene	-0.4277	-0.4277
L Kow	*	Log Kow = 0.89 (experimental)	0.3073	0.2735
MolWt	*	Molecular Weight Parameter		-0.6495
Const	*	Equation Constant		-1.5371
RESULT		LOG Bio Half-Life (days)		-1.2069
RESULT		Bio Half-Life (days)		0.0621
NOTE		Bio Half-Life Normalized to 10 g fish at 15 deg C		

Biotransformation Rate Constant:
kM (Rate Constant): 11.16 /day (10 gram fish)
kM (Rate Constant): 6.277 /day (100 gram fish)
kM (Rate Constant): 3.53 /day (1 kg fish)
kM (Rate Constant): 1.985 /day (10 kg fish)

Arnot-Gobas BCF & BAF Methods (including biotransformation rate estimates):
Estimated Log BCF (upper trophic) = 0.168 (BCF = 1.472 L/kg wet-wt)
Estimated Log BAF (upper trophic) = 0.168 (BAF = 1.472 L/kg wet-wt)
Estimated Log BCF (mid trophic) = 0.138 (BCF = 1.374 L/kg wet-wt)
Estimated Log BAF (mid trophic) = 0.138 (BAF = 1.374 L/kg wet-wt)
Estimated Log BCF (lower trophic) = 0.127 (BCF = 1.34 L/kg wet-wt)
Estimated Log BAF (lower trophic) = 0.127 (BAF = 1.34 L/kg wet-wt)

Arnot-Gobas BCF & BAF Methods (assuming a biotransformation rate of zero):
Estimated Log BCF (upper trophic) = 0.236 (BCF = 1.723 L/kg wet-wt)
Estimated Log BAF (upper trophic) = 0.239 (BAF = 1.735 L/kg wet-wt)

Volatilization From Water
==========

Chemical Name: Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-

Molecular Weight : 253.28 g/mole
Water Solubility : -----
Vapor Pressure : -----
Henry's Law Constant: 9.56E-013 atm-m3/mole (estimated by Bond SAR Method)

RIVER		LAKE	
Water Depth	(meters):	1	1
Wind Velocity	(m/sec):	5	0.5
Current Velocity	(m/sec):	1	0.05

HALF-LIFE (hours) :	9.747E+008	1.063E+010
HALF-LIFE (days) :	4.061E+007	4.43E+008
HALF-LIFE (years) :	1.112E+005	1.213E+006

STP Fugacity Model: Predicted Fate in a Wastewater Treatment Facility

(using 10000 hr Bio P,A,S)

PROPERTIES OF: Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-

Molecular weight (g/mol)		253.28
Aqueous solubility (mg/l)		0
Vapour pressure (Pa)		0
(atm)	0	
(mm Hg)	0	
Henry 's law constant (Atm-m3/mol)		9.56E-013
Air-water partition coefficient		3.90976E-011
Octanol-water partition coefficient (Kow)		7.76247
Log Kow		0.89
Biomass to water partition coefficient		2.35249
Temperature [deg C]		25

Biodeg rate constants (h^-1),half life in biomass (h) and in 2000 mg/L MLSS (h):

-Primary tank	0.01	46.83	10000.00
-Aeration tank	0.01	46.83	10000.00
-Settling tank	0.01	46.83	10000.00

STP Overall Chemical Mass Balance:

g/h	mol/h	percent	
Influent	1.00E+001	3.9E-002	100.00
Primary sludge	2.68E-002	1.1E-004	0.27
Waste sludge	1.52E-001	6.0E-004	1.52
Primary volatilization	5.21E-010	2.1E-012	0.00
Settling volatilization	1.42E-009	5.6E-012	0.00
Aeration off gas	3.50E-009	1.4E-011	0.00
Primary biodegradation	1.76E-003	7.0E-006	0.02
Settling biodegradation	5.28E-004	2.1E-006	0.01
Aeration biodegradation	6.95E-003	2.7E-005	0.07
Final water effluent	9.81E+000	3.9E-002	98.12
Total removal	1.88E-001	7.4E-004	1.88
Total biodegradation	9.24E-003	3.6E-005	0.09

Level III Fugacity Model (Full-Output):

Chem Name : Benzenesulfonamide, 4-amino-N-(5-methyl-3-isoxazolyl)-

Molecular Wt: 253.28

Henry's LC : 9.56e-013 atm-m3/mole (Henrywin program)

