



Green Plains

GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME (GHS Product Identifier): Fermentation Mash
(Other means of Identification): Liquefact, Corn Mash, Beer well, beer

PRODUCT INTENDED USE AND RESTRICTION: Used in fermentation process in ethanol production facility

MANUFACTURER: Green Plains, Inc.
DIVISION:

Green Plains Atkinson LLC. 87590 Hill Crest Rd. Atkinson, NE 68713 P.O. Box 391, Atkinson, NE 68713 Phone: 402-925-5570 Fax: 402-925-2988 <input checked="" type="checkbox"/>	Green Plains Central City LLC. 214 20 th St., Central City, NE 68826 Phone: 308-946-9700 Fax: 308-946-2623 <input checked="" type="checkbox"/>	Green Plains Fairmont LLC. 1125 N Bixby Road, Fairmont, MN 56031 Phone: 507-238-3600 Fax: 507-238-3624 <input checked="" type="checkbox"/>	Green Plains Hereford LLC 4300 County Road 8 Hereford, TX 79045 Phone: 806-258-7800 Fax: 806-258-7801 <input checked="" type="checkbox"/>	Green Plains Madison LLC 395 Bissell St Madison, IL 63060 Phone: 618-451-4420 Fax: 618-452-8946 <input checked="" type="checkbox"/>
Green Plains Mt Vernon LLC 8999 W Franklin Rd Mt Vernon, IN 47620 Phone: 812-985-4023 Fax: 812-985-9983 <input checked="" type="checkbox"/>	Green Plains Obion LLC. 2098 McDonald Rd., Rives, TN 38253/P.O. Box 95, Obion, TN 38240 Phone: 731-536-1286 Fax: 731-536-1434 <input checked="" type="checkbox"/>	Green Plains Ord LLC. 48267 Val-E Road, Ord, NE 68862 Phone: 308-496-4823 Fax: 308-496-4890 <input checked="" type="checkbox"/>	Green Plains Otter Tail LLC. 24096 170th Ave., Fergus Falls, MN 56537 Phone: 218-998-4301 Fax: 218-998-4302 <input checked="" type="checkbox"/>	Green Plains Shenandoah LLC. 4124 Airport Rd., Shenandoah, IA 51601 Phone: 712-246-2932 Fax: 712-246-3988 <input checked="" type="checkbox"/>
Green Plains Superior LLC. 1495 320th Ave, Superior, IA 51363 Phone: 712-858-4666 Fax: 712-858-4684 <input checked="" type="checkbox"/>	Green Plains Wood River LLC. 7874 South 140th Road, Wood River, NE 68883 Phone: 308-385-1200 Fax: 308-385-9990 <input checked="" type="checkbox"/>	Green Plains York LLC 1414 County Rd O York, NE 68467 Phone: 402-362-2285 Fax: 402-362-7041 <input checked="" type="checkbox"/>		
Green Plains Grain Company LLC. Archer 2132 Archer Road Archer, NE 68816 Phone: 308-795-2211 <input type="checkbox"/>	Green Plains Grain Company LLC. Cimarron 19016 Road I Kismet, KS 67859 Phone: 620-624-6296 Fax: 620-624-4411 <input type="checkbox"/>	Green Plains Grain Company LLC. Essex 411 North Street, Essex, IA 51638 Phone: 712-379-3155 Fax: 712-379-3175 <input type="checkbox"/>	Green Plains Grain Company LLC. Hopkins 200 N. Railroad Hopkins, MO 64461 Phone: 660-778-3331 Fax: 660-778-3676 <input type="checkbox"/>	<input type="checkbox"/>

CHEMTREC PHONE (24HR Emergency Telephone): 1-800-424-9300 (Within U.S.A)
INTERNATIONAL CHEMTREC CALL: 1-703-527-3887
OTHER CALLS: 1-402-884-8700 (M-F, 8 AM-5 PM, Central time (U.S.A & Canada); within U.S.A)
FAX PHONE: 1-402-884-8776 (M-F, 8 AM-5 PM, Central time (U.S.A & Canada); within U.S.A)

SECTION 1 NOTES: None Available

SECTION 2: HAZARDS IDENTIFICATION

GHS LABELING AND CLASSIFICATION: This product meets the definition of the following hazard classes as defined by the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

GHS CLASSIFICATION ACCORDING TO ANNEX II:

HEALTH	ENVIRONMENTAL	PHYSICAL
Serious eye damage/Eye irritation-mild irritation 2B Skin corrosion/irritation-Category 3 STOT SE-2	Not classified	Flammable liquid-Category 3
SIGNAL WORD:		WARNING






