# The Green movement and Natural Pesticides

# Univar USA Professional Products and Services

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The term "green" has become a trendy catchword, and is used with respect to pest control and pest control chemicals and equipment. This term does not appear to have specific regulatory boundaries, and many private enterprises are using it to push their products or agendas. Websites exist from numerous anti-pesticide organizations – NCAP, NCAMP, NRDC, etc. – with their own definitions of just what "green" pest management entails.

"Green Buildings" and workplaces are being encouraged by government and activist organizations. A workplace may become a "LEED Certified Green Building" by following protocol established by the U.S. Green Building Council, under their LEED Green Building Rating System. The emphasis with this "certification" is on energy efficiency, optimal use of materials, renewable energy sources, recycling and use of recycled products, water conservation, and minimizing workplace health hazards such as molds, radon, pesticides, and insect and rodent presence.

This certification does not appear to be specific with respect to allowable pesticides. Thus, other resources must be sought that define what pest control products will fit into a green pest management program.

Many individuals and groups advocate the use of "natural" pesticides, and insinuate that since they are found in Nature, and are not synthetically produced, they are therefore safer to use. While many natural products, such as inorganic minerals (boric acid, limestone, diatomaceous earth) or botanicals (pyrethrum, limonene, and many others) may be of a low order of toxicity, this cannot be assumed as a generality for their groups. For example, strychnine and nicotine are both plant-derived, and yet are highly toxic. Methyl bromide and aluminum phosphide also are derived from natural products, but are Category 1, highly toxic pesticides as fumigants. A great many other natural plant oils that are used for pest management are also known to have caused serious illnesses when misused, particularly at a dose higher than needed or allowed.

As a University article stated = "Organisms cannot differentiate between "natural" and "synthetic" chemicals. It is the mode of action, not the source, that is the concern." Numerous university websites will clearly state that just because a substance is "natural", one <u>cannot</u> assume it therefore is without risk. Many natural pesticides may fit into a program of Green Pest Management, but synthetic pesticides may as well.

# **Green Pest Management:**

IT IS NOT ABOUT PESTICIDES. It is about the overall approach to pest management in a manner that reduces the impact on the environment. Please note that there is NO "Green List" of pesticides offered in this resource – only a list of trade names of Natural pesticides. Not all Natural pesticides necessarily fit into Green pest management. It is the manner in which the product is applied that is of importance, and products such as enclosed insect bait stations may be labeled as "green" even though the active ingredient is synthetic.

"Green Pest Management" awaits a specific definition, and pest control industry leaders may be working to achieve this. From the opinions of many pest management professionals there are clear similarities between "Green" pest management and "Integrated" pest management. In the overall goal of reducing any negative impact on the environment, while still managing pest problems that affect our customers, we must emphasize:

- Proper identification of the pest and understanding its biology and habits
- Habitat modification to remove conditions conducive to the pest presence
- Exclusion to prevent entry to structures
- Inspection and monitoring to verify the presence of the pest
- The use of non-chemical control measures where appropriate and effective
- The use of the least hazardous chemicals where appropriate and effective

Green Pest Management should also evaluate every other aspect of the business in the goal of lowering any negative impact on the environment. This includes efficient use of vehicles to reduce gas usage, recycling of all containers and other waste products if possible, good building maintenance for efficient energy use, and other areas not directly related to the control of pests.

# School IPM and Pesticide Use on School Properties:

An increasing emphasis is placed on the use of IPM and "minimum risk" and "reduced risk" pest control materials when performing pest management around children. For this area the use of green pest management or natural pesticides is encouraged, but IPM also involves a great variety of non-pesticide approaches to pest management – physical trapping, environmental changes, exclusion. However, the use of natural pesticides may be nicely tied to the topic of School Pesticide Use.

The California Department of Education offers guidelines on "green" with respect to school environments, and of note are two of their definitions on Harmful Substances within schools, which include:

- VOC's Volatile Organic Compounds including cleaning solvents, pesticides
- <u>Insect, animal, and bird infestations</u> contributing their waste products and allergens the health risk aspect of these pest-related issues is recognized to be potentially harmful to students, and pest management is encouraged for school buildings to be considered Green.

