Issue date: 12-September-2023 Revision date: -Supersedes date: -Version number: 01



SAFETY DATA SHEET

Section 1 - Identification

Product identifier	PROTIVATE™ NU4-DRI	
Other means of identification	None.	
Recommended use of the chem	ical and restrictions on use	
Recommended use	Seed Nutrition	
Restrictions on use	None known.	
Details of manufacturer or impo	rter	
Manufacturer/Supplier	Koch Agronomic Services, LLC	
	4111 E 37th St N	
	Wichita, KS 67220 US	
	kochmsds@kochind.com	
	1.866.863.5550	
Emergency	For Chemical Emergency	
	Call CHEMTREC Day or Night	
	USA/Canada - 1.800.424.9300	
	Mexico - 1.800.681.9531	
	Outside USA/Canada - 1.703.527.3887	
	(collect calls accepted)	

Section 2 - Hazard(s) identification

Classification of the hazardous chemical

Hazard symbol(s)

Physical hazards	Not classified.	
Health hazards	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity following repeated exposure	Category 2 (Brain)
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 2

Label elements, including precautionary statements

		Ł
Corrosion	Health hazard	Environment

Signal word	Danger	
Hazard statement(s)	Causes serious eye damage. May cause damage to organs (Brain) through prolonged or repeated exposure. Toxic to aquatic life with long lasting effects.	
Precautionary statement(s)		
Prevention	Do not breathe dust. Avoid release to the environment. Wear eye protection/face protection.	
Response	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTRE or doctor/physician. Collect spillage.	
Storage	Store away from incompatible materials.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Supplemental information	None.	

May form combustible dust concentrations in air.

Section 3 - Composition and information on ingredients

Mixture

Identity of chemical ingredients	CAS number and other unique identifiers	Concentration of ingredients
Plant Based Polysaccharide	9005-25-8	< 60
Zinc oxide	1314-13-2	< 15
Manganese sulfate monohydrate	10034-96-5	< 10
Zinc sulphate monohydrate	7446-19-7	< 5

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

This Safety Data Sheet is not a guarantee of product specification or NPK value(s). NPK content is on specified sales orders, customer invoices, or product specification sheets obtained from supplier.

Section 4 - First aid measures

Description of necessary first aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.		
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.		
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.		
Ingestion	Rinse mouth. Get medical attention if symptoms occur.		
Personal protection for first-aid responders	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.		
Symptoms caused by exposure	Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Coughing. Prolonged exposure may cause chronic effects.		
Medical attention and special treatment	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.		

Section 5 - Firefighting measures

Extinguishing media Suitable extinguishing equipment	Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable extinguishing equipment	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Explosion hazard: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Hazchem code	2Z
General fire hazards	May form combustible dust concentrations in air.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

Section 6 - Accidental release measures

Personal precautions, protective equipment and emergency procedures

reisonal precautions, protective	equipment and emergency procedures
For non-emergency personnel	Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Wear appropriate protective equipment and clothing during clean-up. Do not breathe dust. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
For emergency responders	Keep unnecessary personnel away. Use only non-sparking tools. Do not breathe dust. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. Use personal protection recommended in Section 8 of the SDS.
Environmental precautions	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take precautionary measures against static discharge. Use only non-sparking tools. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Collect dust using a vacuum cleaner equipped with HEPA filter. Prevent product from entering drains. Stop the flow of material, if this is without risk.
	Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water. Retain and dispose of contaminated wash water.
	Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Clean surface thoroughly to remove residual contamination.
	Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Section 7 - Handling and storage

Precautions for safe handling	Minimise dust generation and accumulation. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Keep away from heat/sparks/open flames/hot surfaces No smoking. Combustible dust clouds may be created where operations produce fine material (dust). Handling and processing operations should be conducted in accordance with 'best practices' (e.g. NFPA-654). Explosion-proof general and local exhaust ventilation. Do not breathe dust. Do not get this material in contact with eyes. Avoid prolonged exposure. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Keep containers tightly closed in a dry, cool and well-ventilated place. Store away from incompatible materials (see section 10 of the SDS).

Section 8 - Exposure controls and personal protection

Control parameters

Follow standard monitoring procedures.

