CENTRO DE BIOACTIVOS QUIMICOS

VITROFURAL

Version date: January 2018

1. PRODUCT IDENTIFICATION	
Product identifier	VITROFURAL®, solid dispersion
Recommended use:	Wide-spectrum bactericide & fungicide
Indications:	Inhibitor of microbial contamination of culture media for large-scale vitroplant production, replacing the conventional autoclave sterilization process
Recommended concentration:	116 mg of Vitrofural/L of culture medium
Presentation:	Boxes of ten 6g bottles
Marketing firm:	EMIDICT
Manufacturer details:	
Name:	Chemical Bioactives Center, Ministry of Higher Education
Address:	Carretera a Camajuaní km 5½. Santa Clara, Villa Clara, Cuba.
Telephone:	(+53 42) 281473, 281130 (8:00am-4:30pm).
Emergency phone:	(+53 42) 281192 (8:00am-4:30pm).
E-mail:	raquelf@uclv.edu.cu
Website:	http://www.cbq.uclv.edu.cu

2. IDENTIFICATION OF HAZARDS	
Classification under Cuban standard NC 1090: 2015:	Inhibitor of microbial contamination of culture media for vitroplant production
Transport identifying mark:	Not required.
Hazard class per Cuban standard NC 229: 2017:	Produces adverse effects at high doses. May cause irritation of the eyes, throat, nose and skin.
Hazard symbol per Cuban standard NC 229: 2017:	

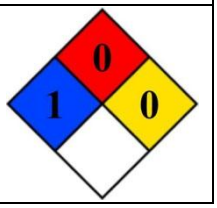
Hazards according to Cuban Standard NC 229: 2017:

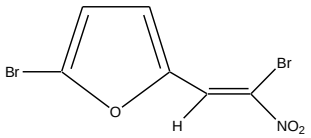
Health hazards

Code	Hazard indication	Hazard category
H305	Potentially harmful if swallowed or inhaled	2
H317	May cause allergic skin reaction	1, 1 A
H320	Irritates the eyes	2B
H334	May cause symptoms of allergy or asthma or breathing difficulty if inhaled.	1, 1 A

Precautions recommended in Cuban standard NC 229: 2017:

Code	Recommended precautions
P232	Protect from damp
P234	Keep only in the original container
P262	Avoid contact with the eyes, skin or clothing
P270	Do not eat or drink; do not smoke while using
P281	Use the compulsory personal protective gear
P284	Carry respiration protection gear (the manufacturer or supplier will specify the relevant conditions).
Code	Recommended precautions on intervention
P301+P310	IF SWALLOWED: Immediately call a TOXICOLOGY INFORMATION CENTER or a doctor
P302+P350	IN THE EVENT OF CONTACT WITH SKIN: Wash gently with plenty of soap and water
P304+P340	IF INHALED: Take the victim outside and keep him/her at rest in a position comfortable for breathing.
P305+P351 +P338	IN THE EVENT OF CONTACT WITH THE EYES: Rinse carefully with water for several minutes. Remove contact lenses if worn and if easily detached. Keep rinsing.
P362+P364	Take off contaminated clothing and wash before reuse
P333+P313	In the event of cutaneous irritation or eruption, consult a doctor
P337+P313	If eye irritation persists, consult a doctor
P342+P311	In the event of respiratory symptoms: call a TOXICOLOGY INFORMATION CENTER or a doctor
P370+P376	In case of fire: Stop it spreading if there is no danger in doing so
P370+P378	In case of fire: To put it out, use the extinguishing agents suggested in **Section 5**.
Code	Recommendfed precautions for storage
P402	Store in a dry place
P410	Protect from sunlight
Code	Recommended precautions for disposal
*	Follow the steps enumerated in **Section 13**.

Safety sign according to National Fire Protection Association standard NFPA 704:	

3. INFORMATION ON THE COMPONENTS	
Chemical identity: **Active pharmaceutical ingredient**	1-(5-bromo-fur-2-il)-2-bromo-2-nitroethane
Synonyms: **Active pharmaceutical ingredient**	Furvina 2-bromo-5-[(1Z)-2-bromo-2-nitroethenyl]-furan 2-bromo-5-(2-bromo-2- nitroethenyl)-furan 2-bromo-5-(2-bromo-2-nitrovinyl)-furan
Main component of the mixture:	Furvina……..…30% Polyethylene glycol 6000….70%
Components contributing to hazard:	Furvina
Chemical formula: **Active pharmaceutical ingredient**	$C_6H_3Br_2NO_3$
Structural formula: **Active pharmaceutical ingredient**	
CAS Registry No.: 2-bromo-5-[(1Z)-2-bromo-2- nitroethenyl]-furan	189935-72-6
CAS Registry No.: 2-bromo-5-(2-bromo-2- nitroethenyl)-furan	35950-55-1