Exactly what pesticides may be used in a Certified Green building is difficult to determine. Texas A&M University offers their "Green List" of pesticides with respect to school use and School IPM for the state of Texas.

#### **IMPORTANT:**

The following list of products is NOT to be interpreted as a list of "green pesticides" for use in Green Pest Management. This list is only that provided by Texas A&M for use on school properties in the state of Texas for compliance with their School IPM and School Pesticide Use regulations. It is provided as an example only:

- Botanical pesticides those derived from plants
  - o Pyrethrins (pyrethrum)
  - Eugenol (clove oil)
  - D-limonene, Linalool

- Azadirachtin (Neem oil)
- o Many other new botanicals likely also fit this category
- Microbial agents microbes
  - Bacillus thuringiensis
  - Spinosad derived from fermentation of natural organism
  - o Avermectin, Abamectin (microbe-based)
  - Steinernema (nematodes)
- Pheromones primarily used in traps and insect monitors
- Biological agents parasites and predators
- Soaps insecticidal and herbicidal soaps
- Insect growth regulators
  - o Fenoxycarb Logic, Award
  - Halofenozide Mach 2
  - Hydroprene Gentrol
  - Methoprene Precor, Altosid
  - o Pyriproxifen Distance, Nylar, Archer
  - Tebufenozide Confirm
- Inorganic pesticides generally mineral in nature:
  - o Boric acid and borates (disodium octaborate tetrahydrate, sodium tetraborate)
  - o Silica gel
  - Diatomaceous Earth
  - o Limestone (NIC Pro) discontinued
  - Sulfur, sulfur compounds, bordeaux mixture
  - Petroleum oil derivatives dormant and horticultural oils
- Insect and rodent baits in tamper-resistant stations or containers, or when used only in crack and crevice treatments:
  - Avermectin Avert roach stations
  - Fipronil Maxforce stations
  - o Boric acid the active ingredient in many insect bait products
  - Hexaflumeron Recruit termite bait
  - o Hydramethylnon Maxforce, Amdro, Siege, Probait, Matrix
  - o Imidacloprid Pre-Empt
  - Nithiazine Quikstrike fly bait strips
  - o Sulfluramid Firstline Termit Bait, Fluorquard, Advance Dual Choice Ant Stations

## Other general categories include:

• Glue Trapping Products

So, with this preamble to the topic of Green Pest Management and Natural Pesticides, we will offer a complete listing of products supplied by Univar USA that may be considered to be <u>Natural</u>.

#### CAUTION!! -

Do not assume that a "Natural" pesticide is therefore also "Organic".

Do not assume that a "Natural" pesticide must also be considered as "Green" – THERE IS NO LISTING OF "GREEN PESTICIDES"

Recognize that Natural products may also have synthetic ingredients in their formulations

Do not assume that "Natural" pesticides are inherently less toxic than synthetic pesticides.

## **Natural Pesticides**

(Note please! – this is <u>not</u> a list of Green pesticides):

A list of pesticide active ingredients and trade names which are derived from natural sources includes the following:

Inorganic materials – usually of mineral origin:

- Boric Acid and Borates derived from borax, a mineral in the soil "boric acid" and "orthoboric acid" are
  essentially the same thing, with Orthoboric acid the proper name. "Borates" are the same as "borax",
  containing sodium, boron, and oxygen. "Boric Acid / Orthoboric Acid" is the more refined crystalline material
  derived from the Borate / Borax. In all of its forms it acts only as a stomach poison, causing disruption of
  proper digestion of food and the insect starves to death.
  - o Boric Acid 1
  - Orthoboric Acid 2
  - o Pentahydrate Borax 3
  - Sodium Tetraborate Decahydrate (borax) 4
  - Disodium Octaborate Tetrahydrate 5
    - Dust products
      - Borid (2)
      - Borid Turbo (2)
      - Boric Acid Insecticidal Dust Eaton (1)
      - BorActin Insecticide Powder (2)
      - Perma-Dust PT-240 (1)
      - Mop-Up (2)
      - Mop-Up WSP (2)
      - Boracide Borate Powder (3)
      - Nibor-D use as dust, liquid, or mop solution (5)
      - Borrada D soluble powder / dry dust formulation (5)
      - Armor Guard dust formulation (5)
      - Victor Roach Powder (2)
    - Insect Bait products
      - Granular
        - Niban FG granular (1)
        - o Niban granular (1)
        - o Intice Coarse Granular Bait (2)
        - o Intice Fine Granular Bait (2)
        - o Intice Select Ant Granules (2)
        - o Intice 10 Perimeter Bait (2)
        - MotherEarth Granular Scatter Bait (1)
      - Liquid/Syrup
        - Terro PCO liquid (4)
        - o Drax Liquidator Indoor (2)
        - o Drax Liquidator Outdoor (2)
        - o Intice Thiquid Ant Bait (4)
        - o Gourmet Ant Bait Liquid (5)
        - o Uncle Albert's Super Smart Ant Bait (5)

