

SAFETY DATA SHEET

easy-BLUE Total RNA Extraction Kit - easy-BLUE Solution

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Revision date: Not applicable

Version: R0001.0001

1. IDENTIFICATION

A. Product name

- easy-BLUE Total RNA Extraction Kit - easy-BLUE Solution

B. Recommended use and restriction on use

- General use : Laboratory chemicals
 - Restriction on use : Not available

C. Manufacturer / Supplier / Distributor information

o Manufacturer information

- Company name : iNtRON Biotechnology, Inc.
 - Address : #1011 Jungang Induspia V B/D, 137, Sagimakgol-ro, Jungwon-gu, Seongnam, Gyeonggi-do, 13202, Korea
 - Dept. : CRT center
 - Telephone number : +82-31-739-5737
 - Emergency telephone number :
 - Fax number : +82-31-739-5264
 - E-mail address : intronbio@intronbio.com

o Supplier/Distributor information

- Company name : iNtRON Biotechnology, Inc.
 - Address : #1011 Jungang Induspia V B/D, 137, Sagimakgol-ro, Jungwon-gu, Seongnam, Gyeonggi-do, 13202, Korea
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2. HAZARD IDENTIFICATION

A. GHS Classification

- Acute toxicity (oral) : Category4
 - Acute toxicity (dermal) : Category3
 - Acute toxicity (inhalation: gas) : Category2
 - Skin corrosion/irritation : Category1A
 - Serious eye damage/irritation : Category1
 - Germ cell mutagenicity : Category1B
 - Reproductive toxicity : Category1B
 - Specific target organ toxicity(Single exposure) : Category1
 - Specific target organ toxicity(Repeated exposure) : Category1

B. GHS label elements

o Hazard symbols



○ **Signal words**

- Danger

○ **Hazard statements**

- H302 Harmful if swallowed
- H311 Toxic in contact with skin
- H314 Causes severe skin burns and eye damage
- H318 Causes serious eye damage
- H330 Fatal if inhaled
- H340 May cause genetic defects
- H360 May damage fertility or the unborn child
- H370 Causes damage to organs(Refer Section SDS 11)
- H372 Causes damage to organs through prolonged or repeated exposure (Refer Section SDS 11)

○ **Precautionary statements**

1) Prevention

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe dust/fume.
- P264 Wash hands thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P284 Wear respiratory protection.

2) Response

- P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P307+P311 If exposed: Call a POISON CENTER or doctor/physician.
- P308+P313 If exposed or concerned: Get medical advice/attention.
- P310 Immediately call a POISON CENTER or doctor/physician.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P314 Get medical advice/attention if you feel unwell.
- P320 Specific treatment is urgent
- P321 Specific treatment
- P330 Rinse mouth.
- P361 Remove/Take off immediately all contaminated clothing.
- P363 Wash contaminated clothing before reuse.

3) Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification : (NFPA Classification)

○ **NFPA grade (0 ~ 4 level)**

- Health : 3, Flammability : 0, Reactivity : 1

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
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Phenol	Benzenol ; Carboic acid ; Phenic acid ; Phenyl hydroxide ; Phenyl alcohol ; Phenylic acid ;	108-95-2	30 ~ 60%
Guanidine isothiocyanate	-	593-84-0	20 ~ 60%
2-Mercaptoethanol	Ethanol, 2-mercapto- ; THIOGLYCOL ; b-Hydroxyethanethiol ; b-Hydroxyethylmercaptan ; b-Mercaptoethanol ; 1-Hydroxy-2-mercaptoethane ; 1-Mercapto-2-hydroxyethane ; 2-Hydroxy-1-ethanethiol ; 2-Hydroxyethanethiol ; 2-Hydroxyethyl mercaptan ; 2-Mercapto-1-ethanol ; 2-Mercaptoethyl alcohol ; 2-Sulfanylethanol ; Ethylene glycol, monothio- ; Hydroxyethyl mercaptan ; Monothioethylene glycol ; Monothioglycol ; Thioethylene glycol ; Thiomonoglycol ; Monothioethyleneglycol ;	60-24-2	0.1 ~ 0.5%
Diethyl pyrocarbonate	-	1609-47-8	0.05 ~ 0.2%
4,4'-(3H-2,1-Benzoxathiol-3-ylidene)bis[2,6-dibromophenol]-S,S-dioxide	-	115-39-9	0.0001 ~ 0.001%

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.
- Remove contact lenses if worn.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Laundering enough contaminated clothing before reuse.
- Get medical attention immediately.
- Prevent the spread of the skin.
- Remove contaminated clothing, shoes and isolate.
- Take the doctor's examination.
- Wash thoroughly after handling.
- Wear gloves when washing the patient, and please avoid contact with contaminated clothing.

