MATERIAL SAFETY DATA SHEET

Section 1: Company and Product Identification and Use	
PRODUCT NAME:	**Ethy-Gen® II Ripening Concentrate**
PRODUCT USE:	Fruit Ripening, Tobacco and Citrus Degreening in Commercial Ripening Rooms; For Industry Use Only.
MANUFACTURER:	Catalytic Generators, LLC 1185 Pineridge Road Norfolk, VA 23502-2095 U.S.A.
EMERGENCY TELEPHONE:	CHEMTREC: (800) 424-9300 (North America) or (703) 527-3887
PREPARED BY:	Catalytic Generators, LLC
TELEPHONE:	(757) 855-0191
PREPARATION DATE:	February 1, 2003

Section 2: Hazardous Ingredients				
Hazardous Ingredient	**%**	**CAS Number**	**LD_{50} of Ingredient**	**LC_{50} of Ingredient**
Ethanol	60 - 100	64-17-5	Rat (Oral) 7060 mg/kg	Rat (Inhalation) 20,000 ppm, 10 hour
Ethyl Acetate	1 – 5	141-78-6	Rat (Oral) 5620 mg/kg	Rat (Inhalation) 200 mg/l, 1 hour
Isopropyl Alcohol	1 - 5	67-63-0	Rat (Oral) 5045 mg/kg	Rat (Inhalation) 16,000 ppm, 8 hour

Section 3: Hazards Identification	
EMERGENCY OVERVIEW:	**Hazards**: Warning! Flammable Liquid. Can burn with little or no visible flame. May be irritating to the eyes and upper respiratory tract. May affect the central nervous system. **Appearance**: Clear / Transparent Liquid **Odor**: Fruity / Sweet 
Potential Health Effects	
ROUTES OF ENTRY:	Skin Contact / Eye Contact / Inhalation / Ingestion
EFFECTS OF ACUTE EXPOSURE TO PRODUCT:	May cause eye and upper respiratory tract irritation. Short-term overexposure above 1,000 ppm by the inhalation route may cause central nervous system (CNS) effects such as headache and irritation of eyes, nose and throat. If continued for more than an hour additional CNS effects may occur such as: dizziness, drowsiness, loss of appetite, and an inability to concentrate. Gastrointestinal (stomach) effects may occur with symptoms such as nausea and vomiting.
SKIN:	Defatting of the skin with irritation, dryness and cracking.

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EYE:	Eye exposure generally causes transient pain, irritation, and reflex lid closure. A foreignbody sensation may persist for one to two days. Vapors produce transient stinging and tearing, but no apparent adverse effects. Transiently impaired perception of color may occur with acute ingestion or chronic alcoholism.
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT:	Long-term exposure can cause loss of appetite, weight loss, nervousness, memory loss, mental retardation and liver damage. May cause dermatitis by defatting the skin from prolonged or repeated contact. Alcoholic beverages are carcinogenic to humans. Ethanol is a developmental toxin and various effects have been associated with ethanol intake. Examples of chronic ethanol abuse effects include physical dependence, malnutrition, amnesia, dementia, somnolence, cardiac myopathy, hepatotoxicity, GI bleeding and pancreatitis. Combined exposure to ethanol and certain other chemicals may result in increased toxic effects.

Section 4: First Aid Measures

INGESTION:	• **Call a poison control center or doctor immediately for treatment advice.** • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
INHALATION:	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
EYE CONTACT:	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
SKIN CONTACT:	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.

Section 5: Fire Fighting Measures

FLAMMABILITY:	Yes, under conditions of heat, sparks, open flames, contact with oxidizing materials.
MEANS OF EXTINCTION:	Alcohol foam, CO_2, dry chemical. Cool exposed containers with water. Water may be ineffective on fire.
FLASHPOINT AND METHOD:	13°C (55°F), Closed Cup
UPPER FLAMMABLE LIMIT:	14.0% by volume
LOWER FLAMMABLE LIMIT:	3.5% by volume
AUTOIGNITION TEMPERATURE:	363°C (685°F)
EXPLOSION DATA:	Insensitive to impact. Unlikely to accumulate a static charge. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area.