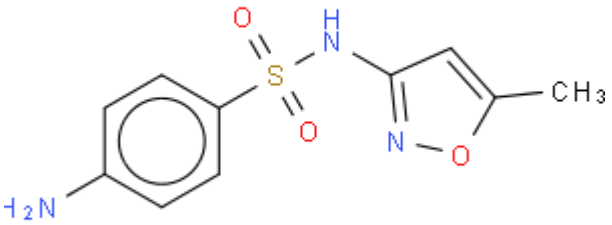
```
Vapor Press : 1.3e-007 mm Hg  (Mpbpwin program)
Liquid VP   : 3.73e-006 mm Hg  (super-cooled)
Melting Pt  : 172 deg C (Mpbpwin program)
Log Kow     : 0.89  (Kowwin program)
Soil Koc    : 258  (KOCWIN MCI method)

Mass Amount    Half-Life    Emissions
(percent)        (hr)       (kg/hr)
Air       9.31e-006       1.28         1000
Water     13.8            900          1000
Soil      86              1.8e+003     1000
Sediment  0.203           8.1e+003     0

Fugacity    Reaction    Advection   Reaction    Advection
(atm)       (kg/hr)      (kg/hr)    (percent)   (percent)
Air       3.77e-016    0.262       0.00486     0.00874     0.000162
Water     1.36e-017    553         719         18.4        24
Soil      1.45e-016    1.73e+003   0           57.6        0
Sediment  1.39e-017    0.907       0.212       0.0302      0.00707

Persistence Time: 1.74e+003 hr
Reaction Time:    2.29e+003 hr
Advection Time:   7.25e+003 hr
Percent Reacted:  76
Percent Advected: 24

Half-Lives (hr), (based upon Biowin (Ultimate) and Aopwin):
Air:      1.283
Water:    900
Soil:     1800
Sediment: 8100
Biowin estimate: 2.430  (weeks-months)

Advection Times (hr):
Air:      100
Water:    1000
Sediment: 5e+004


....
```

Bilag C – Dansk (Q)SAR database resultater

Danish (Q)SAR Database, https://qsar.food.dtu.dk Date: 16-01-2024

(Q)SAR predicted profile

8.1 Structure (as used for QSAR prediction):



SMILES (used for QSAR prediction): C1(NS(=O)(=O)c2ccc(N)cc2)C=C(C)ON=1

8.2 ID

Registry Number	723-46-6	PubChem CID	
REACH EC Number (pre-registration, by 2013)	211-963-3	REACH EC Number (registration, 2019 or 2022)	
REACH registration (2022)		REACH registration cumulated minimum annual tonnage (2022)	
EU CLP Harmonized Classification*		DK-EPA / DTU QSAR-based CLP Advisory Classification	Aquatic Chronic 2
EU Biocide active substances		EU Pesticide active substances	
EU EFSA Botanical substances		US TSCA (Oct. 2021)	Yes
Tox21 (2019)	Yes	ToxCast (Oct. 2021)	
Molecular Formula	C10 H11 N3 O3 S1	Molecular weight (g/mole)	253.28
Chemical Name	sulfamethoxazole		

(Annex VI to CLP up to and including the 9th ATP, and including Nordic Council of Minister SPIN list for group entries)

8.3 Melting point, Boiling point and Vapour pressure

Melting Point (deg C)	172.43	Melting Point Experimental (deg C)	
Boiling Point (deg C)	414.01	Boiling Point Experimental (deg C)	
Vapour Pressure (atm)		Vapour Pressure Experimental (atm)	
Vapour Pressure (mm Hg)	1.3E-007	Vapour Pressure Experimental (mm Hg)	
Vapour Pressure (Pa)	1.733E-005	Vapour pressure Subcooled Liquid (Pa)	0.000505

EPI MPBPVP models

8.4 Henry's Law Constant

HLC Bond Method (atm-m3/mole)	9.563E-013	HLC Group Method (atm-m3/mole)	
HLC Via VP/WSol (atm-m3/mole)	1.099E-011	HLC Via VP/WSol (Pa-m3/mole)	1.114E-006
Henrys Law Const. Exp db (Pa-m3/mole)		Henrys Law Const. Exp db (atm-m3/mole)	

EPI HENRYWIN models

8.5 Water Solubility

Water solubility from Kow (mg/L)	3942	Water solubility from Fragments (mg/L)	869.45
Water solubility Exp (mg/L)	610	Water solubility Exp Ref	YALKOWSKY,SH & DANNENFELSER,RM (1992)

EPI WATERNT model

	Exp	Prediction	Domain
Water solubility v1.0.1 (mg/L)		426.78	good_IN

VEGA model

8.6 Hydrolysis

Hydrolysis Ka half-life pH 7	Hydrolysis Kb half-life pH 7
Hydrolysis Ka half-life pH 8	Hydrolysis Kb half-life pH 8

EPI HYDROWIN model

8.7 pKa

pKa Acid	9
- Standard deviation (±)	0.5
pKa Base	3.3
- Standard deviation (±)	0.5

ACDLabs model

pKa estimate 999: no acidic moiety found. pKa estimate -999: no basic moiety found.

