THE UNIVERSITY OF WESTERN ONTARIO
BIOLOGICAL AGENTS REGISTRY FORM
Approved Biohazards Subcommittee: July 9, 2010
Biosafety Website: www.uwo.ca/humanresources/biosafety/

This form must be completed by each Principal Investigator holding a grant administered by the University of Western Ontario (UWO) or in charge of a laboratory/facility where the use of Level 1, 2 or 3 biological agents is described in the laboratory or animal work proposed. The form must also be completed if any work is proposed involving animals carrying zoonotic agents infectious to humans or involving plants, fungi, or insects that require Public Health Agency of Canada (PHAC) or Canadian Food Inspection Agency (CFIA) permits.

This form must be updated at least every 3 years or when there are changes to the biological agents being used.

Containment Levels will be established in accordance with Laboratory Biosafety Guidelines, 3rd edition, 2004, Public Health Agency of Canada (PHAC) or Containment Standards for Veterinary Facilities, 1st edition 1996, Canadian Food Inspection Agency (CFIA).

Completed forms are to be returned to Occupational Health and Safety, (OHS), (Support Services Building, Room 4190) for distribution to the Biohazards Subcommittee. For questions regarding this form, please contact the Biosafety Officer at extension 81135 or biosafety@uwo.ca. If there are changes to the information on this form (excluding grant title and funding agencies), contact Occupational Health and Safety for a modification form. See website: www.uwo.ca/humanresources/biosafety

PRINCIPAL INVESTIGATOR	HEINZ-BERNHARD KRAATZ
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Location of experimental work to be carried out: Building(s) The Stiller Centre Room(s)_____

*For work being performed at Institutions affiliated with the University of Western Ontario, the Safety Officer for the Institution where experiments will take place must sign the form prior to its being sent to the University of Western Ontario Biosafety Officer (See Section 15.0, Approvals).

FUNDING AGENCY/AGENCIES: NSERC
GRANT TITLE(S): Development of an electrochemical sensor for mycotoxins.

List all personnel working under Principal Investigators supervision in this location:

Name	UWO E-mail Address	Date of Biosafety Training
PIOTR DIAKOWSKI	pdiakows@uwo.ca	Nov 16, 2010

Please explain the biological agents and/or biohazardous substances used and how they will be stored, used and disposed of. Projects without this description will not be reviewed.

Aflatoxins will be used in this study. Aflatoxins are naturally occurring toxins that are produced by many species of fungus. They are highly toxic. May cause cancer, heritable genetic damage. Very toxic by inhalation, in contact with skin and if swallowed. Target organ: liver.

Glows will be used at all times when handling the toxin. Laboratory coat and eye protection will be used at all times when working with the toxin. Preparation of the toxin solutions from the stock will be done in the chemical fumehood. Electrochemical experiments involving afalatoxin will be carried out only on the designated section of the laboratory bench.

Aflatoxins will be stored at Neoventures Biotechnology Inc. (located at the Stiller Centre) in closed containers. Aflatoxins will be disposed of by the Neoventures personel.

Please include a one page research summary or teaching protocol.

Experiments will be carried out to develop electrochemical sensor for detection of aflatoxins. This will require preparation of aflatoxin solutions (1mM and lower concentrations) from the stock solution (50 mM).

Electrodes will be incubated in the afaltoxin solutions of different concentrations (1 mM – 1 nM). Following the incubation step electrochemical measurements will be performed to determine the toxin concentration. Next, electrodes will be hand polished and reused.

1.0 Microorganisms

1.1 Does your work involve the use of biological agents? ✓YES O NO
(non-pathogenic and pathogenic biological agents including but not limited to bacteria and other microorganisms, viruses, prions, parasites or pathogens of plant or animal origin)? If no, please proceed to Section 2.0

Do you use microorganisms that require a permit from the CFIA? O YES ✓NO
If YES, please give the name of the species. _____
What is the origin of the microorganism(s)? _____
Please describe the risk (if any) of escape and how this will be mitigated:

_____
_____
_____

Please attach the CFIA permit.
Please describe any CFIA permit conditions:

_____
_____
_____

1.2 Please complete the table below:

Name of Biological agent(s)*	Is it known to be a human pathogen? YES/NO	Is it known to be an animal pathogen? YES/NO	Is it known to be a zoonotic agent? YES/NO	Maximum quantity to be cultured at one time? (in Litres)	Source/ Supplier	PHAC or CFIA Containment Level
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 2+ O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 2+ O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 2+ O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 2+ O 3

*Please attach a Material Safety Data Sheet or equivalent from the supplier.