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HAZARDOUS COMBUSTION PRODUCTS:	Burning can produce Carbon Monoxide (CO; highly toxic if inhaled) and/or Carbon Dioxide (CO_2; in sufficient concentrations can act as an asphyxiant).		
NFPA:	Health: 1	Fire: 3	Reactivity: 0

Section 6: Accidental Release Measures

LEAK AND SPILL PROCEDURES:	Assure adequate ventilation in leak or spill area. Remove all sources of heat or ignition. Depending upon the nature and size of the release, responders may need to be HAZWOPER trained. Responders must be provided with appropriate respiratory protection and protective clothing. If necessary, use water spray or alcohol-resistant foam to reduce vapors. Contain and recover the liquid, where possible. Do not flush to sewer. Absorb liquid onto a compatible absorbent material; handle as a flammable material. Containerize spill cleanup residues to prevent release of vapors, prevent contact with heat, sparks, open flames, and oxidizing materials.

Section 7: Handling and Storage

HANDLING PROCEDURES:	Avoid contact with sparks, open flames, and oxidizing materials. Do not smoke while using this product. When transferring product from a metal container, ensure that container is grounded.
STORAGE PROCEDURES:	Protect container from physical damage. Store in a dry locked storage area at temperatures below 125° F (52° C). Do not contaminate water, food or feed by storage or disposal.
NOTE:	The ethylene generated by the use of this product is a simple asphyxiant and is flammable. The Lower Explosive Limit of ethylene is 2.7% (27,000 ppm).

Section 8: Exposure Control / Personal Protection

EXPOSURE LIMITS	Ethanol	Ethyl Acetate	Isopropyl Alcohol
OSHA PEL:	1,000 PPM	400 PPM	400 PPM
ACGIH TLV:	1,000 PPM	400 PPM	500 PPM
ENGINEERING CONTROLS:	Use in well ventilated area. When necessary, a system of local or general exhaust is recommended to keep employee exposures below allowable exposure limits. When transferring product from a metal container, ensure that container is grounded.		
PERSONAL PROTECTIVE EQUIPMENT:	**Protective Gloves:** Use chemical-resistant gloves such as rubber, neoprene or vinyl. Do not use PVA gloves. **Eye Protection:** Use chemical safety goggles. Provide and maintain eyewash in the work area. Do not wear contact lenses when working with this material. **Protective Clothing:** Wear long-sleeved shirt, long pants, socks and shoes. **Respiratory Protection:** Under normal conditions, the use of this product should not require respiratory protection. If allowable exposure limits are exceeded, a NIOSH/MSHA approved cartridge respirator can be worn up to the maximum use concentration specified by the respirator manufacturer. For atmospheres that are immediately dangerous to life and health (IDLH) or for unknown atmospheres, use only a self-contained breathing apparatus operating in an approved positive-pressure mode.		

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Section 9: Physical and Chemical Properties			
PHYSICAL STATE:	Liquid	**ODOR AND APPEARANCE:**	Clear with Fruity Odor
ODOR THRESHOLD:	N. Av.	**SPECIFIC GRAVITY:**	0.8 @ 15.5°C (60°F)
VAPOR DENSITY:	1.59	**VAPOR PRESSURE:**	44.6 mmHg @ 20°C (68°F)
EVAPORATION RATE:	1.7	**BOILING POINT:**	78.3°C (173°F)
pH:	N. App.	**FREEZING POINT:**	-114.1°C (-173.4°F)
COEFFICIENT OF WATER / OIL DISTRIBUTION:			-0.31

Section 10: Stability and Reactivity	
CHEMICAL STABILITY:	Yes
INCOMPATIBILITY WITH OTHER SUBSTANCES:	Yes, contact with acetyl chloride or other strong oxidizing agents may result in a violent reaction
REACTIVITY:	Does not react with air, water or other common materials
HAZARDOUS DECOMPOSITION PRODUCTS:	Not expected to decompose under normal conditions

Section 11: Toxicological Properties	
This product has not been tested for toxicological properties; however, the ingredients have.	
ETHANOL	
ROUTES OF ENTRY:	Skin Contact / Eye Contact / Inhalation / Ingestion
EFFECTS OF ACUTE EXPOSURE TO PRODUCT:	May cause eye and upper respiratory tract irritation. Short-term overexposure above 1,000 ppm by the inhalation route may cause central nervous system (CNS) effects such as headache and irritation of eyes, nose and throat. If continued for more than an hour additional CNS effects may occur such as: dizziness, drowsiness, loss of appetite, and an inability to concentrate.
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT:	Long-term exposure can also cause loss of appetite, weight loss, nervousness, memory loss, mental retardation and liver damage. May cause dermatitis by defatting the skin from prolonged or repeated contact. Alcoholic beverages are carcinogenic to humans. Ethanol is a developmental toxin and various effects have been associated with ethanol intake. Examples of chronic ethanol abuse effects include physical dependence, malnutrition, amnesia, dementia, somnolence, cardiac myopathy, hepatotoxicity, GI bleeding and pancreatitis. Combined exposure to ethanol and certain other chemicals may result in increased toxic effects.
EXPOSURE LIMITS:	OSHA PEL = 1000 PPM; ACGIH TLV = 1000 PPM
IRRITANCY:	Yes: Defatting of the skin with irritation, dryness and cracking. Eye exposure to Ethanol generally causes transient pain, irritation, and reflex lid closure. A foreignbody sensation may persist for one to two days. Vapors produce transient stinging and tearing, but no apparent adverse effects. Transiently impaired perception of color may occur with acute ingestion or chronic alcoholism.
SENSITIZATION:	Yes: weak skin sensitizing potential in a very small percentage of the population.
CARCINOGENICITY:	No: The American Conference of Governmental Industrial Hygienists (ACGIH) list ethyl alcohol as an A4 - Not classifiable as a Human Carcinogen. EPA review of available literature indicates that carcinogenic effects are not expected from the industrial uses of ethanol.