8.8 Partition coefficients

pH	1	4	5	6	7	8	9
LogD	-3.28	-0.48	-0.4	-0.4	-0.4	-0.43	-0.68

Minimum LogD in the pH interval 4-9	-0.68	Maximum LogD in the pH interval 4-9	-0.4

ACDLabs models

LogD: Log octanol-water partition coefficient, which for ionizable compounds varies with the pH-dependent amounts of neutral and ionized species

Log Koa	11.298	Log Kaw	-10.408

EPI KOAWIN models

Koa: octanol-air partition coefficient. Kaw: air-water partition coefficient.

Log Kow	0.48		
Log Kow Exp	0.89	Log Kow Exp Ref	HANSCH,C ET AL. (1995)

EPI WSKOW model

LogKow: log octanol-water partition coefficient

Kp (m3/ug) Mackay-based	0.00594	Kp (m3/ug) Koa-based	0.0488
Phi Junge-Pankow-based	0.177	Phi Mackay-based	0.322
Phi Koa-based	0.796		

EPI AEROWIN models

Kp: particle-gas partition coefficient. Phi: fraction of substance sorbed to atmospheric particulates

Koc from MCI (L/kg)	258.3	Log Koc from MCI	2.4121

Koc from Kow (L/kg)	34.33	Log Koc from Kow	1.5356

EPI KOCWIN models

Koc: soil adsorption coefficient of organic compounds. Kow: octanol-water partition coefficient. MCI: first order Molecular Connectivity Index

8.9 Level III Fugacity Environmental Partitioning, emission to air, water and soil

	Air	Water	Soil	Sediment
Mass Amount (%)	9.31E-006	13.8	86	0.203
Half-Life (hr)	1.28	900	1800	8100
Emissions (kg/hr)	1000	1000	1000	0

EPI Level III Fugacity Model

Persistence time (hr)	1740
Persistence time (days)	72.5

EPI Level III Fugacity Model

8.10 Level III Fugacity Environmental Partitioning, emission only to water

	Air	Water	Soil	Sediment
Mass Amount (%)	4.68E-013	98.5	2.05E-006	1.45
Half-Life (hr)	1.28	900	1800	8100
Emissions (kg/hr)	0	1000	0	0

EPI Level III Fugacity Model

Persistence time (hr)	573
Persistence time (days)	23.875

EPI Level III Fugacity Model

8.11 Air Half-Life

	Exp	Prediction	Domain
Air Half-Life (CORAL) v1.0.1 (hr)		0.0975	low_OUT

VEGA model

8.12 Sewage Treatment Plant (STP) overall chemical mass balance using 10,000 hr

	Total removal	Biodegradation	Sludge Adsorption	Volatilization
(%)	1.88	0.09	1.79	0

EPI STPWIN model

8.13 Atmospheric oxidation (25 deg C)

	OH	Ozone
Half-Life (d)	0.05344	0
Half-Life (hr)	0.641	
Overall Rate Const. (OH: E-12 cm3/molecule-sec and OZ: E-17 cm3/molecule-sec)	200.136	

EPI AOPWIN models

8.14 Biodegradation

Biowin1 (linear model) Probability of Rapid Biodegradation	0.4479
Biowin2 (non-linear model) Probability of Rapid Biodegradation	0.1281
Biowin3 Expert Survey Ultimate Biodegradation	2.4297
Biowin3 Expert Survey Ultimate Timeframe	weeks-months
Biowin4 Expert Survey Primary Biodegradation	3.3054
Biowin4 Exp. Survey Primary Timeframe	days-weeks
Biowin5 (MITI linear model) Biodegradation Probability	-0.1165
Biowin6 (MITI non-linear model) Biodegradation Probability	0.006
Biowin7 (Anaerobic Linear) Biodegradation Probability	-0.2907
Petroleum Hydrocarbon Biodegradation Half-Life (days)	