2.0 Cell Culture

2.1 Does your work involve the use of cell cultures? O YES ✓NO
If no, please proceed to Section 3.0

2.2 Please indicate the type of primary cells (i.e. derived from fresh tissue) that will be grown in culture:

Cell Type	Is this cell type used in your work?	Source of Primary Cell Culture Tissue	AUS Protocol Number
Human	O Yes O No		Not applicable
Rodent	O Yes O No		
Non-human primate	O Yes O No		
Other (specify)	O Yes O No		

2.3 Please indicate the type of established cells that will be grown in culture in:

Cell Type	Is this cell type used in your work?	Specific cell line(s)*	Supplier / Source
Human	O Yes O No		
Rodent	O Yes O No		
Non-human primate	O Yes O No		
Other (specify)	O Yes O No		

*Please attach a Material Safety Data Sheet or equivalent from the supplier. (For more information, see www.atcc.org)

2.4 For above named cell types(s) indicate PHAC or CFIA containment level required O 1 O 2 O 2+ O 3

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? O YES ✓NO
If no, please proceed to Section 4.0

3.2 Indicate in the table below the Human Source Material to be used.

Human Source Material	**Source/Supplier /Company Name**	**Is Human Source Material Infected With An Infectious Agent? YES/NO**	**Name of Infectious Agent (If applicable)**	**PHAC or CFIA Containment Level (Select one)**
Human Blood (whole) or other Body Fluid		O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Blood (fraction) or other Body Fluid		O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Organs or Tissues (unpreserved)		O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Organs or Tissues (preserved)		Not Applicable		Not Applicable

4.0 Genetically Modified Organisms and Cell lines

4.1 Will genetic modifications be made to the microorganisms, biological agents, or cells described in Sections 1.0 and 2.0? O YES ✓NO If no, please proceed to Section 5.0

4.2 Will genetic modification(s) involving plasmids be done? O YES, complete table below O NO

Bacteria Used for Cloning *	Plasmid(s) **	Source of Plasmid	Gene Transfected	Describe the change that results from transformation or tranfection

* Please attach a Material Data Sheet or equivalent if available.
** Please attach a plasmid map.

4.3 Will genetic modification(s) involving viral vectors be made? O YES, complete table below O NO

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results from transduction

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

- HIV O YES, please specify _____ O NO
- HTLV 1 or 2 or genes from any Level 1 or Level 2 pathogens O YES, specify _____ O NO
- SV 40 Large T antigen O YES O NO
- E1A oncogene O YES O NO
- Known oncogenes O YES, please specify _____ O NO
- Other human or animal pathogen and or their toxins O YES, please specify _____ O NO

4.5 Will virus be replication defective? O YES O NO

4.6 Will virus be infectious to humans or animals? O YES O NO

4.7 Will this be expected to increase the containment level required? O YES O NO

5.0 Human Gene Therapy Trials

5.1 Will human clinical trials be conducted involving a biological agent? O YES ✓ NO
(including but not limited to microorganisms, viruses, prions, parasites or pathogens of plant or animal origin)
If no, please proceed to Section 6.0

5.2 If YES, please specify which biological agent will be used: _____
Please attach a full description of the biological agent.

5.2 Will the biological agent be able to replicate in the host? O YES O NO

5.3 How will the biological agent be administered? _____

5.4 Please give the Health Care Facility where the clinical trial will be conducted:_____

5.5 Has human ethics approval been obtained? O YES, number: _____ O NO O PENDING

6.0 Animal Experiments

6.1 Will live animals be used? O YES ✓ NO If no, please proceed to section 7.0

6.2 Name of animal species to be used_____

6.3 AUS protocol # _____

6.4 Will any of the agents listed in section 4.0 be used in live animals O YES, specify: _____ O NO

6.5 Will the agent(s) be shed by the animal: O YES O NO, please justify:

_____

_____

7.0 Use of Animal species with Zoonotic Hazards

7.1 Will any animals with zoonotic hazards or their organs, tissues, lavages or other body fluids including blood be used (see list below)? O YES ✓ No If no, please proceed to section 8.0