Green Plains

GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

SYMBOL:				
HAZARD STATEMENT:		Flammable liquid and vapor Cause eye irritation Cause mild skin irritation May cause damage to organs through prolonged or repeated exposure		
PRECAUTIONARY STATEMENTS:	PREVENTIVE:	P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking P233: Keep container tightly closed P235: Keep cool 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 P260: Do not breathe dust/fume/gas/mist/vapors/spray P264: Wash...thoroughly after handling P270: Do not eat, drink or smoke when using this product		
	RESPONSE:	P280: Wear protective gloves/protective clothing/eye protection/face protection P308+P311: IF exposed or concerned: Call a POISON CENTER/doctor/... P332+P313: If skin irritation occurs: Get medical advice/attention P337+P313: If eye irritation persists: Get medical advice/attention P370+P378: In case of fire: Use alcohol-resistant foam too extinguish		
	STORAGE:	P403+P235: Store in a well-ventilated place. Keep cool P405: Store locked up		
	DISPOSAL:	P501: Dispose of contents/containers should be in accordance with local, state and federal regulations		

Any Regional Considerations: N/A

SECTION 2 NOTES: None Available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME: Starch, Ethyl Alcohol, Water
COMMON NAME: N/A
CHEMICAL FAMILY: N/A
CHEMICAL FORMULA: Starch-(C₆H₁₀O₅)_n, Water-H₂O, Ethyl Alcohol-C₂H₆O
SYNONYMS: N/A

INGREDIENT: Corn Starch; Water; Ethyl Alcohol

NAME	CAS#	EC#	ICSC#	% WT	% VOL
Ethyl alcohol 200 proof	64-17-5	200-578-6	0044	0-15%	N/A
Corn starch	9005-25-8	232-679-6	1553	5-40%	N/A
Water	7732-18-5	231-791-2	N/A	About 100%	N/A

CARCINOGENICITY

OSHA: NOT APPLICABLE
 OTHER: N/A

ACGIH: NOT APPLICABLE

NTP: NOT APPLICABLE

IARC: NOT APPLICABLE

IMPURITIES/STABILIZING ADDITIVES IDENTIFICATION: N/A

IMPURITIES/STABILIZING ADDITIVES CLASSIFICATION (if applicable): N/A

SECTION 3 NOTES: None Available

SECTION 4: FIRST AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EMERGENCY OVERVIEW: Material is grain fermentation liquid with a slightly acidic pH and potential ethanol content. May cause dermatitis in sensitive individuals

ROUTES OF ENTRY/FIRST AID:



GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

EYES CONTACT: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower eyelids. Remove contact lenses if present. Do not use an eye ointment. Consult a physician if irritation persists

SKIN CONTACT: Wash contaminated area with soap and water. If irritation is present seek medical attention.

INHALATION: Remove victim to well ventilated area. In cases of inhalation of IDHL levels evacuate to safe location, loosen tight fitting clothing. If breathing is difficult administer oxygen. If victim is not breathing perform mouth to mouth resuscitation and seek medical attention

INGESTION: Not a hazard unless ingested in such quantities as to interfere with normal digestion

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: N/A

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: N/A

SECTION 4 NOTES: None Available

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Use appropriate extinguishing media for surrounding fire

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS: Respiratory and eye protection required. For indoor fires, full protective equipment and self-contained breathing apparatus in pressure demand mode should be used. For small fires SCBA may not be required

UNUSUAL FIRE AND EXPLOSION HAZARDS: N/A
(Define specific hazards arising from the chemical e.g., nature of any hazardous combustion products)

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon oxides including carbon monoxide and carbon dioxide. Possible aldehyde, fatty acid, and nitrogen or sulfur containing compounds

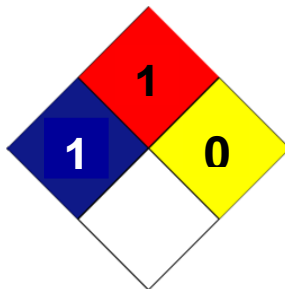
FLAMMABLE LIMITS IN AIR (% by volume):
UPPER LIMIT: Unknown
LOWER LIMIT: Unknown

FLASH POINT: Unknown
F:
C:

METHOD USED: N/A

AUTOIGNITION TEMPERATURE: Unknown
F:
C:

NFPA HAZARD CLASSIFICATION:



HEALTH=1
FLAMMABILITY=1
REACTIVITY=0
OTHER=N/A

HMIS HAZARD CLASSIFICATION (0-4 scale):

Mash	
HEALTH	1
FLAMMABILITY	1
PHYSICAL HAZARD	0
PERSONAL PROTECTION	C
Safety glasses, gloves, and synthetic apron	

SECTION 5 NOTES: None Available

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES: Mash could have very high temperature; wear appropriate Personal Protective Equipment



Green Plains

GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

ENVIRONMENTAL PRECAUTIONS: Keep it away from sewers and natural water bodies

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Isolate hazard and deny entry to unauthorized or unprotected personnel. Absorb spilled material using inert materials (sand). Containerize spilled waste and dispose of in accordance with regulatory requirements.