- PT381B Advance Liquid Ant Bait (4)
- Gel / Paste / Pressurized
  - o 388B Advance Ant Gel Bait (4)
  - Attrax Roach Bait Dual Syringe (2)
  - Ant Fix Ant Gel Bait (2)
  - o Ant-X 75 (1)
  - o CB 441 Protein Paste Ant Bait (2)
  - o CB 441 Carbohydrate Gel Ant Bait (2)
  - o Drax Ant Kil Gel (2)
  - o Drax Ant Kil PF (2)
  - Drax Dual Syringe (2)
  - o Drax NutraBait PBS pressurized (2)
  - o Drax Roach Gel (2)
  - o Gourmet Ant Bait Gel (5)
  - o Intice Sweet Ant Gel (2)
  - o Intice Smart Ant Gel (4)
  - o Intice Roach Bait (2)
  - Ants-No-More Ant Bait Gel (1)
  - o Uncle Albert's Super Ant Bait (5)
- Stations
- Borates for wood applications Disodium Octaborate Tetrahydrate
  - Bora Care liquid concentrate Nisus
  - BoraSol Liquid liquid concentrate J. F. Oakes
  - Bor-Ram Insecticide, Termiticide, Fungicide liquid concentrate Sostram
  - Tim-Bor soluble powder concentrate Nisus
  - Borrada LP soluble powder concentrate Control Solutions
  - Impel rods solid borate rods Wood Products
  - Jecta Diffusible Boracide RTU gel formulation Nisus
- Limestone powdered form acts as a desiccant
  - o NIC-Pro removed from market in 2007
- Silica Gel / Amorphous Silica Gel derived from quartz sand acts as a desiccant
  - o Tri-Die bulk dust with pyrethrins + PBO WMMG
  - o Tri-Die pressurized aerosol PT-230 with pyrethrins + PBO WMMG
  - o Drione with pyrethrins + PBO Bayer
  - o Dri-Die discontinued
  - Eaton's K.I.O. System discontinued
  - Diatect II dust with pyrethrins + PBO
  - Diatect III dust with pyrethrins + PBO
  - Diatect V dust with pyrethrins
- Diatomaceous Earth byproduct of skeletons of oceanic diatoms, mined from soil deposits.
  - Dust products:
    - Insecto saltwater derived DE
    - MotherEarth D from Whitmire-Microgen 8 oz and 10 lb freshwater derived DE
    - Concern DE from Woodstream
  - o Granules:

- MotherEarth Exempt Granules 25 lb freshwater derived DE
- Other miscellaneous minerals
  - o Earthcare Odor Remover Bags sodium aluminosilicate, a natural mineral
  - o Earthcare Odor Remover Granules sodium aluminosilicate, a natural mineral
  - o Earthcare Odor Remover Pouch sodium aluminosilicate, a natural mineral
  - o Clean Kill silver + citric acid surface disinfectant
  - o Sluggo Snail and Slug Bait iron phosphate
  - o Pentathlon LF manganese / zinc foliar fungicide
- Sulfur and Lime Sulfur
  - o Sulfur 6L
- Copper products
  - o Bordeaux Mixture combines copper sulfate + calcium hydroxide (lime)
  - Copper Count-N metallic copper
  - o Nautique Aquatic Herbicide copper carbonate
  - Kocide DF fixed coppers
  - o Kocide 2000 fixed coppers
- Oils, Soaps, Miscellaneous materials Petroleum Distillate, Mineral Oil, Paraffinic Oil, Soap (potassium salts of fatty acids)
  - o Mosquito Larvacide Oil mineral oil surface oil for mosquito control
  - o Saf-T-Side Spray Oil petroleum oil suffocating oil for plant pests
  - o Loveland 415 Oil mineral oil suffocating oil for plant pests
  - o Ultra-Fine Oil paraffinic oil (= kerosene) suffocating oil for plant pests
  - o Ultra-Pure Oil paraffinic oils (= kerosene) suffocating oil for plant pests
  - o Purespray Green paraffinic oils (= kerosene) suffocating oil for plant pests
  - o Damoil Dormant & Summer Spray Oil petroleum oil suffocating oil for plant pests
  - o Mineral Oil Sunpar 107 as diluent for vector fogging products
  - o M-Pede Concentrate soap (= Safer Soap) for use against plant pests
  - Havahart Deer & Rabbit Repellent putrescent whole egg solids