7.2 Please specify the animal(s) used:

- Pound source dogs O YES O NO
- Pound source cats O YES O NO
- Cattle, sheep or goats O YES, please specify species _____ O NO
- Non-human primates O YES, please specify species _____ O NO
- Wild caught animals O YES, please specify species & colony # _____ O NO
- Birds O YES, please specify species _____ O NO
- Others (wild or domestic) O YES, please specify _____ O NO

8.0 Biological Toxins

8.1 Will toxins of biological origin be used? ✓ YES O NO If no, please proceed to Section 9.0

8.2 If YES, please name the toxin(s) AFLATOXIN
Please attach information, such as a Material Safety Data Sheet, for the toxin(s) used.

8.3 What is the LD_{50} (specify species) of the toxin 1.750 mg/kg (Primate-monkey)

8.4 How much of the toxin is handled at one time*? 5 mg

8.5 How much of the toxin is stored*? 5 mg

8.6 Will any biological toxins be used in live animals? O YES, Please provide details:_____ ✓ NO

*For information on biosecurity requirements, please see:
http://www.uwo.ca/humanresources/docandform/docs/healthandsafety/biosafety/Biosecurity_Requirements.pdf

9.0 Insects

9.1 Do you use insects? O YES ✓ NO If no, please proceed to Section 10.0

9.2 If YES, please give the name of the species. _____

9.3 What is the origin of the insect? _____

9.4 What is the life stage of the insect? _____

9.5 What is your intention? O Initiate and maintain colony, give location: _____
O "One-time" use, give location: _____

9.6 Please describe the risk (if any) of escape and how this will be mitigated:
_____
_____

9.7 Do you use insects that require a permit from the CFIA permit? O YES O NO
If YES, Please attach the CFIA permit & describe any CFIA permit conditions:
_____
_____

10.0 Plants

10.1 Do you use plants? O YES ✓ NO If no, please proceed to Section 11.0

10.2 If YES, please give the name of the species. _____

10.3 What is the origin of the plant? _____

10.4 What is the form of the plant (seed, seedling, plant, tree...)? _____

10.5 What is your intention? O Grow and maintain a crop O "One-time" use

10.6 Do you do any modifications to the plant? O YES O NO
If yes, please describe: _____
_____

10.7 Please describe the risk (if any) of loss of the material from the lab and how this will be mitigated:
_____
_____
_____

10.8 Is the CFIA permit attached? O YES O NO
If YES, Please attach the CFIA permit & describe any CFIA permit conditions:
_____
_____

11.0 Import Requirements

11.1 Will any of the above agents be imported? O YES, please give country of origin_____ ✓ NO
If no, please proceed to Section 12.0

11.2 Has an Import Permit been obtained from HC for human pathogens? O YES O NO

11.3 Has an import permit been obtained from CFIA for animal or plant pathogens? O YES O NO

11.4 Has the import permit been sent to OHS? O YES, please provide permit # _____ O NO

12.0 Training Requirements for Personnel Named on Form

All personnel named on the above form who will be using any of the above named agents are required to attend the following training courses given by OHS:

- Biosafety
- Laboratory and Environmental/Waste Management Safety
- WHMIS (Western or equivalent)
- Employee Health and Safety Orientation

As the Principal Investigator, I have ensured that all of the personnel named on the form who will be using any of the biological agents in Sections 1.0 to 9.0 have been trained.

SIGNATURE _____

13.0 Containment Levels

13.1 For the work described in sections 1.0 to 9.0, please indicate the highest HC or CFIA Containment Level required. O 1 O 2 O 2+ O 3

13.2 Has the facility been certified by OHS for this level of containment?

O YES, permit # if on-campus_____

O NO, please certify

O NOT REQUIRED for Level 1 containment

14.0 Procedures to be Followed

14.1 As the Principal Investigator, I will ensure that this project will follow the Western Biosafety Guidelines and Procedures Manual for Containment Level 1 & 2 Laboratories (and the Level 3 Facilities Manual for Level 3 projects). I will ensure that UWO faculty, staff and students working in my laboratory have an up-to-date Hazard Communication Form, found at http://www.wph.uwo.ca/

SIGNATURE [signature] Date: Nov. 10 2010.