Occupational exposure limits

Australia. National Workplace OEL Components	Type	Value	Form
Manganese sulfate monohydrate (CAS 10034-96-5)	TWA	1 mg/m3	Dust.
Plant Based Polysaccharide (CAS 9005-25-8)	TWA	10 mg/m3	Inhalable dust.
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		10 mg/m3	Inhalable dust.
US. ACGIH Threshold Limit Values	(TLV)		
Components	Туре	Value	Form
Manganese sulfate monohydrate (CAS 10034-96-5)	TWA	0.1 mg/m3	Inhalable fraction.

old Limit Val /TI \/

US. ACGIH Threshold Limit Components	Type	Value	Form
		0.02 mg/m3	Respirable fraction.
Plant Based Polysaccharide (CAS 9005-25-8)	TWA	10 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.
UK. OELs. Workplace Expos Components	sure Limits (WELs) (EH40/2005 (Four Type	th Edition 2020)), Table 1 Value	Form
Manganese sulfate monohydrate (CAS 10034-96-5)	TWA	0.05 mg/m3	Respirable fraction.
Plant Based Polysaccharide (CAS 9005-25-8)	TWA	4 mg/m3	Respirable.
		10 mg/m3	Inhalable
Zinc oxide (CAS 1314-13-2)	TWA	4 mg/m3	Respirable dust.
		10 mg/m3	Inhalable dust.
Germany. DFG MAK List (ad in the Work Area (DFG)	lvisory OELs). Commission for the Ir	vestigation of Health Hazard	Is of Chemical Compounds
Components	Туре	Value	Form
Plant Based Polysaccharide (CAS 9005-25-8)	TWA	4 mg/m3	Inhalable dust.
logical limit values	No biological exposure limits noted for	or the ingredient(s).	
ntrol banding	Follow standard monitoring procedure	es.	
ineering controls	Explosion-proof general and local ext Ventilation rates should be matched t exhaust ventilation, or other engineer exposure limits. If exposure limits hav acceptable level. It is recommended t ventilation and material transport syst relief vents or an explosion suppress dust-handling systems (such as exhat equipment) are designed in a manner is no leakage from the equipment). If concentrations of dust particulates be respiratory protection must be worn. If powered industrial trucks. Provide ey	to conditions. If applicable, use ring controls to maintain airborn ve not been established, maintai that all dust control equipment s tems involved in handling of thi ion system or an oxygen-deficie just ducts, dust collectors, vess r to prevent the escape of dust engineering measures are not elow the OEL (occupational exp Use only appropriately classifie ewash station.	process enclosures, local ne levels below recommended ain airborne levels to an such as local exhaust s product contain explosion ent environment. Ensure that sels, and processing into the work area (i.e., there sufficient to maintain bosure limit), suitable
vidual protection measures, Eye/face protection	such as personal protective equipm Wear safety glasses with side shields	· · ·	
	wear sarely glasses with side shields		
Skin protection Hand protection	Wear appropriate chemical resistant	gloves.	
Other	Wear suitable protective clothing. Use	e of an impervious apron is rec	ommended.
Respiratory protection	limits (where applicable) or to an acce	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.	
Thermal hazards	Wear appropriate thermal protective of	clothing, when necessary.	

Section 9 - Physical and chemical properties

Physical state	Solid.
Form	Powder.
Colour	White
Odour	Characteristic.

Odour threshold	Not available.		
рН	Not available.		
Melting point/freezing point	Not available.		
Boiling point and boiling range	Not available.		
Flash point	Not available.		
Evaporation rate	Not available.		
Upper/lower explosive limits			
Explosion limit - lower (%)	Not available.		
Explosion limit - upper (%)	Not available.		
Vapour pressure	Not available.		
Vapour density	Not available.		
Relative density	Not available.		
Solubility			
Solubility (water)	Not available.		
Flammability (solid, gas)	Combustible dust.		
Partition coefficient: n-octanol/water	Not available.		
Auto-ignition temperature	Not available.		
Decomposition temperature	Not available.		
Viscosity	Not available.		
Particle characteristics	Not available.		
Data relevant with regard to physical hazard classes	No relevant additional information available.		
Other physical and chemical parameters			
Explosive properties	Not explosive.		
Oxidising properties	Not oxidising.		
Section 10 - Stability and reactivity			
Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.		
Chemical stability	Material is stable under normal conditions.		

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.		
Chemical stability	Material is stable under normal conditions.		
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.		
Conditions to avoid	Keep away from heat, sparks and open flame. Contact with incompatible materials. Minimise dust generation and accumulation.		
Incompatible materials	Strong oxidising agents. Acids.		
Hazardous decomposition products	No hazardous decomposition products are known.		