C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.
- Get medical attention immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

- If exposed or concerned, get medical attention/advice.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

B. Specific hazards arising from the chemical

- Not available

C. Special protective actions for firefighters

- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Notify your local firestation and inform the location of the fire and characteristics hazard.
- Avoid inhalation of materials or combustion by-products.
- Do not access if the tank on fire.
- Use appropriate extinguishing measure suitable for surrounding fire.
- Keep containers cool with water spray.
- Fine powder may cause ignition.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Ventilate closed spaces before entering.
- Must work against the wind, let the upwind people to evacuate.
- Move container to safe area from the leak area.
- Avoid dust formation.
- Moist with water to prevent dust scattering.
- Avoid skin contact and inhalation.
- Cleanup and disposal under expert supervision is advised.
- Keep unauthorized people away, isolate hazard area and deny entry.

B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notification to central government, local government. When emissions at least of the standard amount
- Dispose of waste in accordance with local regulation.
- Appropriate container for disposal of spilled material collected.
- Dust spills : Cover dust spills with plastic sheet or waterproof cloth to minimize spreading and avoid contact with water.
- Small liquid state spills: Appropriate container for disposal of spilled material collected.
- For disposal of spilled material in appropriate containers collected and clear surface.
- Spilled material should be treated as a potential risk of waste collected.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid direct physical contact.
- Since emptied containers retain product residue(vapor, liquid, solid) follow all MSDS and label warnings even after container is emptied.
- Comply with all applicable laws and regulations for handling
- Get the manual before use.
- Minimize occurrence of dust and accumulation.
- Contaminated work clothing should not be allowed out of the workplace.

B. Conditions for safe storage, including any incompatibilities

- Do not apply direct heat.
- Save applicable laws and regulations.
- Avoid direct sunlight.
- Please pay attention to incompatibilities materials and conditions to avoid.
- Keep sealed when not in use.
- Collected them in sealed containers.
- Do not eat, drink or smoke when using this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

- **ACGIH TLV**
 - [Phenol] : TWA 5 ppm (19 mg/m³)
- **OSHA PEL**
 - [Phenol]:5ppm 19mg/m³

B. Engineering controls

- A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. The use of local exhaust ventilation is recommended to control emissions near the source.

C. Individual protection measures, such as personal protective equipment

- **Respiratory protection**
 - Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
 - Respiratory protection is ranked in order from minimum to maximum.
 - Consider warning properties before use.
 - Dust, mist, fume-purifying respiratory protection
 - Any air-purifying respirator with a corpuscle filter of high efficiency
 - Any respiratory protection with a electromotion fan(for dust, mist, fume-purifying)
 - Self-contained breathing apparatus with a corpuscle filter of high efficiency
 - For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- **Eye protection**
 - Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
 - Provide an emergency eye wash station and quick drench shower in the immediate work area.
- **Hand protection**
 - Wear appropriate glove.
- **Skin protection**
 - Wear appropriate clothing.
- **Others**
 - Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

[Phenol]

A. Appearance	
- Appearance	No data
- Color	No data
B. Odor	Phenol odor
C. Odor threshold	3 ppm
D. pH	6 (Aqueous solution)
E. Melting point/Freezing point	40 ~ 43°C
F. Initial Boiling Point/Boiling Ranges	182°C
G. Flash point	79°C (c.c)
H. Evaporation rate	No data
I. Flammability(solid, gas)	No data
J. Upper/Lower Flammability or explosive limits	10 / 1.36%

K. Vapour pressure	0.35 mmHg (25°C)
L. Solubility	8.28g/100ml (25°C)
M. Vapour density	3.2
N. Specific gravity(Relative density)	1.0576
O. Partition coefficient of n-octanol/water	1.46
P. Autoignition temperature	715°C
Q. Decomposition temperature	No data
R. Viscosity	1.51cP (80°C)
S. Molecular weight	94.11

[Diethyl pyrocarbonate]

A. Appearance	
- Appearance	Liquid
- Color	Achromatic
B. Odor	Fruit flavor
C. Odor threshold	None
D. pH	None
E. Melting point/Freezing point	None
F. Initial Boiling Point/Boiling Ranges	93.3 ~ 94°C (at 18mmHg)
G. Flash point	69°C
H. Evaporation rate	No data
I. Flammability(solid, gas)	No data
J. Upper/Lower Flammability or explosive limits	-/-
K. Vapour pressure	No data
L. Solubility	Hydrolysis (Solvent availability: Ethanol, methanol, alcohol, hydrocarbons, esters, ketones)
M. Vapour density	None
N. Specific gravity(Relative density)	1.101-1.12 (water=1)
O. Partition coefficient of n-octanol/water	None
P. Autoignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	1.97cP (at 20C)
S. Molecular weight	162.14