14.2 Please describe additional risk reduction measures will be taken beyond containment level 1, 2, 2+ or 3 measures, that are unique to this agent.

~~N/A~~

14.3 Please outline what will be done if there is an exposure to the biological agents listed, such as a needlestick injury:

Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 min. while removing contaminated clothing.

15.0 Approvals

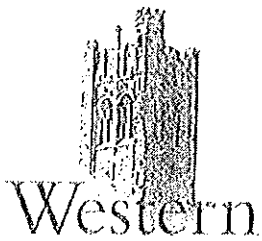
1) UWO Biohazards Subcommittee: SIGNATURE: _____
Date: _____

2) Safety Officer for the University of Western Ontario
SIGNATURE: _____
Date: _____

3) Safety Officer for Institution where experiments will take place (if not UWO):
SIGNATURE: _____
Date: _____

Approval Number: _____ Expiry Date (3 years from Approval): _____

Special Conditions of Approval:



TOXIN USE RISK ASSESSMENT

Name of Toxin:	Aflatoxin
Proposed Use Dose:	5000 µg
Proposed Storage Dose:	5000 µg
LD $_{50}$ (species):	1750 µg

Calculation:

1750 µg/kg x 70 kg/person

Dose per person based on LD $_{50}$ in µg = 122500

LD_{50} per person with safety factor of 10 based on LD_{50} in µg = 12250

Comments/Recommendations: OK

CHEMICAL IDENTIFICATION

RTECS Number	AW5950000
Chemical Name	Aflatoxin
CAS Registry Number	1402-68-2
Last Updated	201001
Data Items Cited	58
Compound Descriptor	Tumorigen Mutagen Natural Product Human Reproductive Effector

HEALTH HAZARD DATA

ACUTE TOXICITY DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Toxic Effects	Reference
LDLo - Lowest	Oral	Human	229 ug/kg/8W	Behavioral - anorexia (human)	LANCAO Lancet. (7 Adam St., London

published lethal dose				Gastrointestinal - ulceration or bleeding from small intestine Liver - jaundice, other or unclassified	WC2N 6AD, UK) V.1-1823- Volume (issue)/page/year: 1,1061,1975
LD50 - Lethal dose, 50 percent kill	Oral	Primate - monkey	1750 ug/kg	Liver - hepatitis (hepatocellular necrosis), zonal Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	FCTXAV Food and Cosmetics Toxicology. (London, UK) V.1-19, 1963-81. For publisher information, see FCTOD7. Volume (issue)/page/year: 14,227,1976
LD50 - Lethal dose, 50 percent kill	Intramuscular	Primate - monkey	2020 mg/kg	Liver - hepatitis (hepatocellular necrosis), zonal Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	FCTXAV Food and Cosmetics Toxicology. (London, UK) V.1-19, 1963-81. For publisher information, see FCTOD7. Volume (issue)/page/year: 14,227,1976
LDLo - Lowest published lethal dose	Oral	Bird - quail	4 mg/kg	Details of toxic effects not reported other than lethal dose value	BPOSA4 British Poultry Science. (Longman Group UK Ltd., Longman House, Burnt Mill, Harlow, Essex CM20 2JE, UK) V.1-1960- Volume (issue)/page/year: 21,29,1980

OTHER MULTIPLE DOSE TOXICITY DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Toxic Effects	Reference
TDLo - Lowest published toxic dose	Oral	Mammal - dog	1 gm/kg/10W (intermittent)	Blood - change in clotting factors Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - phosphatases	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 18,579,1971
TDLo - Lowest published toxic dose	Oral	Rodent - rabbit	900 mg/kg/60D (continuous)	Blood - pigmented or nucleated red blood cells Blood - changes in other cell count (unspecified) Blood - changes in	BECTA6 Bulletin of Environmental Contamination and Toxicology. (Springer-Verlag New York, Inc.,

