SAFETY DATA SHEET

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SECTION 1: COMPANY AND PRODUCT INFORMATION

1.1 Product identifiers

Product name : X-Gal Solution, 40mg/mL in DMF, sterile

Product code : 40121146

CAS number : 68-12-2

Synonyms : DMF, NSC 5356

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : For research and laboratory use only.

1.3 Details of the supplier of the safety data sheet

Address : Genelinx International Inc, dba bioWORLD
4150 Tuller Rd. Suite 228
Dublin, OH 43017

Email : tech@bio-world.com

Phone : 614-792-8680

1.4 Emergency telephone number

CHEMTREC USA : 1-800-424-9300
CHEMTREC International : +1-703-537-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Eye irritation (Category 2A), H319
Reproductive toxicity (Category 1B), H360

2.2 GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Eye irritation (Category 2A), H319
Reproductive toxicity (Category 1B), H360

2.3 Label elements and precautionary statements

Pictogram :



Signal word : Danger

Hazard statement(s)	:	H226 - Flammable liquid and vapor. H312+332 - Harmful in contact with skin or if inhaled. H319 - Causes serious eye irritation. H360 - May damage fertility or the unborn child.
Precautionary statement(s)	:	P201 - Obtain special instructions before use. P202 - Do not handle until all safety precautions have been read and understood. P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking. P233 - Keep container tightly closed. P240 - Ground/bond container and receiving equipment. P241 - Use explosion-proof electrical/ventilating/ lighting/equipment. P242 - Use only non-sparking tools. P243 - Take precautionary measures against static discharge. P261 - Avoid breathing dust/fume/gas/mist/vapors/spray. P264 - Wash skin thoroughly after handling. P271 - Use only outdoors or in a well-ventilated area. P280 - Wear protective gloves/protective clothing/eye protection/face protection. P303+361+353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+351+338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308+313 - IF exposed or concerned: Get medical advice/attention. P337+313 - If eye irritation persists: Get medical advice/attention. P363 - Wash contaminated clothing before reuse. P370+378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction. P403+235 - Store in a well-ventilated place. Keep cool. P405 - Store locked up. P501 - Dispose of contents/container to an approved waste disposal plant.

2.4 Hazards not otherwise classified (HNOC) or not covered by GHS

Product rapidly absorbs through the skin.

2.5 NFPA Rating

Health hazard	:	2
Fire hazard	:	2
Reactivity hazard	:	0

2.6 HMIS Rating

Health hazard	:	2
Chronic health hazard	:	*
Reactivity hazard	:	0
Flammability	:	2
Physical hazard	:	0

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Substance	CAS#	EC#	Concentration
N,N-Dimethylformamide M.F: C_3H_7NO M.W: 73.09 g/mol	68-12-2	200-679-5	96%

3.2 Hazardous components & classification

Flam. Liq. 3 Acute Tox. 4 Eye Irrit. 2A Repr. 1B H226, H312+332, H319, H360

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician if symptoms are severe or persistent. Provide this data sheet to medical personnel. If product is spilled or leaked, evacuate area.

In case of inhalation

If inhaled, move person to fresh air and monitor breathing. If not breathing, give artificial ventilation. Consult a physician if symptoms are severe or persistent.

In case of skin contact

Immediately wash with excess soap and water. If spilled on clothing, remove all affected clothing. Consult a physician if symptoms are severe or persistent.

In case of eye contact

Flush eyes with water or eye wash solution as a precaution for 15 minutes. Consult a physician if symptoms are severe or persistent.

In case of ingestion

Only induce vomiting if recommended by medical personnel. If subject is unconscious, do not give anything by mouth. If conscious, rinse mouth with water. Consult a physician if symptoms are severe or persistent.

4.2 Most important symptoms and effects, both acute and delayed

All known important symptoms are described in Section 2 and/or Section 11. No other important symptoms to report.

4.3 Indication of any immediate medical attention and special treatment needed

No special treatment indicated. Provide treatment in accordance with exhibited systems.

SECTION 5: FIREFIGHTING MEASURES

5.1 Suitable extinguishing media

Water spray, alcohol-resistant foam, dry chemical, and carbon dioxide extinguishers are suitable.

5.2 Unsuitable extinguishing media

No known unsuitable extinguishing media.

5.3 Special hazards arising from the substance

Carbon oxides and Nitrogen oxides may be released under fire conditions.
Vapors are heavier than air and may spread along floors. Forms explosive mixtures with air at elevated temperatures.

5.4 Advice for firefighters

Wear protective gear, such as self-contained breathing apparatus, if necessary

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Provide suitable ventilation. Use any necessary personal protective equipment. Avoid contact with skin and eyes, and avoid creation and inhalation of vapor or dust. Keep all unnecessary personnel away.

For personal protection see section 8

6.2 Environmental precautions

Prevent product from entering public sewers and waterways.

6.3 Methods and material for containment and cleaning up

Use inert absorbent material to absorb any spilled or leaked product. Keep in suitable, closed containers for disposal.