4. FIRST AID	
Accidental contact with the product in the cases of:	
Contact by inhalation:	Move the victim to the open air
Contact with the skin:	Wash the area affected alternately with ethyl alcohol and water, until the product is eliminated. Remove contaminated clothing
Contact with the eyes:	Wash with plenty of water, keeping the eyes open
Ingestion:	Drink lots of water
Most important, acute and delayed symptoms/effects:	May cause allergic reactions
*** In all cases, if the symptoms persist or worsen, consult a doctor.**	

5. FIRE-FIGHTING AIDS	
Extinguishing agents:	Water spray, Water jet, BC Powder, ABC Powder, Foam, Carbon dioxide (CO_2).
Hazards product of combustion:	Toxic (nitrous) vapors may be produced.
Personal protection gear for fire-fighting:	Masks with adaptor for filter types: NO-P3 A1,B2,E2,K1,CO,NO,Hg-P3

6. MEASURES TO BE TAKEN IN CASE OF ACCIDENTAL SPILLS	
Individual precautions, protective gear and emergency procedures:	Use of personal protection gear recommended in **Section 8.3**.
Environmental precautions:	Not applicable
Isolation & cleaning methods & materials (neutralization technique):	Apply a concentrated solution of sodium hydroxide (result apparent from the conversion of the yellow

	mass of Vitrofural® into a light brown viscous mass), wash with water and subsequently with diluted acid, such as acetic acid or similar, until complete neutrality. If sodium hydroxide is not available, use whitewash or a concentrated sodium carbonate solution Clean with plenty of water.

7. HANDLING & STORAGE	
Handling:	
Worker exposure:	Use personal protection gear recommended in **Section 8.3**. Avoid inhalation and contact with the skin, mucosae and eyes. Wash hands after handling
Handling precautions:	Act responsibly. Work without rushing. Handle in its packaging.
Storage:	
Technical aspects:	Keep the product bottle firmly capped
Storage conditions:	Protect from light and damp.
Winkler storage code:	green.

8. EXPOSURE & PERSONAL PROTECTION CONTROLS	
8.1 Control parameters: occupational or biological exposure limits or cut-off values:	
Weighted permissible exposure limit (PEL):	Not applicable
Absolute PEL:	Not applicable
Temporary PEL:	Not applicable
Odiferous threshold:	Not applicable
Biological standards:	Not applicable
Monitoring procedure:	Not applicable
8.2 Appropriate engineering controls	Not applicable
8.3 Means of individual protection, e.g. personal protection gear	
Respiratory protection:	FFP2 self-filtering mask with exhalation valve
Hand protection:	Latex gloves
Eye protection:	Safety spectacles
Skin & body protection:	White coat (long)
Other protective gear:	Safety footwear.

9. PHYSICAL & CHEMICAL PROPERTIES	
Physical state:	Solid
Color:	Yellow
Odor:	Distinctive
Boiling point/freezing point:	Not applicable
Boiling point or initial boiling point and boiling interval:	Not applicable
Flammability:	Not applicable
Lower & upper explosion limits/flammability limit:	Not applicable
Flash point:	Not applicable
Spontaneous ignition temperature:	Not applicable
Decomposition temperature:	Not applicable
pH at 25°C:	6.2
Kinematic viscosity	Not applicable
Solubility in water at 20°C:	Scarcely soluble
Vapor pressure:	Not applicable
Density and/or relative density:	Not applicable
Vapor relative density:	Not applicable
Particle characteristics:	Not applicable

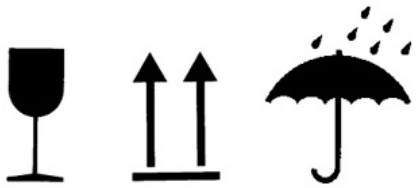
10. STABILITY & REACTIVITY	
Reactivity:	Not applicable
Chemical stability:	Up to 5 years from date of manufacture.
Possibility of hazardous reactions:	Little reactivity.
Conditions to be avoided:	High temperatures. Exposure to light. Damp.
Incompatible materials:	No incompatibilities have been detected with the culture media used in plant micropropagation.
Hazardous decomposition products:	Not applicable
Corrosiveness:	Must not be allowed contact with metal receptacles, unless of stainless steel.

11. TOXICOLOGICAL INFORMATION	
Information on exposure routes (inhalation, ingestion, contact with skin or eyes):	
Dermal irritation:	Not a dermal irritant in rabbits (OECD Test No.404 Guidelines).
Ocular irritation:	Not an ocular irritant in rabbits. (OECD Test No.405 Guidelines).
Sensitization:	No dermal sensitizing effect in guinea pigs. (OECD Test No.406 Guidelines).
Symptoms associated with the physical, chemical and toxicological characteristics:	May cause dermatitis by contact.