EPI BIOWIN models
SkinBiowin1 and Biowin2: ≥0.5: "Rapid" <0.5: "Slow"
Biowin3 and Biowin4: 5 ~ hours; 4 ~ days; 3 ~ weeks; 2 ~ months; 1 ~ years.
Biowin5 and Biowin6: ≥0.5: "Readily", <0.5: "Not readily".
Biowin7: ≥0.5: "Fast", <0.5: "Slow"

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Not Ready Biodegradability		POS_OUT	INC_OUT	POS_IN	POS_OUT

DTU-developed models
POS=Not Ready

.	Exp	Prediction_Domain
Not Ready Biodegradability		POSS.NEG_low_OUT

v1.0.10

VEGA model
POS=Not Ready

8.15 Bioaccumulation

BCF (L/kg wet-wt)	3.162
Log BCF (L/kg wet-wt)	0.5
Whole Body Primary Biotransformation Fish Half-Life (days)	0.0621
BCF Arnot-Gobas (upper trophic) Including Biotransformation (L/kg wet-wt)	1.472
BCF Arnot-Gobas (upper trophic) Zero Biotransformation (L/kg wet-wt)	1.723
BAF Arnot-Gobas (upper trophic) Including Biotransformation (L/kg wet-wt)	1.472
BAF Arnot-Gobas (upper trophic) Zero Biotransformation (L/kg wet-wt)	1.735

EPI BCFBAF models
BCF: Bioconcentration factor, BAF: Bioaccumulation factor

	Exp	Prediction	Domain
Log BCF (CAESAR) v2.1.15 (L/kg)		0.37	low_OUT

VEGA model

8.16 Aquatic toxicity

Exp	Battery	Leadscope	SciQSAR
Fathead minnow 96h LC50 (mg/L)	80.17872	19.6228	140.7346
Domain	IN	IN	IN
Daphnia magna 48h EC50 (mg/L)	13.74235	15.58048	11.90422
Domain	IN	IN	IN
Pseudokirchneriella s. 72h EC50 (mg/L)	23.90612	19.07792	28.73432
Domain	IN	IN	IN

DTU-developed models

	Exp	Prediction	Domain
Daphnia magna 48h EC50 v1.0.1 (mg/L)		0.1563	low_OUT
Daphnia magna 21d NOEC v1.0.1 (mg/L)		0.2765	low_OUT
Algae Acute 72h ErC50 v1.0.1 (mg/L)		10.08	low_OUT
Sludge Classification, 3h EC50 < 100 mg/L v1.0.1*		NEG_low_OUT	See prediction

Sludge 3h EC50 v1.0.1 (mg/L)	56.39	low_OUT

VEGA models

** The quantitative model should only be applied when the Sludge classification model is POS_IN*

MOA Toxicity classification (EPA T.E.S.T) v1.0.2	
- predicted Mode of action	Narcosis
- Domain	low_OUT
- Exp, if part of training set	

VEGA model

Qualitative estimation of MOA for Fathead minnow 96h

	Fish 96h	Daphnid 48h	Green Algae 96h
LC50 (Fish) or EC50 (Daphnid and Algae) for Most Toxic Class (mg/L)	410.762	1.872	6.615
Max. Log Kow for Most Toxic Class	6	>3	>4
Most Toxic Class	Anilines (Unhindered)	Anilines (Unhindered)	Anilines (Unhindered)
Note			

EPI ECOSAR models

ECOSAR Classes: Anilines (Unhindered); Amides

8.17 Oral absorption

Lipinski's Rule-of-five score (bioavailability)	0
Absorption from gastrointestinal tract for 1 mg dose (%)	50
Absorption from gastrointestinal tract for 1000 mg dose (%)	50

Leadscope model on Lipinski's Rule-of-five. Equation from literature on GI abs.

Lipinski scores of 0 or 1: The substance may be bioavailable. Lipinski scores of 2, 3 or 4: The substance may not be bioavailable.

8.18 Skin absorption

Dermal absorption (mg/cm2/event)	0.00322

EPI DERMWIN model

8.19 Brain/blood Distribution

Log brain/blood partition coefficient	-0.8222

Equation from literature

Partitioning between the two tissues at equilibrium. >1: high, >0 to <1: medium, >-1 to <0, fair, <-1: low.