				erythrocyte (RBC) count	Service Center, 44 Hartz Way, Secaucus, NJ 07094) V.1- 1966- Volume (issue)/page/year: 49,861,1992
TDLo - Lowest published toxic dose	Oral	Mammal - pig	56 mg/kg/28D (continuous)	Blood - change in clotting factors Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Nutritional and Gross Metabolic - changes in iron	BECTA6 Bulletin of Environmental Contamination and Toxicology. (Springer-Verlag New York, Inc., Service Center, 44 Hartz Way, Secaucus, NJ 07094) V.1- 1966- Volume (issue)/page/year: 40,576,1988
TDLo - Lowest published toxic dose	Oral	Bird - chicken	20 mg/kg/10D (intermittent)	Kidney/Ureter/Bladder - other changes in urine composition Kidney/Ureter/Bladder - changes in bladder weight Nutritional and Gross Metabolic - changes in calcium	JTEHD6 Journal of Toxicology and Environmental Health. (Hemisphere Pub., 1025 Vermont Ave., NW, Washington, DC 20005) V.1- 1975/76- Volume (issue)/page/year: 34,309,1991
TDLo - Lowest published toxic dose	Oral	Bird - chicken	80 mg/kg/32D (continuous)	Blood - other changes	RVTSA9 Research in Veterinary Science. (British Veterinary Assoc., 7 Mansfield St., London W1M OAT, UK) V.1- 1960- Volume (issue)/page/year: 58,119,1995
TDLo - Lowest published toxic dose	Oral	Bird - quail	105 mg/kg/3W (continuous)	Nutritional and Gross Metabolic - weight loss or decreased weight gain	BPOSA4 British Poultry Science. (Longman Group UK Ltd., Longman House, Burnt Mill, Harlow, Essex CM20 2JE, UK) V.1- 1960- Volume (issue)/page/year: 21,29,1980
TDLo - Lowest published toxic dose	Oral	Mammal - domestic	2925 ug/kg/39D (intermittent)	Liver - jaundice, other or unclassified Blood - hemorrhage Related to Chronic Data - death	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St.,

					Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 65,354,1982
TDLo - Lowest published toxic dose	Oral	Mammal - domestic	1680 ug/kg/21D (continuous)	Blood - changes in erythrocyte (RBC) count Nutritional and Gross Metabolic - weight loss or decreased weight gain Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	JJATDK JAT, Journal of Applied Toxicology. (John Wiley & Sons Ltd., Baffins Lane, Chichester, W. Sussex PO19 1UD, UK) V.1- 1981- Volume (issue)/page/year: 16,85,1996
TDLo - Lowest published toxic dose	Oral	Mammal - cattle	2100 ug/kg/3W (continuous)	Blood - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - phosphatases Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases	JDSCAE Journal of Dairy Science. (American Dairy Science Assoc., 309 W. Clark St., Champaign, IL 61820) V.1- 1917- Volume (issue)/page/year: 68,437,1985
TDLo - Lowest published toxic dose	Oral	Rodent - mouse	4.62 ug/kg/60D (continuous)	Liver - hepatitis (hepatocellular necrosis), diffuse Gastrointestinal - necrotic changes	FCTOD7 Food and Chemical Toxicology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.20- 1982- Volume (issue)/page/year: 39,579,2001
TDLo - Lowest published toxic dose	Oral	Rodent - mouse	7.28 ug/kg/90D (continuous)	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Nutritional and Gross Metabolic - changes in calcium	FCTOD7 Food and Chemical Toxicology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.20- 1982- Volume (issue)/page/year: 39,579,2001
TDLo - Lowest published toxic dose	Intramuscular	Rodent - mouse	45 gm/kg/45D (intermittent)	Endocrine - androgenic Reproductive - Paternal Effects - testes, epididymis, sperm duct Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels -	FCTOD7 Food and Chemical Toxicology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.20- 1982- Volume (issue)/page/year:

				dehydrogenases	40,669,2001
TDLo - Lowest published toxic dose	Oral	Rodent - mouse	33.75 mg/kg/45D (intermittent)	Endocrine - androgenic Reproductive - Paternal Effects - testes, epididymis, sperm duct Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases	FCTOD7 Food and Chemical Toxicology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.20-1982- Volume (issue)/page/year: 40,669,2002
TDLo - Lowest published toxic dose	Oral	Mammal - dog	1365 ug/kg/1Y (continuous)	Related to Chronic Data - death	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1- 1981- Volume (issue)/page/year: 72,251,2003
TDLo - Lowest published toxic dose	Oral	Rodent - rat	9000 ug/kg/90D (intermittent)	Liver - fatty liver degeneration Nutritional and Gross Metabolic - weight loss or decreased weight gain Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - multiple enzyme effects	FCTOD7 Food and Chemical Toxicology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.20-1982- Volume (issue)/page/year: 47,418,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	20 mg/kg/40D (intermittent)	Behavioral - somnolence (general depressed activity) Kidney/Ureter/Bladder - changes in kidney weight Related to Chronic Data - death	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume (issue)/page/year: 53,33,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	40 mg/kg/40D (intermittent)	Nutritional and Gross Metabolic - dehydration	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume (issue)/page/year: 53,33,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	5 mg/kg/10D (intermittent)	Liver - other changes Liver - changes in liver weight Kidney/Ureter/Bladder - changes in tubules (including acute renal failure, acute tubular	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume

				necrosis)	(issue)/page/year: 53,33,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	10 mg/kg/20D (intermittent)	Blood - hemorrhage	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume (issue)/page/year: 53,33,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	15 mg/kg/30D (intermittent)	Liver - hepatitis (hepatocellular necrosis), zonal	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume (issue)/page/year: 53,33,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	10 mg/kg/10D (intermittent)	Nutritional and Gross Metabolic - weight loss or decreased weight gain Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume (issue)/page/year: 53,33,2009
TDLo - Lowest published toxic dose	Oral	Rodent - rat	20 mg/kg/20D (intermittent)	Kidney/Ureter/Bladder - other changes Kidney/Ureter/Bladder - changes in kidney weight Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1- 1962- Volume (issue)/page/year: 53,33,2009

TUMORIGENIC DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Toxic Effects	Reference
TDLo - Lowest published toxic dose	Oral	Rodent - rat	7788 ug/kg/13W (continuous)	Tumorigenic - equivocal tumorigenic agent by RTECS criteria Liver - tumors	NATUAS Nature. (Nature Subscription Dept., POB 1018, Manasguan, NJ 08736) V.1- 1869- Volume (issue)/page/year: 202,1016,1964
TDLo - Lowest published toxic dose	Oral	Rodent - rat	2250 ug/kg	Tumorigenic - equivocal tumorigenic agent by RTECS criteria Reproductive - Tumorigenic effects - transplacental	CNREA8 Cancer Research. (Public Ledger Building, Suit 816, 6th & Chestnut Sts., Philadelphia, PA

				tumorigenesis Liver - tumors	19106) V.1- 1941- Volume (issue)/page/year: 33,262,1973
TDLo - Lowest published toxic dose	Multiple routes	Primate - monkey	71 mg/kg/6Y (intermittent)	Tumorigenic - equivocal tumorigenic agent by RTECS criteria Liver - jaundice, other or unclassified Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	FCTXAV Food and Cosmetics Toxicology. (London, UK) V.1-19, 1963-81. For publisher information, see FCTOD7. Volume (issue)/page/year: 10,519,1972
TD - Toxic dose (other than lowest)	Oral	Rodent - rat	87 mg/kg/52W (continuous)	Tumorigenic - equivocal tumorigenic agent by RTECS criteria Liver - tumors Gastrointestinal - tumors	NATUAS Nature. (Nature Subscription Dept., POB 1018, Manasguan, NJ 08736) V.1- 1869- Volume (issue)/page/year: 209,90,1966
TD - Toxic dose (other than lowest)	Oral	Rodent - rat	66 mg/kg/52W (continuous)	Tumorigenic - equivocal tumorigenic agent by RTECS criteria Gastrointestinal - tumors Liver - tumors	NATUAS Nature. (Nature Subscription Dept., POB 1018, Manasguan, NJ 08736) V.1- 1869- Volume (issue)/page/year: 209,90,1966
TD - Toxic dose (other than lowest)	Oral	Rodent - rat	62 mg/kg/37W (continuous)	Tumorigenic - equivocal tumorigenic agent by RTECS criteria Liver - tumors Kidney/Ureter/Bladder - Kidney tumors	IJCNAW International Journal of Cancer. (International Union Against Cancer, 3 rue du Conseil- General, 1205 Geneva, Switzerland) V.1- 1966- Volume (issue)/page/year: 4,422,1969