SECTION 6 NOTES: None Available

SECTION 7: HANDLING AND STORAGE

PRECAUTION FOR SAFE HANDLING: Wear appropriate PPEs; keep away from excessive heat

CONDITIONS FOR SAFE STORAGE (any incompatibilities): Keep containers closed, loosen closure cautiously before opening. Store in a cool, dry, well ventilated place away from oxidizing agents, acids, and caustics; Keep away from heat sparks and flame. Protect from direct sunlight

SECTION 7 NOTES: None Available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES: Ethyl alcohol, corn starch

INGREDIENTS	ACGIH	NIOSH	OSHA-FINAL PELs
Ethyl alcohol	1000 ppm TWA	1000 ppm TWA; 1900 mg/m ³ TWA 3300 ppm IDLH	1000 ppm TWA; 1900 mg/m ³ TWA
Corn starch	10 mg/m ³ TLV	10 mg/m ³ TWA; 5 mg/m ³ TWA Inhalation	15 mg/m ³ OSHA PEL; 5 mg/m ³ OSHA TWA

ENGINEERING CONTROLS: Provide exhaust ventilation or other engineering controls for odor. Eyewash station and safety shower should be available

VENTILATION: Provide exhaust ventilation

PERSONAL PROTECTIVE EQUIPMENT (PPE):

EYE PROTECTION: Avoid wearing contacts when working with this material. Splash resistant safety glasses sufficient

SKIN PROTECTION: Full body covering and gloves

RESPIRATORY PROTECTION: Wear Dust Respirator if significant amount of dust is present

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: N/A

SECTION 8 NOTES: If indoors, wash down all PPE prior to storage

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Thick yellow liquid with suspended solids

PHYSICAL STATE: Liquid

COLOR: yellow

ODOR: Characteristic fermentation odor, baker's yeast, alcohol

pH AS SUPPLIED: 3.5-6.0

pH (Other):

FREEZING POINT:

F: 32.0°F

C: 0°C

BOILING POINT:



Green Plains

GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

F: 212.0°F
C: 100.0°C

MELTING POINT: N/A
F: N/A
C: N/A

FLASH POINT: Unknown
F:
C:

EVAPORATION RATE (BASIS=1): Similar to water

FLAMMABILITY (by %volume): Unknown
UPPER FLAMMABILITY LIMIT:
LOWER FLAMMABILITY LIMIT:

VAPOR PRESSURE (mmHg): Unknown
@
F:
C:

VAPOR DENSITY (AIR = 1): Unknown
@
F:
C:

SOLUBILITY IN WATER: Miscible

PARTITION COEFFICIENT n-octanol/water: Unknown

AUTO-IGNITION TEMPERATURE: Unknown
F:
C:

DECOMPOSITION TEMPERATURE: Unknown
F:
C:

SPECIFIC GRAVITY (H₂O = 1): Undetermined
@
F:
C:

PERCENT SOLIDS BY WEIGHT: 0-40%

PERCENT VOLATILE: Varies by content
BY WT/BY VOL @
F:
C:

VOLATILE ORGANIC COMPOUNDS (VOC): Unknown
WITH WATER: LBS/GAL
WITHOUT WATER: LBS/GAL

MOLECULAR WEIGHT: Unknown

VISCOSITY: Unknown
@
F:
C:

SECTION 9 NOTES: None Available

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: If high concentration of alcohol is present, alcohol can react with oxidizers. (See 200 Proof Ethanol SDS for more information)



Green Plains

GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

STABILITY: Stable

CONDITIONS TO AVOID (STABILITY): N/A

POSSIBILITY OF HAZARDOUS REACTIONS: If high concentration of alcohol is present, it will have a number of hazardous reactions. (See 200 Proof Ethanol SDS for more information)

INCOMPATIBILITY MATERIAL: May be incompatible with strong acids, strong bases, and oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: N/A

SECTION 10 NOTES: None Available

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: Prolonged exposure to skin may cause dermatitis

ROUTES OF EXPOSURE: Dermal contact, eye contact, ingestion

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL AND TOXICOLOGICAL CHARACTERISTICS:

CONTACT WITH EYE: Liquid may cause eye irritation

CONTACT WITH SKIN: Liquid is lightly acidic, may cause allergic skin reaction, redness, itching, etc.