8.20 Metabolism

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
CYP2C9 substrates (Human clinical data)	POS	INC_OUT	POS_IN	NEG_OUT	NEG_IN
CYP2D6 substrates (Human clinical data)	NEG	NEG_IN	NEG_IN	NEG_IN	NEG_IN

DTU-developed models

8.21 Acute toxicity in Rodents

	LD50 (mg/kg/d)	Reliability Index
Rat Oral	4700	0.47
Rat Intraperitoneal	1000	0.51
Mouse Oral	1700	0.14
Mouse Intraperitoneal	99.28	0.4
Mouse Intravenous	220	0.54
Mouse Subcutaneous	180	0.57

ACDLabs models

Reliability index: <0.3 = Not reliable prediction quality; 0.3-0.5 = borderline prediction quality; 0.5-0.75 = moderate prediction quality; >0.75 = high prediction quality.

8.22 Effects in Humans

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
MRDD in Humans ≤ 2.69 mg/kg-bw/d		NEG_IN	NEG_IN	NEG_IN	NEG_IN

DTU-developed models

Model based on data on pharmaceuticals. Maximum recommended daily dose in pharmaceutical clinical trials employing primarily oral route of exposure and daily treatments, usually for 3-12 months.

.	Exp	Prediction_Domain
Hepatotoxicity v1.0.1	POS	POS_NA

VEGA model

Profiler-type of predictions to be used as supporting information together with relevant QSAR predictions.

8.23 Irritation and Sensitization

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR

Severe Skin Irritation in Rabbit		NEG_OUT	INC_OUT	INC_OUT	NEG_IN
Skin sensitisation GHS/CLP at least Cat. 1, LLNA-based (open data only)				NEG_IN	
Skin sensitisation GHS/CLP at least Cat. 1, LLNA-based (open data and REACH-registrations)	N/A			NEG_IN	
Skin sensitisation GHS/CLP at least Cat. 1, LLNA-based, only negative predictions (open data only)				NEG_IN	
Skin sensitisation GHS/CLP Cat. 1A, LLNA-based (open data only)				NEG_OUT	
Skin sensitisation GHS/CLP Cat. 1A, LLNA-based (open data and REACH-registrations)	N/A			NEG_IN	
Skin sensitisation GHS/CLP Cat. 1A, LLNA-based, only positive predictions (open data and REACH-registrations)	N/A			N/A	
Allergic Contact Dermatitis in Guinea Pig and Human*	N/A	POS_IN	POS_IN	POS_IN	POS_IN
Respiratory Sensitisation in Humans		INC_OUT	INC_OUT	POS_OUT	POS_OUT

DTU-developed models

**Based on commercial training set*

Protein binding by OASIS, alerts in:	
- parent only	No alert found
- metabolites from skin metabolism simulator only	C-Nitroso compounds
- metabolites from auto-oxidation simulator only	
Protein binding by OECD, alerts in:	
- parent only	No alert found
- metabolites from skin metabolism simulator only	No alert found
- metabolites from auto-oxidation simulator only	
Protein binding potency Cys (DRPA 13%), alerts in:	
- parent only	DPRA less than 9% (DPRA 13%) >> No protein binding alert
- metabolites from skin metabolism simulator only	DPRA above 21% (DPRA 13%) >> Substituted nitrosoarenes
- metabolites from auto-oxidation simulator only	
Protein binding potency Lys (DRPA 13%), alerts in:	
- parent only	DPRA less than 9% (DPRA 13%) >> No protein binding alert
- metabolites from skin metabolism simulator only	DPRA less than 9% (DPRA 13%) >> Substituted nitrosoarenes
- metabolites from auto-oxidation simulator only	
Keratinocyte gene expression, alerts in:	
- parent only	Not possible to classify according to these rules

- metabolites from skin metabolism simulator only	Not possible to classify according to these rules
- metabolites from auto-oxidation simulator only	
Protein binding potency GSH, alerts in:	
- parent only	Not possible to classify according to these rules (GSH)

OECD QSAR Toolbox v.4.1 profilers

Profiler predictions are supporting information to be used together with the relevant QSAR predictions