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REPRODUCTIVE TOXICITY:	No.
TERATOGENICITY:	Yes: Ethanol is generally recognized as a human developmental neurotoxicant (Rees *et al.* 1990). Jones and Smith (1973) and Jones *et al.* (1973) initially described Fetal Alcohol Syndrome that results from the effects of chronic maternal alcohol consumption on the fetus. The effects of this syndrome include altered prenatal growth and morphogenesis, characterized, in part, by severe growth retardation, mental retardation and microencephaly. Meyer and Riley (1986) extensively reviewed the behavioral teratology of alcohol and describe transient delays in development, such as age-dependent deficits in activity, delays in maturational indices (eye opening, incisor eruption), increased open field activity, and learning deficits. The effects listed here are generally associated with high (grams/day, oral) maternal consumption of ethanol. Given that OSHA has established the threshold limit value at 1000 ppm (10 hour, time weighted average), the human risk to ethanol exposure in an industrial environment appear to be minimal.
MUTAGENICITY:	Yes; 1 of 7 studies showed positive results (EPA Genetox Program, 1988, Rodent dominate lethal); 6 of 7 tests were negative.
SYNERGISTIC PRODUCTS:	Yes: Carbon Tetrachloride
ETHYL ACETATE	
ROUTES OF ENTRY:	Skin Contact / Eye Contact / Inhalation / Ingestion
EFFECTS OF ACUTE EXPOSURE TO PRODUCT:	**Skin:** Prolonged or repeated contact may dry skin and cause irritation. Symptoms of exposure may include: Drying, cracking or inflammation of skin. **Eyes:** Exposure to vapors and liquid May cause eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision. **Inhalation:** May cause respiratory tract irritation. Symptoms of exposure may include: Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty. Nausea, headache and/or dizziness. **Ingestion:** Symptoms of exposure may include: Central nervous system depression with nausea, headache and mental sluggishness.
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT:	Defatting and dermatitis of skin; central nervous system depression; allergic skin reaction.
EXPOSURE LIMITS:	OSHA PEL = 400 PPM; ACGIH TLV = 400 PPM
IRRITANCY:	Irritating to eyes and respiratory passages at concentrations above 400 ppm.
SENSITIZATION:	Not Available
CARCINOGENICITY:	Not Available
REPRODUCTIVE TOXICITY:	Not Available
TERATOGENICITY:	Not Available
MUTAGENICITY:	**In Vitro:** Results were unclear. Ethyl acetate was negative in two Ames tests with Salmonella typhimurium and in a recombination assay with Bacillus subtilis. In the Sister Chromatid Exchange (SCE) assay with Chinese hamster ovary (CHO) cells, it was positive with activation and negative without activation. In five separate tests for aneuploidy with Saccharomyces cerevisiae, it was positive four times. It was negative for chromosomal aberrations in CHO cells, but positive in Chinese hamster lung fibroblasts. **In Vivo:** Not Mutagenic: Ethyl acetate was negative in three separate