[Guanidine isothiocyanate]

A. Appearance	
- Appearance	Solid powder
- Color	Colorless
B. Odor	No data
C. Odor threshold	No data
D. pH	No data
E. Melting point/Freezing point	120°C
F. Initial Boiling Point/Boiling Ranges	132.9°C
G. Flash point	34.2°C
H. Evaporation rate	No data
I. Flammability(solid, gas)	No data
J. Upper/Lower Flammability or explosive limits	-/-
K. Vapour pressure	No data
L. Solubility	Aqueous solution (Soluble in alcohol)
M. Vapour density	No data
N. Specific gravity(Relative density)	No data
O. Partition coefficient of n-octanol/water	-4.04
P. Autoignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	118.18

[2-Mercaptoethanol]

A. Appearance	
- Appearance	Liquid
- Color	Colorless
B. Odor	A faint but unusual incense
C. Odor threshold	No data
D. pH	4.5-6 (500g/L and 20°C)
E. Melting point/Freezing point	< -50°C
F. Initial Boiling Point/Boiling Ranges	154 ~ 161°C
G. Flash point	70.5°C
H. Evaporation rate	No data
I. Flammability(solid, gas)	No data
J. Upper/Lower Flammability or explosive limits	18 / 2.3 %
K. Vapour pressure	1.756 mmHg (25°C)
L. Solubility	No data
M. Vapour density	2.69
N. Specific gravity(Relative density)	1.1143 (20°C/4°C)
O. Partition coefficient of n-octanol/water	-0.056 (25°C)
P. Autoignition temperature	295°C
Q. Decomposition temperature	No data
R. Viscosity	3.43cP
S. Molecular weight	78.13

[4,4'-(3H-2,1-Benzoxathiol-3-ylidene)bis[2,6-dibromophenol]-S,S-dioxide]

A. Appearance	
- Appearance	No data
- Color	No data
B. Odor	No data
C. Odor threshold	No data
D. pH	No data
E. Melting point/Freezing point	No data
F. Initial Boiling Point/Boiling Ranges	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability(solid, gas)	No data
J. Upper/Lower Flammability or explosive limits	No data
K. Vapour pressure	No data
L. Solubility	No data
M. Vapour density	No data
N. Specific gravity(Relative density)	No data
O. Partition coefficient of n-octanol/water	No data
P. Autoignition temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	No data

10. STABILITY AND REACTIVITY**A. Chemical Stability**

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

C. Conditions to avoid

- Avoid contact with incompatible materials and condition.

- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

- **(Respiratory tracts)**
 - Not available
- **(Oral)**
 - Harmful if swallowed
- **(Eye/Skin)**
 - Causes serious eye damage
 - Causes severe skin burns and eye damage

B. Delayed and immediate effects and also chronic effects from short and long term exposure

- **Acute toxicity**
 - * **Oral**
 - Product (ATEmix) : 300mg/kg < ATEmix <= 2000mg/kg
 - [Phenol] : LD50 317 mg/kg Rat
 - [2-Mercaptoethanol] : LD50 = 131 mg/kg Rat
 - [Diethyl pyrocarbonate] : LD50 850 mg/kg Rat
 - * **Dermal**
 - Product (ATEmix) : 200mg/kg < ATEmix <= 1000mg/kg
 - [Phenol] : LD50 670 mg/kg Rat
 - [2-Mercaptoethanol] : LD50 = 251 mg/kg rabbit
 - * **Inhalation**
 - Product (ATEmix) : Not available
 - [Phenol] : dust LC50 0.316 mg/ℓ Rat
 - [2-Mercaptoethanol] : Steam LC50 = 2 mg/ℓ 4 hr Rat
- **Skin corrosion/irritation**
 - Causes severe skin burns and eye damage
- **Serious eye damage/irritation**
 - Causes serious eye damage
- **Respiratory sensitization**
 - Not available
- **Skin sensitization**
 - Not available
- **Carcinogenicity**
 - * **IARC**
 - [Phenol] : Group 3
 - * **OSHA**
 - Not available
 - * **ACGIH**
 - [Phenol] : A4
 - * **NTP**
 - Not available
 - * **EU CLP**
 - Not available
- **Germ cell mutagenicity**
 - May cause genetic defects
- **Reproductive toxicity**
 - May damage fertility or the unborn child
- **STOT-single exposure**