8.24 Endocrine and Molecular Endpoints

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Estrogen Receptor α Binding, Full training set (Human *in vitro*)		NEG_IN	INC_OUT	NEG_IN	NEG_IN
Estrogen Receptor α Binding, Balanced Training Set (Human *in vitro*)		NEG_IN	INC_OUT	NEG_IN	NEG_IN
Estrogen Receptor α Activation (Human *in vitro*)		NEG_IN	INC_OUT	NEG_IN	NEG_IN
Estrogen Receptor Activation, CERAPP data (*in vitro*)		N/A	N/A	NEG_IN	N/A
Androgen Receptor Inhibition (Human *in vitro*)		NEG_IN	INC_OUT	NEG_IN	NEG_IN
Androgen Receptor Binding, CoMPARA data (*in vitro*)		N/A	N/A	NEG_IN	N/A
Androgen Receptor Inhibition, CoMPARA data (*in vitro*)		N/A	N/A	NEG_IN	N/A
Androgen Receptor Activation, CoMPARA data (*in vitro*)		N/A	N/A	NEG_IN	N/A
Thyroperoxidase (TPO) inhibition QSAR1 (Rat *in vitro*)		N/A	N/A	POS_IN	N/A
Thyroperoxidase (TPO) inhibition QSAR2 (Rat *in vitro*)		N/A	N/A	POS_IN	N/A
Sodium/iodide symporter (NIS), higher sensitivity		N/A	N/A	NEG_IN	N/A
Sodium/iodide symporter (NIS), higher specificity		N/A	N/A	NEG_IN	N/A
Thyroid Receptor α Binding (Human *in vitro*)					
- mg/L			40513.61	4898.7	40606.99
- μM			159955.8	19341.05	160324.5
- Positive for IC_{50} ≤ 10 μM					
- Positive for IC_{50} ≤ 100 μM					
- Domain		OUT	OUT	OUT	OUT
Thyroid Receptor β Binding (Human *in vitro*)					
- mg/L			8195.984	59.26535	8195.984
- μM			32359.38	233.9915	32359.38

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
- Positive for IC_{50} ≤ 10 µM					
- Positive for IC_{50} ≤ 100 µM					
- Domain		OUT	OUT	OUT	OUT
Peroxisome Proliferator-Activated Receptor gamma (PPAR-γ) Inhibition at max. 10 µM (Human *in vitro*)	NEG	N/A	N/A	NEG_IN	N/A
Peroxisome Proliferator-Activated Receptor gamma (PPAR-γ) Inhibition at any concentration (Human *in vitro*)	NEG	N/A	N/A	NEG_IN	N/A
Retinoic Acid Receptor (RAR) inhibition at max. 10 µM (Human *in vitro*)		N/A	N/A	NEG_IN	N/A
Arylhydrocarbon Receptor (AhR) Activation – Rational final model (Human *in vitro*)		N/A	N/A	NEG_IN	N/A
Arylhydrocarbon Receptor (AhR) Activation – Random final model (Human *in vitro*)		N/A	N/A	NEG_IN	N/A
Pregnane X Receptor (PXR) Binding (Human *in vitro*)	N/A	NEG_IN	NEG_IN	NEG_IN	NEG_IN
Pregnane X Receptor (PXR) Binding (Human *in vitro*) NEW		N/A	N/A	NEG_IN	N/A
Pregnane X Receptor (PXR) Activation (Human *in vitro*)		N/A	N/A	NEG_IN	N/A
Pregnane X Receptor (PXR) Activation (Rat *in vitro*)		N/A	N/A	NEG_IN	N/A
CYP3A4 Induction (Human *in vitro*)		N/A	N/A	NEG_IN	N/A
Constitutive Androstane Receptor (CAR) Activation at max. 20 µM (Human *in vitro*)		N/A	N/A	NEG_IN	N/A
Constitutive Androstane Receptor (CAR) Activation at max. 50 µM (Human *in vitro*)	NEG	N/A	N/A	NEG_IN	N/A
Constitutive Androstane Receptor (CAR) Inhibition at max. 20 µM (Human *in vitro*)	NEG	N/A	N/A	NEG_IN	N/A
Constitutive Androstane Receptor (CAR) Inhibition at max. 50 µM (Human *in vitro*)		N/A	N/A	NEG_IN	N/A

DTU-developed models

Estrogen Receptor Binding, alerts in:	
- parent only	Strong binder, NH2 group
- metabolites from *in vivo* Rat metabolism simulator only	Non binder, without OH or NH2 group
- metabolites from Rat liver S9 metabolism simulator only	Non binder, without OH or NH2 group

rtER Expert System - USEPA, alerts in:	
- parent only	No alert found
- metabolites from *in vivo* Rat metabolism simulator only	No alert found
- metabolites from Rat liver S9 metabolism simulator only	No alert found

OECD QSAR Toolbox v.4.2 profilers

Profiler predictions are supporting information to be used together with the relevant QSAR predictions

8.25 Developmental Toxicity

	Battery	CASE Ultra	Leadscope	SciQSAR
Teratogenic Potential in Humans	NEG_IN	NEG_IN	NEG_IN	NEG_IN