Immediate & delayed effects; chronic effects produced by short- or long-term exposure:	
Mutagenicity:	Not mutagenic via the dermal route, LOC I.
Carcinogenicity:	Not available.
Toxicity for reproduction:	Not available.
Specific systemic toxicity for target organs - single exposure:	Not available.
Inhalation hazard:	Not available.
Numerical toxicity indicators:	
Acute oral toxicity:	LD50 in Rats: > 2,000 mg/kg. (OECD Test No. 401 guidelines).
Acute cutaneous toxicity:	LD50 in Rats: > 2.000 mg/kg. (OECD Test No. 402 guidelines).
Acute inhalation toxicity:	Not available.

12. ECO-TOXICOLOGICAL INFORMATION	
Toxicity in aquatic environments:	Not a hazard to the aquatic environment in the concentrations recommended for use.
Toxicity for fish:	Static LC50 test in freshwater fish *Poecilliareticulata*: > 116 mg/L. (Concentration used in culture media); 96 h. (OECD guidelines on Tests Nos. 203 & 204).
Toxicity for aquatic invertebrates:	Static LC50 test in Artemia sp: > 116 mg/L.(Concentration used in culture media); 48 h. (Artoxkit M. 1990).
Toxicity for mollusks:	Static LC50 test in mollusks *Physacubensis*: >116 Mg/L. (Concentration used in culture media); 96 h. Environmental Protection Agency (EPA) test guidelines 885.4240. 1996).
Toxicity in terrestrial environments:	
Toxicity for lettuce seed:	Static LC50 test on *Lactuca sativa* >116 mg/L. (Concentration used in culture media); 120 h. Environmental Protection Agency (EPA) test guidelines 850.4200.
Toxicity for earthworms:	Static LC50 test on *Eiseniafoetida*: >116 mg/L. (Concentration used in culture media); 14 days. (OECD Test No. 207 Guidelines).
Persistence & degradability:	Following the recommended procedure for using Vitrofural®, the product degrades within 3 - 4 days; there are consequently no residues at the conclusion of the process.
Bio-accumulation potential:	Not available.
Motility in soil:	Not available.

13. INFORMATION ON PRODUCT ELIMINATION	
Recommended method for safe disposal of the product, its residues & wastes	1. Disperse in a 3 mol/L hydrochloric acid solution. 2. Heat until colorless. 3. Neutralize the solution with sodium hydroxide. 4. Dilute in water for disposal.

14. INFORMATION ON TRANSPORT	
UN Model Regulations (transport of dangerous goods):	Not required
Environmental hazards:	Hazardous product regulations do not apply
Special precautions a user should know and apply during transportation or transfer within or outside its sites:	Maintain the packing & packaging conditions
Transport sign:	

15. INFORMATION ON REGULATION

1- National Assembly of the People's Power. Law No. 81/1997 *(the Environment Law)*

2- National Assembly of the People's Power. Law No. 116/2013 *(the Employment Code)*

3- Council of State. Decree-Law No. 186/1998 *Physical Safety & Protection System*

4- Council of State. Decree-Law No. 225/2001 *Industrial explosives, means of initiation, their chemical precursors and toxic chemical products*

5- Council of State. Decree-Law No. 309/2013 *Chemical safety*

6- Council of Ministers. Decree No. 326/2014 *Regulation of the Employment Code*

7- Ministry of Home Affairs. Resolution 1/2006 *Regulations for protection of hazardous substances*

8- United Nations. GHS_Rev.6/2015 *Globally Harmonized System of Classification and Labeling of Chemicals (GHS)*.

9- United Nations. GHS_Rev.7/2017 *Globally Harmonized System of Classification and Labeling of Chemicals (GHS)*

10- National Standards Office. Cuban standard NC 1039:2014 *Workers' personal protection gear. General requirements & classification*

11- National Standards Office. NC 1090:2015 *Inhibitor of microbial contamination of culture media for vitroplant production. Vitrofural. Requirements & testing methods*

12- National Standards Office. NC 18001:2015 *Health & safety at work. Health & safety at work management system. Requirements*

13- National Standards Office. NC 229:2017 *Health & safety at work. Hazardous chemicals. Risk-reduction methods*.

16. OTHER INFORMATION	
Validity:	This card reproduces the technical data relevant to use of the product but is not a substitute for the formal specification. The information it contains is based on the relevant knowledge at the date indicated. The use of the product and precautions to be taken are the direct responsibility of the individual concerned.