For proper disposal see section 13

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Provide suitable ventilation. Wear any necessary personal protective equipment.

For precautions see section 2

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions : Store upright, closed container in arid, ventilated environment.
Storage temperature: -20°C.
Storage class (TRGS 510): 3: Flammable liquids.

Incompatible materials : Strong oxidizing agents, reducing agents, alkali metals, and halogens are incompatible with this product.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

N,N-Dimethylformamide, CAS No.: 68-12-2

TWA: 10 ppm. Basis: USA. ACGIH Threshold Limit Values (TLV). Remarks: Liver damage, substances for which there is a Biological Exposure Index or Indices (see BEI section), not classifiable as a human carcinogen, danger of cutaneous absorption.
TWA: 10 ppm, 30 mg/m3. Basis: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants. Remarks: Skin designation, the value in mg/m3 is approximate.
TWA: 10 ppm, 30 mg/m3. Basis: USA. NIOSH Recommended Exposure Limits. Remarks: Potential for dermal absorption.
PEL: 10 ppm, 30 mg/m3. Basis: California permissible exposure limits for chemical contaminants (Title 8, Article 107). Remarks: Skin.

8.2 Engineering controls

Follow good industrial hygiene and safety practices when handling product.

8.3 Personal protective equipment

Eye/face protection : Use only government-approved safety glasses with side-shields.

	Skin protection	:	Use gloves when handling product. Inspect gloves before use to ensure suitability for use. Remove without exposing skin to the gloves outer surface. Discard used gloves according to all pertinent laws and/or current good practices (cGXP). Wash hands with soap and water.
	Body protection	:	Wear appropriate clothing. Ensure clothing is in good condition, with no holes or tears. When selecting clothing, consider the concentration and amount of substance to be handled.
	Respiratory protection	:	Use only approved respirators and components which comply with CDC and NIOSH (US) or CEN (EU) regulations. Required only when vapors or aerosols are created.
	Control of environmental exposure	:	Prevent product from entering the environment, especially through public sewers or waterways.
	General hygiene considerations	:	Comply with general industrial hygiene practice guidelines.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	:	Clear, colorless
b)	Physical states	:	Liquid
c)	Odor	:	Amine-like
d)	Odor threshold	:	Not available
e)	Melting point	:	-61°C
f)	Boiling point range	:	153°C
g)	pH	:	Not available
h)	Density	:	Not available
i)	Flash point	:	58°C - closed cup
j)	Evaporation rate	:	Not available
k)	Flammability	:	Not available
l)	Upper/lower flammability or explosive limits:	:	Upper explosion limit: 15.2 %(V) Lower explosion limit: 2.2 %(V)
m)	Vapor pressure	:	3.60 hPa (2.70 mmHg) @ 20 °C 5.16 hPa (3.87 mmHg) @ 25°C
n)	Vapor density	:	2.52 - (Air = 1.0)
o)	Relative density	:	0.944 g/mL
p)	Water solubility	:	Not available
q)	Partition coefficient:n-octanol/water	:	log Pow: -1.01
r)	Autoignition temperature	:	Not available
s)	Decomposition temperature	:	Not available
t)	Kinematic viscosity	:	Not available

u)	Explosive properties	:	Not available
v)	Oxidizing properties	:	Not available
w)	Solubility in other solvents	:	Not available
x)	Surface tension	:	Not available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

No special reactivity is known.

10.2 Chemical stability

Product is stable when stored and used as recommended.

10.3 Stability note(s)

Avoid heat, flames, and sparks around the product.

10.4 Polymerization

No known polymerization.

10.5 Possibility of hazardous reactions

Violent reactions possible with halides, nitrates, metallic and nonmetallic oxides, halogenated hydrocarbon, triethylaluminium, isocyanates, Sodium, Sodium borohydride, hydrides, phosphorus oxides, Tin, rubber, and Copper.
Risk of explosion and/or toxic gas formation possible with azides, Bromine, Chlorine, Chromium (VI) oxide, Potassium permanganate, chlorates, and Iron.

10.6 Incompatible materials

Strong oxidizing agents, reducing agents, alkali metals, and halogens are incompatible with this product.

10.7 Hazardous decomposition products

Carbon oxides and Nitrogen oxides may be released under fire conditions.
Vapors are heavier than air and may spread along floors. Forms explosive mixtures with air at elevated temperatures.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Acute toxicity

LD50 Oral	:	Rat - male and female - 3,010 mg/kg (OECD Test Guideline 401)
LD50 Dermal	:	Rabbit - 1500 mg/kg
LC50 Inhalation	:	Estimate: 4 hours - vapor - 11.1 mg/L

11.2 Skin corrosion/irritation

Rabbit - 20 hrs - no skin irritation

11.3 Serious eye damage/eye irritation

Rabbit - irritating to eyes (OECD Test Guideline 405)