DTU-developed models based on commercial training set

.	Exp	Prediction_Domain
Developmental/Reproductive Toxicity library (PG) v1.1.2		POS_mod_OUT

VEGA model

Profiler-type of predictions to be used as supporting information together with relevant QSAR predictions

8.26 Genotoxicity - Structural Alerts for DNA Reactivity

	Battery	CASE Ultra	Leadscope	SciQSAR
Ashby Structural Alerts	POS_IN	POS_IN	POS_IN	POS_OUT

DTU-developed models based on commercial training set

DNA binding by OASIS, alerts in:	
- parent only	Single-Ring Substituted Primary Aromatic Amines
DNA binding by OECD, alerts in:	
- parent only	Primary aromatic amine

OECD QSAR Toolbox v.4.2 profilers

Profiler predictions are supporting information to be used together with the relevant QSAR predictions

8.27 *In vitro* Genotoxicity - Bacterial Reverse Mutation Test (Ames test)

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Ames test in S. typhimurium (*in vitro*)		NEG_OUT	INC_OUT	NEG_IN	NEG_OUT
*Direct Acting Mutagens (without S9)	N/A	POS_IN	INC_OUT	POS_IN	POS_IN

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
*Base-Pair Ames Mutagens	N/A	NEG_OUT	INC_OUT	NEG_IN	INC_OUT
*Frameshift Ames Mutagens	N/A	INC_OUT	INC_OUT	POS_OUT	POS_OUT
*Potent Ames Mutagens, Reversions ≥ 10 Times Controls	N/A	INC_OUT	INC_OUT	INC_OUT	POS_OUT

DTU-developed models

* The four models (Direct Acting mutagens (without S9), Base-Pair Ames Mutagens, Frameshift Ames Mutagens, Potent Ames Mutagens) should not be used to determine if substances are Ames mutagens, but can be used for indication of mechanism or potency for cases where the main Ames model (Ames test in S. typhimurium (*in vitro*)) is POS_IN.

	Consensus	Mut. / Non-mut. Scores	Used models
Ames test Consensus	NEG	0 / 1	1

VEGA model

Mutagenicity (Ames) consensus model version 1.0.4 contained in VEGA version 1.4.3 with calculation core version 1.3.14

	Exp	Prediction
Ames test (ISS) v1.0.3		POS_low_OUT
Ames test (CAESAR) - v2.1.13		NEG_good_IN
Ames test (SarPy) v1.0.8		NEG_good_IN
Ames test (KNN/Read-Across) v1.0.1	NEG	NEG_exp_IN

VEGA models

DNA alerts for AMES by OASIS, alerts in:	
- parent only	No alert found
In vitro mutagenicity (Ames test) alerts by ISS, alerts in:	
- parent only	Primary aromatic amine,hydroxyl amine and its derived esters

OECD QSAR Toolbox v.4.2 profilers

Profiler predictions are supporting information to be used together with the relevant QSAR predictions

8.28 Other *in vitro* Genotoxicity Endpoints

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Chromosome Aberrations in Chinese Hamster Ovary (CHO) Cells*	N/A	NEG_IN	INC_OUT	NEG_IN	NEG_IN
Chromosome Aberrations in Chinese Hamster Lung (CHL) Cells		POS_OUT	INC_OUT	POS_IN	INC_OUT
Mutations in Thymidine Kinase Locus in Mouse Lymphoma Cells		POS_OUT	INC_OUT	POS_IN	NEG_OUT

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Mutations in HGPRT Locus in Chinese Hamster Ovary (CHO) Cells		INC_OUT	INC_OUT	INC_OUT	INC_OUT
Unscheduled DNA Synthesis (UDS) in Rat Hepatocytes		NEG_OUT	INC_OUT	INC_OUT	NEG_IN
Syrian Hamster Embryo (SHE) Cell Transformation		INC_OUT	INC_OUT	POS_OUT	INC_OUT

DTU-developed models
**Based on commercial training set*

HGPRT: Hypoxanthine-guanine phosphoribosyltransferase

.	Exp	Prediction_Domain
Micronucleus (VERMEER) v1.0.1		INC_OUT

VEGA model

DNA alerts for CA and MNT by OASIS, alerts in:	
- parent only	No alert found
Protein binding alerts for Chromosomal aberration by OASIS, alerts in:	
- parent only	No alert found

OECD QSAR Toolbox v.4.2 profilers
CA: Chromosomal aberration, MNT: Micronucleus test
Profiler predictions are supporting information to be used together with the relevant QSAR predictions