REPRODUCTIVE DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Sex/Duration	Toxic Effects	Reference
TDLo - Lowest published toxic dose	Parenteral	Rodent - hamster	4 mg/kg	female 8 day (s) after conception	Reproductive - Fertility - litter size (e.g. # fetuses per litter; measured before birth) Reproductive -	DABBBA Dissertation Abstracts International, B: The Sciences and Engineering. (University Microfilms

					Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) Reproductive - Specific Developmental Abnormalities - musculoskeletal system	International, 300 N. Zeeb Rd., Ann Arbor, MI 48106) V.30- 1969- Volume (issue)/page/year: 34,5251,1973
TDLo - Lowest published toxic dose	Parenteral	Rodent - hamster	6 mg/kg	female 8 day (s) after conception	Reproductive - Specific Developmental Abnormalities - urogenital system	DABBBA Dissertation Abstracts International, B: The Sciences and Engineering. (University Microfilms International, 300 N. Zeeb Rd., Ann Arbor, MI 48106) V.30- 1969- Volume (issue)/page/year: 34,5251,1973

MUTATION DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Reference
Cytogenetic analysis		Human Leukocyte	50 mg/L	MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume(issue)/page/year: 16,373,1972
Micronucleus test	Oral	Rodent - rat	8500 ug/kg	DCTODJ Drug and Chemical Toxicology. (Marcel Dekker, 270 Madison Ave., New York, NY 10016) V.1- 1977/78- Volume (issue)/page/year: 10,291,1987
Cytogenetic analysis	Oral	Rodent - mouse	84 ug/kg	NULSAK Nucleus (Calcutta). (Dr. A.K. Sharma, Centre of Advanced Studies in Cell and Chromosome Research, Calcutta, 35 Baliygunge Circular Rd., Calcutta 700 019, India) V.1- 1958- Volume(issue)/page/year: 32,142,1989
Dominant lethal test	Intraperitoneal	Rodent - mouse	68 mg/kg	NATUAS Nature. (Nature Subscription Dept., POB 1018, Manasguan, NJ 08736) V.1- 1869- Volume(issue)/page/year: 219,385,1968

REVIEWS

IARC Cancer Review:Human	IMSUDL IARC Monographs, Supplement. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) No.1- 1979- Volume

Sufficient Evidence	(issue)/page/year: 7,83,1987
IARC Cancer Review:Animal Sufficient Evidence	IMSUDL IARC Monographs, Supplement. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) No.1- 1979- Volume (issue)/page/year: 7,83,1987
IARC Cancer Review:Group 1	IMSUDL IARC Monographs, Supplement. (WHO Publications Centre USA, 49 Sheridan Ave., Albany, NY 12210) No.1- 1979- Volume (issue)/page/year: 7,83,1987
TOXICOLOGY REVIEW	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1- 1973- Volume(issue)/page/year: 180,151,2002
TOXICOLOGY REVIEW	JAVMA4 Journal of the American Veterinary Medical Association. (American Veterinary Medical Assoc., 930 N. Meacham Rd., Schaumburg, IL 60196) V.48- 1915- Volume(issue)/page/year: 164,277,1974
TOXICOLOGY REVIEW	32XPAD "Teratology," Berry, C.L., and D.E. Poswillo, eds., New York, Springer, 1975 Volume(issue)/page/year: -,49,1975
TOXICOLOGY REVIEW	IJNDAN Indian Journal of Nutrition and Dietetics. (Sri Avinashilingam Home Science College for Women, Coimbatore 641 043, India) V.7- 1970- Volume(issue)/page/year: 8,85,1971
TOXICOLOGY REVIEW	FCTXAV Food and Cosmetics Toxicology. (London, UK) V.1-19, 1963-81. For publisher information, see FCTOD7. Volume (issue)/page/year: 6,80,1968
TOXICOLOGY REVIEW	TPHSDY Trends in Pharmacological Sciences. (Elsevier Science Pub. Co., Inc., 52 Vanderbilt Ave., New York, NY 10017) V.1- 1979- Volume(issue)/page/year: 24,328,2003
TOXICOLOGY REVIEW	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1977- Volume (issue)/page/year: 134,51,2002
TOXICOLOGY REVIEW	ZKKOBW Zeitschrift fuer Krebsforschung und Klinische Onkologie. (Berlin, Fed. Rep. Ger.) V.76-92, 1971-78. For publisher information, see JCROD7. Volume(issue)/page/year: 78,99,1972
TOXICOLOGY REVIEW	DIMON* Disease-a Month (Chicago : Year Book Publishers) V. 24- 1978- Volume(issue)/page/year: 39,678,1993
TOXICOLOGY REVIEW	MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume (issue)/page/year: 584,1,2005
TOXICOLOGY REVIEW	MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume (issue)/page/year: 636,95,2007
TOXICOLOGY REVIEW	MUREAV Mutation Research. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1964- Volume (issue)/page/year: 659,31,2008
TOXICOLOGY REVIEW	MUTAEX Mutagenesis. (Oxford Univ. Press, Pinkhill House, Southfield Road, Eynsham, Oxford OX8 1JJ, UK) V.1- 1986- Volume (issue)/page/year: 23,1,2008