Section 11 - Toxicological information

Information on possible routes of exposure

Inhalation	Dust may irritate respiratory system. Prolonged inhalation may be harmful.	
Skin contact	Dust or powder may irritate the skin.	
Eye contact	Causes serious eye damage.	
Ingestion	May cause discomfort if swallowed.	
Early onset symptoms related to exposure	Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Coughing.	
Delayed health effects from exposure	Prolonged inhalation may be harmful.	
Acute toxicity	Not expected to be acutely toxic.	

Components	Species		Test Results	
Manganese sulfate monohydrate	(CAS 10034-	96-5)		
Acute				
Oral				
LD50	Rat		2150 mg/kg	
Plant Based Polysaccharide (CA	S 9005-25-8)			
Acute				
Dermal				
LD50			> 5000 mg/kg	
Oral				
LD50			> 50000 mg/kg	
<u>Chronic</u>				
Other				
NOAEL			> 5000 mg/kg	
Zinc oxide (CAS 1314-13-2)				
Acute				
Dermal				
LD50	Rat		2000 mg/kg	
Inhalation				
LC50	Rat		1.68 - 5.7 mg/l, 4 hours	
Oral				
LD50	Mouse		2000 - 5000 mg/kg	
	Rat		2000 - 5000 mg/kg	
Skin corrosion/irritation	Prolonaed	Prolonged skin contact may cause temporary irritation.		
Serious eye damage/irritation	-	Causes serious eye damage.		
Respiratory or skin sensitisatio		, 0		
Respiratory sensitisation		iratory sensitiser.		
Skin sensitisation	-	This product is not expected to cause skin sensitisation.		
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.			
Carcinogenicity	•	iable as to carcino	icity to humans.	
ACGIH Carcinogens				
-	ohydrate (CAS 10034-96-5) A4 Not classifiable as a human carcinogen. ride (CAS 9005-25-8) A4 Not classifiable as a human carcinogen.			
Reproductive toxicity	•		cause reproductive or developmental effects.	
Specific target organ toxicity - single exposure		Not classified.		
Specific target organ toxicity - repeated exposure	May cause	May cause damage to organs through prolonged or repeated exposure.		
Aspiration hazard	Not an asr	piration hazard		
Chronic effects	•	Not an aspiration hazard. Prolonged inholation may be barmful. May cause damage to organs through prolonged or		
	Prolonged inhalation may be harmful. May cause damage to organs through prolonged or repeated exposure.			
Section 12 - Ecological ir	formation			
Ecotoxicity	Toxic to a	quatic life with long	ting effects.	
Components		Species	Test Results	
Zinc oxide (CAS 1314-13-2)				
Aquatic				
Algae	EC50	Algae	> 0.69 - < 4.55 mg/l, 24 hours	
			> 0.3 - < 1.94 mg/l, 96 hours	
		Algae	1.071 mg/l, 16 days	

Components		Species	Test Results
Acute			
Crustacea	EC50	Aquatic invertebrates	> 1.27 - < 1.92 mg/l, 4 hours
			> 0.155 - < 100 mg/l, 48 hours
			> 0.14 - < 6 mg/l, 24 hours
			> 0.072 - < 0.103 mg/l, 96 hours
	LC50	Aquatic invertebrates	> 0.37 - < 1.19 mg/l, 96 hours
Fish	EC50	Fish	> 2.065 - < 2.966 mg/l, 85 hours
	LC50	Fish	23.06 mg/l, 84 hours
			0.33 mg/l, 95 hours
			> 0.112 - < 8.062 mg/l, 96 hours
Zinc sulphate monohydrate (CAS	\$ 7446-19-7)		
Aquatic			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	0.06 mg/l, 48 hours
Fish	LC50	Hirame, flounder (Paralichthys olivaceus)	< 10 mg/l, 96 hours
Persistence and degradability	No data is av	ailable on the degradability of this produ	ct.
Bioaccumulative potential	No data available.		
Mobility in soil	No data available for this product.		
Other adverse effects	No data available.		
Section 13 - Disposal con	nsiderations		
Disposal methods	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.		
Residual waste	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).		
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.		
Section 14 - Transport in	formation		
ADG			

	0	
	UN number	3077
	UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide, Manganese sulfate monohydrate)
	Transport hazard class(es)	
	Class	9
	Subsidiary risk	-
	Packing group	
	Environmental hazards	Yes
	Hazchem code	2Z
	Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
RID		
	UN number	3077
	UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide, Manganese sulfate monohydrate)
	Transport hazard class(es)	
	Class	9
	Subsidiary risk	-
	Label(s)	9
	Packing group	III
	Environmental hazards	Yes
	Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ΙΑΤΑ

3077
Environmentally hazardous substance, solid, n.o.s. (Zinc oxide, Manganese sulfate monohydrate)
9
-
Yes
9L
r Read safety instructions, SDS and emergency procedures before handling.
3077
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide, Manganese sulfate monohydrate)
9
-
Yes
F-A, S-F
r Read safety instructions, SDS and emergency procedures before handling. Not applicable.

