Reference HE

Summary of Impurities and Transformations of Explosives

Compound	Soluble in H2O	Source	Trans Time	TNT	HMX	RDX	PETN	Tetryl
2,4,6-trinitrotoluene (TNT)	130 mg/l@20C			Yes				
2,4-dinitrotoluene (2,4-DNT)	270 mg/L@22C	I		Yes				
2,6-dinitrotoluene (2,6-DNT)	206 mg/L@25C	I		Yes				
1,3-dinitrobenzene (DNB)	460 mg/L@15C	I		Yes				
2,4,5-trinitrotoluene		I		Yes				
2,3,4-trinitrotoluene		I		Yes				
2-amino-4,6-dinitrotoluene (2-A)	2800 mg/L@20C	AB	24 days	Yes				
4-amino-2,6-dinitrotoluene (4-A)	2800 mg/L@20C	AB	24 days	Yes				
Tetranitroazoxytoluene isomers		AB		Yes				
2,4-diamino-6-nitrotoluene (2,4-DA)		AB	91 days	Yes				
2,6-diamino-4-nitrotoluene (2,6-DA)		AB	91 days	Yes				
2-hydroxylamino-4,6-dinitrotoluene (2-OHA)		AB		Yes				
4-hydroxylamino-2,6-dinitrotoluene (4-OHA)		AB		Yes				
2,2',6,6'-tetranitro-4,4'-azoxytoluene (4,4'-Az)		AB		Yes				
4,4',6,6'-tetranitro-2,2'-azoxytoluene (2,2-Az)		AB	91 days	Yes				
2',4,6,6-tetranito-2,4'-azoxytoluene (2,4-Az)		AB	91 days	Yes				
Trinitrobenzene (TNB)	278 mg/L@15C	AB/P		Yes				
Trinitrobenzaldehyde (TNBA)		M/P		Yes				
Arylamines		AB/ANB		Yes				
Nitrosodinitrotoluene isomer				Yes (DNT)				
3,5-dinitroaniline (DNA)		P/AB		Yes				
2-amino-4,6-dinitrobenzoic acid		P		Yes				
Aminodinitrobenzoic acid isomers		P		Yes				
3,5-dinitrophenol		P/AB		Yes				
3,5-dinitrocatechol		P/AB		Yes				
3,5-dinitrohydroquinone		P/AB		Yes				
Oxalic acid		P/AB		Yes				
2,6-dinitroanthranil		P		Yes				
4,6-dinitroanthranil		P		Yes				
2,4,6-trinitrobenzonitrile		P		Yes				
2,4,6-trinitobenzaldehyde (TNBA)		P/AB		Yes				
1,3,5-trinitrobenzene		I/PAB		Yes				
1,3,5-trinitrobenzaldehyde		I/P		Yes				
1,3,5-trinitrobenzoic acid		I/P		Yes				

I=Impurity, M=Microbial Transformation, P=Photodegradation, AB=Aerobic biodegradation
ANB=Anaerobic biodegradation
Unlikely under normal environmental conditions that TNT degrades to CO_2

9084

Cl... groundwater samples

Summary of Impurities and Transformations of Explosives

Compound	Soluble in H2O	Source	Trans Time	TNT	HMX	RDX	PETN	Tetryl
2-amino-4-nitrotoluene		AB (2,4-DNT)		Yes				
4-amino-2-nitrotoluene		AB (2,4-DNT)		Yes				
2,2'-dinitro-4,4'-azoxytoluene		AB (2,4-DNT)		Yes				
4,4'-dinitro-2,2'-azoxytoluene		AB (2,4-DNT)		Yes				
4-acetamide-2-nitrotoluene		AB (2,4-DNT)		Yes				
4-hydroxylamino-2-nitrotoluene		AB (2,4-DNT)		Yes				
2-hydroxylamino-4-nitrotoluene		AB (2,4-DNT)		Yes				
1,3,5-trinitro-1,3,5-trizocyclohexane (RDX)	42 mg/L@20					Yes		
mono-, di-, trinitroso-RDX		P			Yes	Yes		
1,3,5,7-tetranitro-1,2,5,7-tetraazacyclooctane (HMX)	5 mg/L@25C	I			Yes			
hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX)		ANB				Yes		
hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine (DNX)		ANB				Yes		
hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX)		ANB				Yes		
2-amino-4-nitrotoluene						Yes		
4-amino-2-nitrotoluene						Yes		
3-nitroaniline						Yes		
hydrazine		ANB/P			Yes	Yes		
1,1-dimethylhydrazine		ANB			Yes	Yes		
1,2-dimethylhydrazine		ANB			Yes	Yes		
ESH-18 formaldehyde		ANB/P			Yes	Yes		
methanol		ANB			Yes	Yes		
ESH-18 Carbon dioxide		M/AB/P		Yes	Yes	Yes		
DX Nitrate		P		Yes	Yes	Yes		
D > Nitrite		P			Yes	Yes		
Organic nitro-compounds		P			Yes	Yes		
DX Ammonia		P			Yes	Yes		
Nitrous oxide		P				Yes		
Formamide		P				Yes		
N-nitroso-methylenediamine		P				Yes		
ESH-3 Hydrogen cyanide	? DX	P			Yes	Yes		
Cyanic acid		P				Yes		
DX Formic acid	alkaline	P				Yes		
Methenamine (hexamethylene tetramine)		I			Yes	Yes		
Pentaerythritol		P					Yes	

pH - field

I=Impurity, M=Microbial Transformation, P=Photodegradation, ANB=Anaerobic biodegradation

AB=Aerobic biodegradation

Unlikely under normal environmental conditions that TNT degrades to CO2

↑ pH → greater degradation

Summary of Impurities and Transformations of Explosives

Compound	Soluble in H2O	Source	Trans Time	TNT	HMX	RDX	PETN	Tetryl
N-methylpicramide		P						Yes
Picric acid		P						Yes
Methylnitramine		P						Yes

I=Impurity, M=Microbial Transformation, P=Photodegradation,
ANB=Anaerobic biodegradation

AB=Aerobic biodegradation
Unlikely under normal environmental conditions that TNT degrades to CO2