Microbial Products / Living Organisms – and products derived from living organisms:

- Insect Control
  - Aquabac 200G Bacillus thuringiensis israelensis bacteria known as b.t.i. vector control
  - B.T.I. Briquets b.t.i.
  - Mosquito Bits b.t.i.
  - Mosquito Dunks b.t.i.
  - Gnatrol b.t.i.
  - Teknar CG Granules b.t.i.
  - Teknar G Granules b.t.i.
  - Teknar HP-D Larvacide b.t.i.
  - Vectobac 12AS b.t.i.
  - Dipel Pro Bacillus thuringiensis plant pests
  - Millenium Steinernema carpocapsae nematodes ground dwelling insects
  - Avid abamectin or avermectin derived from soil fungus for plant pests
- Surface Cleaning / Organic Buildup Removal
  - BioMop liquid bacteria formulation for surface cleaning and removal of organic material

- Invade Bio-Cleaner microbial formulation + citrus oil + cleaners for surface cleaning
- Invade Bio Remediation concentrated microbial formulation for grease traps, drains
- Invade Bio Foam liquid formulation microbial with citrus oil
- Invade Bio Foam Hot Spot aerosol formulation microbial with citrus oil
- Invade Multi RTU liquid microbial + citrus oil + foaming agent + cleaners
- Invade Bio Bullet solid block concentrated microbial only grease traps
- Invade Bio Zap liquid spray microbes + citrus oil for organic odors and scum removal

#### Drain Cleaning

- DrainGel natural, non-pathogenic Bacillus spores
- DrainGel IBD natural, non-pathogenic Bacillus spores for "ice and beverage dispenser" drain lines
- DrainFoam microbial and enzymatic cleaner for drains, crevices, corners, etc.
- Vector Bio-5
- Invade Bio Foam Hot Spot aerosol formulation microbial with citrus oil
- Invade Bio Foam liquid formulation microbial with citrus oil
- Invade Bio Drain thickened gel formulation microbial with citrus oil
- Invade Bio Remediation concentrated microbial formulation for grease traps, drains
- Invade Multi RTU liquid microbial + citrus oil + foaming agent + cleaners
- Invade Bio-Cleaner microbial formulation + citrus oil + cleaners for surface cleaning
- MFP 2000 MicroFoam bacterial formulation
- Drain Force Drain Cleaning multi-strain bacteria formulation
- DF-5000 bacteria + free enzymes
- Bac-Azap live bacteria and enzyme formulation
- Bio-Gel bacteria with chlorine / ammonia formulation

#### Odor Control

- OdorPro Special natural, non-pathogenic Bacillus spores
- Earthcare odor removal products see Miscellaneous Minerals above
- Bac-Azap live bacteria and enzyme formulation
- Invade Bio Zap liquid spray formulation of microbes and citrus oil for organic odors
- o Insect Growth Regulators most of these are NOT natural products, but are synthetic mimics of naturally occurring products generally thought of as green and natural.
  - Methoprene a juvenile hormone mimic
    - Altosid 30-Day Briquets methoprene vector control
    - Altosid XR Briquets
    - Altosid XR Briquets Ingots
    - Altosid Liquid Larvacide SR-5
    - Altosid Liquid Larvacide SR-20
    - Altosid XR-G
    - Altosid Pellets
    - Altosid Pellets WSP
    - Altosid Pro-G IGR
    - PreStrike Mosquito Torpedos methoprene
    - o Extinguish Pro Fire Ant Bait methoprene
    - Extinguish Plus Fire Ant Bait methoprene, but also contains hydramethylnon (synthetic)
    - Petcor Flea Spray methoprene + pyrethrum + PBO synergist
    - o Precor IGR Concentrate methoprene
    - o Precor Plus Fogger methoprene, but also contains permethrin (synthetic)