	micronucleus assays - mouse (i.p.), Chinese hamster (i.p.), and Chinese hamster (gavage).
SYNERGISTIC PRODUCTS:	Not Available
ISOPROPYL ALCOHOL	
ROUTES OF ENTRY:	Skin Contact / Eye Contact / Inhalation / Ingestion
EFFECTS OF ACUTE EXPOSURE TO PRODUCT:	The substance irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system, possibly resulting in depression, nausea, headache, dizziness, unconsciousness and coma. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. Ingestion may cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage.
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT:	Prolonged or repeated skin contact may cause defatting of the skin and dermatitis.
EXPOSURE LIMITS:	OSHA PEL = 400 PPM; ACGIH TLV = 500 PPM
IRRITANCY:	**Eye:** Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause transient corneal injury. **Skin**: May cause irritation with pain and stinging, especially if the skin is abraded. Isopropanol has a low potential to cause allergic skin reactions; however, rare cases of allergic contact dermatitis have been reported. May be absorbed through intact skin. Dermal absorption has been considered toxicologically insignificant.
SENSITIZATION:	No
CARCINOGENICITY:	No
REPRODUCTIVE TOXICITY:	No
TERATOGENICITY:	Limited information is available on the reproductive toxicity of isopropyl alcohol. In the rat, high maternally-toxic inhalation exposures were associated with reduced fetal weight and increased skeletal and visceral malformations
MUTAGENICITY:	No
SYNERGISTIC PRODUCTS:	Yes: Carbon Tetrachloride

Section 12: Ecological Information

This product has not been tested for ecological impact; however, the ingredients have.

AQUATIC TOXICITY:	**Ethanol:** Ethanol has been shown to be practically non-toxic in tests. LC50 Rainbow Trout (Salmo gairdneri): 13,000 ppm. LC50 Fathead Minnow (Pimephales promelas): 14,200 ppm. **Ethyl Acetate:** Ethyl acetate exhibits low acute toxicity to aquatic organisms. Fish (Salmo gairdneri) 96-hr. LC50 = 230 ppm. Fish (Pimephales promelas) 96-hr. LC50 = 230 ppm. Crustacean (Daphnia magna) 48-hr. EC50 = 717 ppm. Mollusc (Lymnea stagnalis) 48-hr. EC50 = 1100 ppm. **Isopropyl Alcohol:** Isopropyl alcohol has been shown to be practically non-toxic in tests. LC50 Fathead Minnow (Pimephales promelas): 6,550 ppm. EC50 Daphnia: 2,280 ppm.

ENVIRONMENTAL FATE:	**Ethanol:** ***Degradation:*** When spilled on land, ethyl alcohol is apt to volatilize, biodegrade, and/or leach into the groundwater. It is anticipated, based on its physical properties, that water will serve as the terminal media. Based on these factors, it is anticipated that ethyl alcohol will neither absorb to soil nor bioconcentrate in aquatic organisms. Once in water, photolysis, hydrolysis, and biodegration is anticipated to occur. ***Bioaccumulation:*** Not expected to occur. **Ethyl Acetate:** ***Degradation:*** Ethyl acetate was "readily biodegradable" when tested according to OECD Guideline 301D, Ready Biodegradability: Closed Bottle Test and had "100% degradation" when tested according to OECD Guideline 303A, "Simulation Test - Aerobic Sewage Treatment: Coupled Unit Test. Similar results were noted in numerous (at least 10) other tests for aerobic biodegradation. The BOD5/COD ratio was 0.81 when tested under aerobic conditions. A single test under anaerobic conditions indicated 100% degradation after 4 days. These data indicate that substantial biodegradation of ethyl acetate takes place rapidly under a variety of conditions. ***Bioaccumulation:*** Low potential to occur. **Isopropyl Alcohol:** Relatively biodegradable

Section 13: Disposal Considerations

WASTE DISPOSAL:	All packaging, labeling, transporting and disposal of recovered material should be performed in accordance with federal, state, and local laws and regulations.

Section 14: Transportation Information

SPECIAL SHIPPING INFORMATION:	Proper Shipping Name:	FLAMMABLE LIQUID N.O.S. (CONTAINS ISOPROPYL ALCOHOL AND ETHANOL)
	DOT Class Hazard:	3
	UN ID:	UN1993
	Packing Group:	PGII
	Labels:	Flammable Liquid
	Marine Pollutant:	No

Section 15: Regulatory Information

WHMIS:	Class B / 2; Class D / 2 / B
OSHA:	Hazardous chemical
TSCA:	Listed
SARA 313:	Not listed
SARA 311 and 312:	Fire hazard and acute health hazard
TSCA:	Listed
CALIFORNIA PROP. 65:	Ethanol causes developmental toxicity (when in alcoholic beverages)
STATE:	Ingredients are found in following state right-to-know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
CERCLA:	Not listed

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Section 16: Other Information

All statements, technical information and recommendations on this MSDS are believed to be accurate and were obtained from sources currently available to us that we believe to be reliable. We make no warranty, express or implied, with respect to this information, since we have no control over the conditions or methods of handling, storage, use or disposal of this product. Also, the accuracy or completeness of the information is not guaranteed. Users should make their own investigations to determine the suitability of the information for their particular purposes and should know and comply with all applicable rules, regulations and laws relating to this product.

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