11.4 Respiratory or skin sensitization

Local Lymph Node Assay: Mouse - negative (OECD Test Guideline 406)

11.5 Germ cell mutagenicity

Sister Chromatid Exchange Assay: Chinese hamster ovary cells - with and without metabolic activation - negative (ECHA)
Unscheduled DNA Synthesis Assay: Human diploid fibroblasts - with and without metabolic activation - negative (ECHA)
Ames Test: Salmonella typhimurium - with and without metabolic activation - negative (ECHA)
Micronucleus Test: Mouse bone marrow - intraperitoneal injection - negative (ECHA)
Dominant Lethal Test: Rat - inhalation - negative (ECHA)
Dominant Lethal Test: Mouse - intraperitoneal - negative (ECHA)

11.6 Carcinogenicity

IARC : 2A: Probably carcinogenic to humans

ACGIH : Product and components are not regulated by the ACGIH.

NTP : Product and components are not regulated by the NTP.

OSHA : Product and components are not regulated by OSHA.

11.7 Reproductive toxicity

Can cause congenital malformation in the fetus.

11.8 Specific target organ toxicity – single exposure

No specific organ toxicity data available.

11.9 Specific target organ toxicity – repeated exposure

No specific organ toxicity data available.

11.10 Aspiration hazard

No aspiration hazard data available.

11.11 Additional Information

RTECS: LQ2100000.
Warning: Intolerance for alcohol can occur up to 4 days after dimethylformamide exposure. N,N-dimethylformamide is considered to be a potent liver toxin. DMF can cause vomiting, diarrhea, and abdominal pain. Symptoms include headache, dizziness, and drowsiness.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

No ecological toxicity data available.

12.2 Aquatic toxicity

Species: Rainbow Trout (Oncorhynchus mykiss). Exposure: 96 hours. Result: LC50 9800 mg/L
Species: Bluegill (Lepomis macrochirus). Exposure: 96 hours. Result: LC50 6300 mg/L
Species: Fathead Minnow. Exposure: 96 hours. Result: LC50 10600 mg/L.
Species: Water Flea (Daphnia magna). Exposure: 48 hours. Result: EC50 15700 mg/L
Species: Green Algae (Desmodesmus subspicatus). Exposure: 96 hours. Result: LC50 > 500 mg/L.

12.3 Persistence and degradability

Aerobic - 21 days - 100% - Readily biodegradable (OECD Test Guideline 301E)
Biochemical Oxygen Demand: 900 mg/g
Theoretical Oxygen Demand: 1,863 mg/g

12.4 Bioaccumulative potential

Cyprinus carpio (Carp) - 56 days, 25°C - 0.002 mg/L
Bioconcentration Factor: 0.3 - 1.2 - Does not significantly accumulate in organisms (OECD Test Guideline 305C)

12.5 Mobility in soil

No soil mobility data available.

12.6 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment is not required/was not conducted.

12.7 Other adverse effect

- ca.50 d - reaction with hydroxyl radicals

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Product

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult and adhere to local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

13.2 Packaging

Packaging should be disposed of in the same manner as unused product.

13.3 Recommendation

Disposal must be made according to official regulations.

SECTION 14: TRANSPORTATION INFORMATION

14.1 DOT (US)

UN #2265
Class: 3
Packing group: III
Proper shipping name: N,N-Dimethylformamide
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

14.2 IMDG

UN #2265
Class: 3
Packing group: III
EMS-No.: F-E, S-D
Proper shipping name: N,N-Dimethylformamide

14.3 IATA

UN #2265
Class: 3
Packing group: III
Proper shipping name: N,N-Dimethylformamide

SECTION 15: REGULATORY INFORMATION

15.1 SARA

SARA 302: This product and components are not subject to the reporting requirements of SARA Title III, Section 302.
SARA 313: This product contains components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313 (N,N-Dimethylformamide CAS No.: 68-12-2)
SARA 311/312: Fire Hazard, Acute Health Hazard, Chronic Health Hazard (N,N-Dimethylformamide CAS No.: 68-12-2)

15.2 Clean water act (CWA)

No chemicals are present in this product that are subject to regulation under the Clean Water Act.

15.3 Right to know components

Massachusetts	:	N,N-Dimethylformamide CAS No.: 68-12-2
Pennsylvania	:	N,N-Dimethylformamide CAS No.: 68-12-2
New Jersey	:	N,N-Dimethylformamide CAS No.: 68-12-2
California proposition 65 components	:	This product contains the following chemicals which are known to the State of California to cause cancer, or birth defects or other reproductive harm: N,N-Dimethylformamide CAS No.: 68-12-2

SECTION 16: OTHER INFORMATION

16.1 Disclaimer

This product is offered by bioWORLD for research, laboratory or further manufacturing use. Not for human use or consumption. The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchant-ability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall bio-WORLD.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect,incidental,consequential or exemplary damages, howsoever arising, even if bio-WORLD.com has been advised of the possibility of such damages.

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16.2 Preparation Information

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