- Precor 2000 Plus Premise Spray methoprene, but also contains permethrin and phenothrin (synthetics) and dual synergists PBO and MGK-264
- Hydroprene a juvenile hormone mimic
  - o Gentrol Aerosol hydroprene
  - o Gentrol IGR Concentrate
  - o Gentrol Point Source
- Pyriproxyfen (Nylar) a juvenile hormone mimic
  - o Flea Fix IGR
  - o IG Regulator
  - o Archer IGR
  - o Pyri-Shield EC
  - Nyguard IGR Concentrate
  - Nylar Carpet Spray
  - Distance Fire Ant Bait
  - Distance IGR
- Fenoxycarb a juvenile hormone mimic
  - Award Fire Ant Bait
  - Preclude TR Micro Total Release aerosol
- Cyromazine a chitin synthesis inhibitor
  - Larvadex
- Diflubenzuron a chitin synthesis inhibitor
  - Outpost Termite Bait
- Hexaflumeron a chitin synthesis inhibitor
  - o Recruit / Shatter termite bait

## Botanicals – plant byproducts:

- D-limonene / Linalool extracted from citrus
  - XT-2000 Termiticide for Drywood Termites d-limonene
  - Power Plant
  - Orange Guard d-limonene general insect control
  - Orange Guard Ornamental Plants Concentrate d-limonene
  - Pro-Citra DL d-limonene general insect control
  - Demize EC linalool flea control synergized with PBO
  - MotherEarth Wasp & Hornet Jet Spray limonene only
- Neem Oil / Azadirachtin extracted from the Neem fruit tree
  - Azatrol EC azadirachtin + liminoids
- Rotenone extracted from roots of tropical legumes
  - Prenfish Toxicant Prentox
- Sabadilla from seeds of the Sabadilla Lily a.i. is called Veratrine

- Mint Oil combinations
  - Victor Poison Free Ant & Roach aerosol
  - Victor Poison Free Ant Killer
  - Victor Poison Free Flying Insect Killer
  - Victor Poison Free Wasp & Hornet
- Castor Oil from seeds of castor bean plants
  - Mole Med mole repellent
  - Chase Granular Mole and Gopher repellent
  - Chase Liquid Mole and Gopher repellent
- Pyrethrum / Pyrethrins extracted from chrysanthemums by far the most common botanical active ingredient in insect control products.
  - Nearly all pyrethrum products are combined with either one or two synergists, which enhance the
    effectiveness of the pyrethrum. The most common synergist is Piperonyl butoxide (PBO, which is derived
    from sesame, but processing changes it sufficiently that it cannot be used in Organic programs.
  - Aerosols
    - Metered Aerosols
      - Clear Zone Metered Aerosol
      - o Clean Air Purge 1
      - o Clean Air Purge II
      - o Clean Air Purge III
    - Directed Spray Aerosols
      - o Clear Zone Farm Fly Spray
      - o Microcare Pressurized microencapsulated
      - P.I. Contact Insecticide
      - o 1600 X-Clude Timed Release
      - o PT-565 Plus XLO Formula 2
      - o PT-580P
      - o CB-38 Extra
      - o CB-40 Extra
      - o CB-80 Extra
      - o CB-123 Extra
      - Konk 1 Flying Insect Killer
      - o Konk BVT Flying Insect Killer
      - Konk Too Flying Insect Killer
      - Tri-Die Pressurized silica + pyrethrum with PBO
    - Total Release Aerosols
      - o Pro-Control T/R with Pyrethrin
      - o Pyrethrum T/R Micro Total Release
      - o PCO Fogger with Pyrethrins
  - Liquid Concentrates
    - o Emulsifiable Spray Concentrate 96 spray or ULV fog
    - ExciteR spray or ULV fog
    - o Fog & Mill Spray spray or ULV fog
    - Fogging Insecticide PF spray or ULV fog
    - o Kicker EC
    - Microcare CS microencapsulated