8.29 *In vivo* Genotoxicity Endpoints

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Sex-Linked Recessive Lethal (SLRL) Test in Drosophila m.		NEG_IN	NEG_OUT	NEG_IN	NEG_IN
Micronucleus Test in Mouse Erythrocytes		POS_OUT	INC_OUT	POS_IN	INC_OUT
Dominant Lethal Mutations in Rodents		INC_OUT	INC_OUT	NEG_OUT	NEG_OUT
Sister Chromatid Exchange in Mouse Bone Marrow Cells		INC_OUT	POS_OUT	POS_IN	NEG_IN
Comet Assay in Mouse		INC_OUT	INC_OUT	POS_IN	NEG_IN

DTU-developed models

In vivo mutagenicity (Micronucleus) alerts by ISS, alerts in:	
- parent only	H-acceptor-path3-H-acceptor; Primary aromatic amine, hydroxyl amine and its derived esters

OECD QSAR Toolbox v.4.2 profilers

Profiler predictions are supporting information to be used together with the relevant QSAR predictions

8.30 Carcinogenicity

	E Ultra	Leadscope
FDA RCA Cancer Male Rat	POS_IN	INC_OUT
FDA RCA Cancer Female Rat	POS_IN	INC_OUT
FDA RCA Cancer Rat	POS_IN	NEG_IN
FDA RCA Cancer Male Mouse	NEG_IN	POS_OUT
FDA RCA Cancer Female Mouse	POS_OUT	POS_IN
FDA RCA Cancer Mouse	POS_OUT	NEG_IN
FDA RCA Cancer Rodent	POS_IN	NEG_OUT

Commercial models from CASE Ultra and Leadscope

FDA RCA: Data from US Food and Drug Administration as part of Research Cooperation Agreement

Carcinogenicity (genotox and nongenotox) alerts by ISS, alerts in:	
- parent only	Benzenesulfonic ethers, methylation (Nongenotox); Primary aromatic amine,hydroxyl amine and its derived esters (Genotox); Structural alerts for both genotoxic and nongenotoxic carcinogenicity
Oncologic Primary Classification, alerts in:	
- parent only	Aromatic Amine Type Compounds

OECD QSAR Toolbox v.4.2 profilers

Profiler predictions are supporting information to be used together with the relevant QSAR predictions

	Exp	Battery	CASE Ultra	Leadscope	SciQSAR
Liver Specific Cancer in Rat or Mouse		NEG_IN	INC_OUT	NEG_IN	NEG_IN

DTU-developed models

9 Abbreviations

INC: inconclusive. A definite call within the defined applicability domain could not be made.

NEG: negative

POS: positive

IN: inside applicability domain

OUT: outside applicability domain

Exp: Experimental values, from EpiSuite experimental databases or from QSAR models training sets.

N/A: Not applicable, either because training set data cannot be released for commercial or proprietary models / training sets, or because the model was not developed in a given QSAR software (i.e. a given prediction is not available as the model version does not exist).

10 Important notes

This is an automatically generated report from the Danish (Q)SAR Database, http://qsar.food.dtu.dk.

For predictions from CASE Ultra, Leadscope, SciQSAR, VEGA as well as the Acute toxicity in rodent from ACDLabs information on the software versions can be found in the QMRFs. For the other predicted properties the software versions are:

EPI MPBPWIN v1.43

EPI HENRYWIN v3.20

EPI WSKOW v1.42

EPI WATERNT v1.01

EPI KOAWIN v1.10

EPI AEROWIN v1.00

EPI KOCWIN v2.00

EPI Level III Fugacity Model (EPI Suite v4.11)

EPI STPWIN (EPI Suite v4.11)

EPI AOPWIN v1.92

EPI BIOWIN v4.10

EPI BCFBAF v3.01

EPI ECOSAR v1.11

EPI DERMWIN v2.02

ACD/ ToxSuite 2.95.1 Ionization\pKa

ACD/ ToxSuite 2.95.1 Ionization\ LogD

ACD/ ToxSuite 2.95.1

It is recommended to run the latest version of the EPI Suite Programs in preference of the predictions given in this document when these endpoints are of importance and new versions have been released from the United States Environmental Protection Agency in comparisons. EPI Suite can be downloaded from the US EPA homepage: http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm

For further information on the applied systems, see the following homepages:

Case Ultra: https://www.multicase.com/case-ultra

Leadscope: https://www.leadscope.com/

VEGA: https://vegahub.it

ToxSuite: https://www.acdlabs.com/

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