- Causes damage to organs
- **STOT-repeated exposure**
 - Causes damage to organs through prolonged or repeated exposure
- **Aspiration hazard**
 - Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

- **Fish**
 - [Phenol] : LC50 10.9 mg/ℓ 96 hr
 - [2-Mercaptoethanol] : LC50 = 3.7 mg/ℓ 96 hr *Leuciscus idus* (OECD SIDS)
 - [Diethyl pyrocarbonate] : LC50 6881.765 mg/ℓ 96 hr (Estimate)
 - [4,4'-(3H-2,1-Benzoxathiol-3-ylidene)bis[2,6-dibromophenol]-S,S-dioxide] : LC50 0.285 mg/ℓ 96 hr (Estimate)
- **Crustaceans**
 - [Phenol] : LC50 3.1 mg/ℓ 48 hr (EU-RAR (2002))
 - [2-Mercaptoethanol] : EC50 = 0.4 mg/ℓ 48 hr *Daphnia magna* (OECD SIDS)
 - [Diethyl pyrocarbonate] : LC50 16480.371 mg/ℓ 48 hr (Estimate)
 - [4,4'-(3H-2,1-Benzoxathiol-3-ylidene)bis[2,6-dibromophenol]-S,S-dioxide] : LC50 0.024 mg/ℓ 48 hr (Estimate)
- **Algae**
 - [Phenol] : EC50 370 mg/ℓ 96 hr
 - [2-Mercaptoethanol] : EC50 = 12 mg/ℓ 72 hr *Scenedesmus subspicatus* (OECD SIDS)
 - [Diethyl pyrocarbonate] : EC50 3637.892 mg/ℓ 96 hr (Estimate)
 - [4,4'-(3H-2,1-Benzoxathiol-3-ylidene)bis[2,6-dibromophenol]-S,S-dioxide] : EC50 0.027 mg/ℓ 96 hr (Estimate)

B. Persistence and degradability

- **Persistence**
 - [Phenol] : log Kow 1.46 (NITE)
 - [Guanidine isothiocyanate] : log Kow -4.04 (Estimate)
 - [2-Mercaptoethanol] : log Kow = -0.056 (25°C) (IUCLID)
- **Degradability**
 - [2-Mercaptoethanol] : BOD5/COD = 0.055 (IUCLID)

C. Bioaccumulative potential

- **Bioaccumulative potential**
 - [Guanidine isothiocyanate] : BCF 3.162 (Estimate)
 - [2-Mercaptoethanol] : BCF = 3 (NLM/HSDB)
 - [Diethyl pyrocarbonate] : BCF 3.162 (Estimate)
- **Biodegradation**
 - [Phenol] : 85 (%) (existing chemical safety inspections data)
 - [2-Mercaptoethanol] : Biodegradability = 6 (%) 5 day (IUCLID)

D. Mobility in soil

- [Guanidine isothiocyanate] : Koc -0.961

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- Since more than two kinds of designaed waste is mixed, it is difficult to treat sepatrly, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre-process with Water separation process.
- Dispose by incineration.

B. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.

- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR)

- 1671

B. Proper shipping name

- PHENOL, SOLID

C. Hazard Class

- 6.1

D. IMDG CODE/IATA DGR Packing group

- II

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-A (General fire schedule)
- EmS SPILLAGE SCHEDULE : S-A (Toxic substances)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

- **POPs Management Law**
 - Not applicable
- **Information of EU Classification**
 - * **Classification**
 - [Phenol] : H341, H331, H311, H301, H373, H314
- **U.S. Federal regulations**
 - * **OSHA PROCESS SAFETY (29CFR1910.119)**
 - Not applicable
 - * **CERCLA Section 103 (40CFR302.4)**
 - [Phenol] : 453.599 kg 1000 lb
 - * **EPCRA Section 302 (40CFR355.30)**
 - [Phenol] : 226.7995/4535.99 kg 500/10000 lb
 - * **EPCRA Section 304 (40CFR355.40)**
 - [Phenol] : 453.599 kg 1000 lb
 - * **EPCRA Section 313 (40CFR372.65)**
 - [Phenol] : Applicable
- **Rotterdam Convention listed ingredients**
 - Not applicable
- **Stockholm Convention listed ingredients**
 - Not applicable
- **Montreal Protocol listed ingredients**
 - Not applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2018-06-01

C. Revision number and Last date revised

- Not applicable

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).