- Pyrenone Food Crop Spray spray or ULV fog
- Pyganic Pro spray or ULV fog the only pyrethrum liquid without Piperonyl butoxide
- Pyreth-It spray or ULV fog 6% pyrethrum + 60% PBO
- o Pyreth-It Formula 2 6% pyrethrum + 60% PBO
- Pyronyl 303 EC spray or ULV fog
- Pyronyl Crop Spray spray or ULV fog
- Pyronyl Oil Concentrate 525 spray or ULV fog
- o ULD HydroPy-300 oil based spray or ULV fog
- ULD HydroPy-300 CF water based spray or ULV fog
- Vampyre spray or ULV fog
- Liquid RTU's primarily for fogging
  - o ULD BP-50
  - o ULD BP-100
  - o ULD BP-300
  - o Pyrenone 50
  - o Pyrenone 100
  - o Pyrenone 25-5 PHI mosquito control
  - Pyrocide 100
  - o Pyrocide 300
  - o Pyrocide Concentrate 7369
  - Pyrocide Concentrate Aqueous 74404
  - Heartland Farm & Dairy Spray
  - Riptide Pyrethrin ULV
  - o Pyronyl UL-100
  - Jetstream Water-based Contact Insecticide + PBO + MGK-264
  - Shockwave Fogging Concentrate also contains Esfenvalerate + PBO + MGK-264
  - Eaton Kills Bedbugs directed spray bottle (NOT Eaton Kills Bedbugs II, which is a synthetic pyrethroid)
- Dusts
  - Drione combines pyrethrum + silica gel
  - Tri-Die bulk dust silica + pyrethrum dust with PBO
  - Tri-Die pressurized aerosol silica + pyrethrum dust with PBO
- Essential Tree Oils & Miscellaneous botanical oils "hexa-hydroxyl" is the proprietary name for a combination
  of tree oils in EcoSmart products seen on their label as 2-Phenethyl Propionate.

Their "exempt" product line is exempt from registration by EPA and is considered "minimum risk" status.

- Dust
  - EcoPCO D-X hexa-hydroxyl + pyrethrins
  - EcoExempt D hexa-hydroxyl + clove oil
- Granules
  - EcoExempt G clove oil + thyme oil
  - MotherEarth Exempt G 25 lb cedar oil + wintergreen oil
- Liquid Concentrates
  - EcoExempt IC2 hexa-hydroxyl + rosemary oil + peppermint oil
  - EcoExempt IC hexa-hydroxyl + rosemary oil
  - EcoExempt MC oils of rosemary, cinnamon, lemongrass
  - o EcoPCO EC-X

- EcoPCO EC hexa-hydroxyl + PBO synergist
- Organocide Insecticide/Fungicide sesame oil, edible fish oil, lecithin

## Wettable Powders

EcoPCO WP-X – hexa-hydroxyl + thyme oil + pyrethrins

#### Aerosols

- o EcoPCO AR-X hexa-hydroxyl + pyrethrins
- o EcoPCO ACU hexa-hydroxyl only
- EcoExempt Jet Wasp & Hornet hexa-hydroxyl + rosemary oil
- o EcoPCO Jet-X Wasp & Hornet hexa-hydroxyl + PBO synergist
- o EcoExempt KO hexa-hydroxyl + clove oil
- Bioganic Flying Insect Killer eugenol (clove oil) + sesame oil
- o Bioganic Crawling Insect Killer rosemary oil

#### Herbicides

- EcoExempt HC hexa-hydroxyl + clove oil
- o Matran EC clove oil

## Repellents

- o Ro-Pel Animal Repellent thyme oil, peppermint oil, white pepper
- o Critter Ridder Animal Repellent oil of black pepper, piperine, capsaicin
- Castor Oil from seeds of castor bean plants
  - Mole Med mole repellent
  - Chase Granular Mole and Gopher repellent
  - Chase Liquid Mole and Gopher repellent