Section 15 - Regulatory information

Safety, health and environmental regulations National regulations This Safety Data Sheet was prepared in accordance with Australia Model Code of Practice for the preparation of Safety Data Sheets for Hazardous Chemicals. Australia Medicines & Poisons Appendix E Zinc sulphate monohydrate (CAS 7446-19-7) Australia Medicines & Poisons Appendix F Zinc sulphate monohydrate (CAS 7446-19-7) **Australia Medicines & Poisons Schedule 4** Zinc oxide (CAS 1314-13-2) Zinc sulphate monohydrate (CAS 7446-19-7) Australia Medicines & Poisons Schedule 6 Zinc sulphate monohydrate (CAS 7446-19-7) Australia National Pollutant Inventory (NPI): Threshold quantity Manganese sulfate monohydrate (CAS 10034-96-5) 10 tonnes/yr Threshold Category: 1 Zinc oxide (CAS 1314-13-2) 10 tonnes/yr Threshold Category: 1 Zinc sulphate monohydrate (CAS 7446-19-7) 10 tonnes/yr Threshold Category: 1 **High Volume Industrial Chemicals (HVIC)** Manganese sulfate monohydrate (CAS 10034-96-5) 1000 - 9999 TONNES See the regulation for additional information. Plant Based Polysaccharide (CAS 9005-25-8) 1000 - 9999 TONNES See the regulation for additional information. 1000 - 9999 TONNES See the regulation for additional Zinc sulphate monohydrate (CAS 7446-19-7) information. Importation of Ozone Depleting Substances (Customs(Prohibited imports) Regulations 1956, Schedule 10, as amended) Not listed. National Pollutant Inventory (NPI) substance reporting list Plant Based Polysaccharide (CAS 9005-25-8) 2000 tonnes/yr Threshold Category: 2B 400 tonnes/yr Threshold Category: 2A 2000 tonnes/yr Threshold Category: 2B

400 tonnes/yr Threshold Category: 2A

Zinc oxide (CAS 1314-13-2)

Prohibited Carcinogenic Substances

Not regulated.

Prohibited Substances (National Model Regulation for the control of Workplace Hazardous Substances, Schedule 2 NOHSC:1005 (1994) as amended)

Not listed.

Restricted Carcinogenic Substances

Not regulated.

Restricted Importation of Organochlorine Chemicals (Customs(Prohibited Imports) Regulations 1956, Schedule 9) Not listed.

International regulations

- **Stockholm Convention**
- Not applicable.
- **Rotterdam Convention**
 - Not applicable.
- Kyoto Protocol
 - Not applicable.

Montreal Protocol Not applicable.

Basel Convention

Not applicable.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s) A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

Section 16 - Any other relevant information

Issue date	12-September-2023		
Revision date	-		
Further information	Refer to: OSHA 3371-08 2009, Hazard Communication Guidance for Combustible Dusts NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids		
Key abbreviations or acronyms used	AICIS: Australian Inventory of Industrial Chemicals.		

Disclaimer

NOTICE: The information contained in this document is based on data considered to be accurate as of the preparation date of this Safety Data Sheet (SDS) and was prepared pursuant to applicable Government regulation(s). This SDS may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, expressed or implied, is made as to the accuracy or comprehensiveness of the above data and safety information, nor is any authorization given or implied to practice any patented invention without a license. Additional information may be needed to evaluate other uses of the product, including use of the product in combination with any materials or in any processes other than those specifically referenced. Information provided about any hazards that may be associated with the product is not meant to suggest that use of the product in a given application will necessarily result in any exposure or risk to workers or the general public. Purchasers and users of the product are responsible for determining that this product is suitable for the intended use and application. No responsibility can be assumed by vendor for any damage or injury resulting from failure to adhere to recommended uses, or from any hazards inherent to the product. Purchasers and users assume all risk of use, storage and handling of the product in compliance with applicable federal, state and local laws and regulations. Purchasers and users of the product should explicitly advise their employees, agents, contractors and customers who will use the product of this SDS.