9.9. Exposure scenario 9: Widespread use by professional workers - Use of silver nitrate as reactive laboratory reagent

Product category used: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals
Sector of use: SU 20: Health services; SU 24: Scientific research and development

Environment contributing scenario(s):		
CS 1	Use of silver nitrate as reactive laboratory reagent	ERC 8b
Worker contributing scenario(s):		
CS 2	Use as laboratory reagent	PROC 15

9.9.1. Env CS 1: Use of silver nitrate as reactive laboratory reagent (ERC 8b)

Assessment entity group used for the assessment of this contributing scenario: ENV RA

9.9.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily local widespread use amount: <= 5.5E-6 tonnes/day
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 80.1%]
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations

9.9.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.91. Local releases to the environment

Release	Assessment entity	Release estimation method	Explanations
Water	Ag dissolved	ERC	**Release factor before on site RMM:** 2% **Release factor after on site RMM:** 2% **Local release rate:** 1.1E-4 kg/day
Air	Ag dissolved	ERC	**Release factor before on site RMM:** 0.1% **Release factor after on site RMM:** 0.1%
Non agricultural soil	Ag dissolved	ERC	**Release factor after on site RMM:** 0%

9.9.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.92. Exposure concentrations and risks for the environment and man via the environment

Protection target	Assessment entity	Exposure concentration	Risk quantification
Fresh water	Ag dissolved	**Local PEC:** 6.34E-6 mg/L RCR = 0.138	Final RCR = 0.138
Sediment	Ag dissolved	**Local PEC:** 1.209 mg/kg dw	Final RCR < 0.01

Protection target	Assessment entity	Exposure concentration	Risk quantification
(freshwater)		RCR = 2.76E-3	
Marine water	Ag dissolved	**Local PEC:** 1.94E-6 mg/L RCR = 2.25E-3	Final RCR < 0.01
Sediment (marine water)	Ag dissolved	**Local PEC:** 0.369 mg/kg dw RCR = 8.43E-4	Final RCR < 0.01
Sewage Treatment Plant	Ag dissolved	**Local PEC:** 1.09E-5 mg/L RCR = 4.38E-4	Final RCR < 0.01
Agricultural soil	Ag dissolved	**Local PEC:** 0.098 mg/kg dw RCR = 0.093	Final RCR = 0.093
Man via environment - Inhalation (systemic effects)	Ag dissolved	**Concentration in air:** 8.53E-8 mg/m³ RCR = 5.69E-7	Final RCR < 0.01
Man via environment - Oral	Ag dissolved	**Exposure via food consumption:** 3.84 µg/kg bw/day (Measured data: See section 9.0.3.6) RCR = 0.035	Final RCR = 0.035
Man via environment - combined routes			Final RCR = 0.035

Remarks on measured exposure:

See section 9.0.3.6 for Ag dissolved:
Identity of the substance used: Ag
Explanation: Worst case exposure of 3.84 µg Ag/kg bw/day from food (section 9.0.3.6) was taken forward to the risk characterisation.
The intake via drinking water calculated with CHESAR was 3-4 orders of magnitudes lower compared to the intake via food and has thus not been taken into account.

9.9.2. Worker CS 2: Use as laboratory reagent (PROC 15)

Assessment entity group used for the assessment of this contributing scenario: HH RA
Covers laboratory use both as liquid and solid substance

9.9.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	MEASE 1.02.01
• Physical form of the used product: Solid (material with low dustiness)	MEASE 1.02.01
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	MEASE 1.02.01
Technical and organisational conditions and measures	
• Occupational Health and Safety Management System: Basic	MEASE 1.02.01
• Pattern of use: Non-dispersive use	MEASE 1.02.01
• Pattern of exposure control: Direct handling	MEASE 1.02.01
• Contact level: Extensive	MEASE 1.02.01
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training. (effectiveness >= 90%)	MEASE 1.02.01
• Respiratory protective equipment (RPE) as precautionary measure: RPE protecting from local effects via inhalation	

	Method
Due to potential adverse effects of the substance to the respiratory tract, RPE is prescribed on a precautionary basis for all workplaces unless inhalation exposure to the substance can be excluded.	
• Gloves as precautionary measure: Gloves protecting from local effects to the skin (high hazard) *Due to the potential adverse effects of the substance to skin, protective gloves according to EN 374 have to be worn at all workplaces. Additionally, face protection is required to be worn as appropriate.*	
• Eye protection: Eye protection to be worn to protect from adverse effects to the eyes *Due to the adverse effects of the substance to the eyes, direct contact of the eyes with the substance is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	

9.9.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.93. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Silver nitrate	0.1 mg/m³ (MEASE 1.02.01) RCR = 0.104	Final RCR = 0.104
Inhalation, local, long term	Silver nitrate	0.1 mg/m³ (MEASE 1.02.01)	Qualitative risk
Dermal, systemic, long term	Silver nitrate	0.017 mg/kg bw/day (MEASE 1.02.01) RCR = 0.05	Final RCR = 0.05
Combined routes, systemic, long-term			Final RCR = 0.154

Risk characterisation

Qualitative risk characterisation (Inhalation, local, long term, Inhalation, local, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
See section 9.0.4.2