STATUS IN U.S.

EPA GENETOX PROGRAM 1988, Positive: Aspergillus-forward mutation

EPA GENETOX PROGRAM 1988, Inconclusive: In vitro cytogenetics-human lymphocyte

EPA GENETOX PROGRAM 1988, Inconclusive: D melanogaster-reciprocal translocation

EPA GENETOX PROGRAM 1988, Inconclusive: D melanogaster Sex-linked lethal

END OF RECORD

RTECS® is provided quarterly by Symyx Software, Inc., and was last updated: **April, 2010**.

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Mail: 135 Hunter Street East, Hamilton Ontario L8N 1M5

Material Safety Data Sheet

Version 4.2
Revision Date 10/22/2010
Print Date 11/25/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Aflatoxin B_1

Product Number : 32754
Brand : Fluka
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +19058299500
Fax : +19058299292
Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

D1A D2A	Very Toxic Material Causing Immediate and Serious Toxic Effects	Highly toxic by ingestion Highly toxic by skin absorption Highly toxic by inhalation Teratogen

GHS Classification

Acute toxicity, Inhalation (Category 2)
Acute toxicity, Dermal (Category 1)
Acute toxicity, Oral (Category 1)
Carcinogenicity (Category 1B)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H300 + H310	Fatal if swallowed or in contact with skin.
H330	Fatal if inhaled.
H350	May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash hands thoroughly after handling.
P280	Wear protective gloves/ protective clothing.
P284	Wear respiratory protection.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
P310	Immediately call a POISON CENTER or doctor/ physician.

HMIS Classification

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

Potential Health Effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Skin	May be fatal if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be fatal if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : AFLATOXIN B(1)
2,3,6AA,9AA-TETRAHYDRO-4-METHOXYCYCLOPENTA[c]FURO[2',3':4,5]FURO[2,3-h]CHROMENE-1,11-DIONE

Formula : $C_{17}H_{12}O_6$

Molecular Weight : 312.27 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Aflatoxin B1			
1162-65-8	214-603-3	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Explosion data - sensitivity to mechanical impact
no data available

Explosion data - sensitivity to static discharge
no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature: -20 °C

Light sensitive. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	light yellow white

Safety data

pH	no data available
Melting/freezing	268.0 - 269.0 °C (514.4 - 516.2 °F)

point	
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
Light.

Materials to avoid
Strong oxidizing agents, Strong bases

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 4.8 mg/kg

Inhalation LC50
Dermal LD50
Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Aflatoxin B1)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Teratogenicity

Damage to fetus possible

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Ingestion	May be fatal if swallowed.
Skin	May be fatal if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: GY1925000

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Aflatoxin B1)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Aflatoxin B1)
Marine pollutant: No

IATA
UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s. (Aflatoxin B1)

15. REGULATORY INFORMATION

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Aflatoxin B1	1162-65-8

WHMIS Classification

D1A D2A	Very Toxic Material Causing Immediate and Serious Toxic Effects	Highly toxic by ingestion Highly toxic by skin absorption Highly toxic by inhalation Teratogen

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.