INHALATION: Inhalation hazard is minimal, mist from hot liquid may present an inhalation hazard

INGESTION: Material may be hazardous if ingested

DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT- AND LONG-TERM EXPOSURE:

ACUTE HEALTH HAZARDS: N/A

CHRONIC HEALTH HAZARDS: Prolonged or repeated skin contact may cause dermatitis

NUMERICAL MEASURES OF TOXICITY:

LD50/LC50: No data available

IRRITATION DATA: No data available

CARCINOGENICITY: No data available

EPIDEMIOLOGY: No data available

TERATOGENICITY: No data available

REPRODUCTIVE EFFECTS: No data available

NEUROTOXICITY: No data available

MUTAGENICITY: No data available

OTHER: No data available

SECTION 11 NOTES: None Available

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY (AQUATIC AND TERRESTRIAL, WHERE AVAILABLE):

Corn Starch: N/A

Ethanol, 200 Proof: Ecotoxicity: Fish: Rainbow trout: LC50 = 12900-15300 mg/L; 96 Hr; Flow-through @ 24-24.3°C Fish: Rainbow trout: LC50 = 11200 mg/L; 24 Hr; Fingerling (Unspecified) Bacteria: *Phytobacterium phosphoreum*: EC50 = 34900 mg/L; 5-30 min; Microtox test. When spilled on land it is apt to volatilize, biodegrade, and leach into the ground water, but no data on the rates of these processes could be found. Its fate in ground water is unknown. When released into water it will volatilize and probably biodegrade. It would not be expected to adsorb to sediment or bioconcentrate in fish.



GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

PERSISTENCE AND DEGRADABILITY: Biodegradable

BIOACCUMULATIVE POTENTIAL: No

MOBILITY IN SOIL: Expect to be mobile

OTHER ADVERSE EFFECTS: N/A

SECTION 12 NOTES: None Available

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: This material is not defined as hazardous under existing regulations

RCRA HAZARD CLASS: N/A

DESCRIPTION OF WASTE RESIDUES AND INFORMATION ON THEIR SAFE HANDLING AND METHODS OF DISPOSAL, INCLUDING ANY CONTAMINATED PACKAGING: N/A

SECTION 13 NOTES: None Available

SECTION 14: TRANSPORT INFORMATION

U.N. GHS TRANSPORT REQUIREMENT

UN NUMBER: N/A

PROPER SHIPPING NAME: Mash

TRANSPORT HAZARD CLASS: N/A

PACKING GROUP: N/A

LABEL STATEMENT: N/A

MARINE POLLUTANT: NO

SPECIAL PRECAUTIONS FOR USER: N/A

SECTION 14 NOTES: None Available

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TOXIC SUBSTANCE CONTROL ACT (TSCA): Starch, Ethanol are listed in TSCA Inventory

OCCUPATIONAL, SAFETY AND HEALTH ADMINISTRATION (OSHA): N/A

COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT (CERCLA): N/A

CLEAN WATER ACT (CWA): N/A

CLEAN AIR ACT (CAA): N/A

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III INFORMATION:

SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: N/A

SARA SECTION 311/312 (40 CFR 370) HAZARD CATEGORIES: N/A

SARA 313 REPORTABLE INGREDIENTS: N/A

STATE REGULATIONS:

Starch: regulated in the following states: Rhode Island RTK hazardous; Pennsylvania RTK; Minnesota; Massachusetts RTK; Tennessee

Ethanol: regulated in the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, and Massachusetts.

INTERNATIONAL REGULATIONS: N/A

SECTION 15 NOTES: None Available



Green Plains

GHS SAFETY DATA SHEET

MASH

SDS DATE: 04/17/2019

SECTION 16: OTHER INFORMATION

DISCLAIMER: The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability 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 Green Plains Inc. 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 Green Plains Inc. has been advised of the possibility of such damages.

REFERENCES:

GHS Annex II
GHS SDS Instruction

ACRONYMS/ABBREVIATIONS:

ACGIH-American Conference of Governmental Industrial Hygienists
CAA-Clean Air Act
CAS-Chemical Abstracts Service
CERCLA-Comprehensive Response Compensation and Liability Act
CHEMTREC-It serves as a round-the-clock resource for obtaining immediate response information for incidents involving hazardous material and dangerous goods.
CWA-Clean Water Act
EC-European Commission
GHS-Globally Harmonized System of Classification and Labeling of Chemicals
IARC-International Agency for the Research on Cancer
ICSC-International Chemical Safety Cards
LC50-The concentration of a chemical in air or of a chemical in water which causes the death of 50% of a group of test animals.
LD50-The amount of a chemical, given all at once, which causes the death of 50% of a group of test animals.
NIOSH-The National Institute for Occupational Safety and Health
NTP-National Toxicology Program
OSHA-Occupational Safety and Health Administration
RCRA-Resource Conservation and Recovery Act
RQ-Reportable Quantity
SARA-Superfund Amendments and Reauthorization Act
STOST-SE-Specific Target Organ Toxicity Single Exposure
TPQ-Threshold Planning Quantity
TSCA-Toxic Substance Control Act
U.N.-United Nation
UNCED-United Nations Conference on Environment and Development
VOL-Volume
WT-Weight