




SAVING PETS' LIVES, 24 HOURS A DAY, 7 DAYS A WEEK

PET POISON HELPLINE



Nationwide®



Sniffing Out the Truth: Updates on the Safety of Essential Oils and Pets

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What is Pet Poison Helpline?

- **24/7 animal poison control center**
- **Veterinary & human expertise**
 - 20+ DVMs, 75+ CVTs
 - DABVT, DABT
 - DACVECC
 - DACVIM
 - 10 PharmDs
 - 2 MDs
- **Case fee of \$59 includes**
 - Unlimited consultation
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 - Free webinars (archived)
 - Tox tools
 - Wheel of Vomit
 - Pot of Poisons (toxic plants)
 - Textbook
 - iPhone app
 - Newsletters for vet professionals
 - Free resources for clinics
 - Videos
 - Electronic material
 - Clings

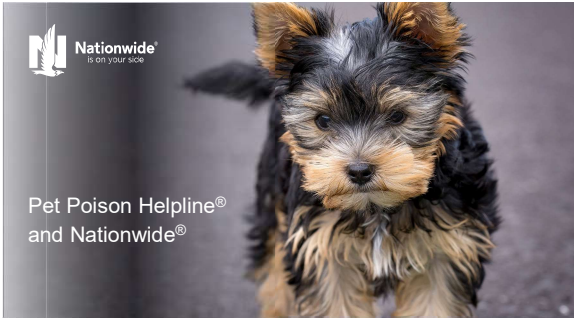
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Nationwide
is on your side

**Pet Poison Helpline®
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**Shared mission in highlighting
the importance of preparing
for accidents and poisonings in
small animals**

Addressing the cost of veterinary care:
Nationwide® covers the \$59 Pet Poison Helpline® fee when an insured pet is brought in to your hospital for care.

Enabling best medicine:
Pet owners with Nationwide® spend twice as much on their pets than those without pet insurance.

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Complete confidence


- More than 35 years of experience protecting pets
- Pet insurance that offers more coverage than any other pet plan
- Pet insurance plans for every pet and every budget

Coverage includes:

- Accidents and injuries
- Chronic conditions
- Procedures and surgeries
- Common illnesses
- Hereditary conditions
- Holistic and alternative medicines
- Serious illnesses
- Diagnostics and imaging
- Wellness visits

Additional member perks

- 24/7 pet poison helpline
- Emergency medical care
- Prescription drug discounts
- Wellness and preventative care



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Sniffing Out the Truth: Updates on the Safety of Essential Oils and Pets

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What are essential oils?

- **Concentrated** volatile oils distilled or extracted from plants that give plants their characteristic fragrance
 - >3000 essential oils are currently known
 - ~300 are commonly used
 - Fixed oils are non-volatile oils such as olive oil or coconut oil



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We Think of These As Essential Oils...

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...But These Are Essential Oil Products, Too

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Essential Oil Characteristics

- Small, lipophilic molecules
- Readily absorbed systemically across skin, lungs, and GIT
- Most can cross BBB
- Contain mixed hydrocarbons, usually terpenes
 - Contain 20-200 different chemical components in varying concentrations


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Essential Oil Kinetics

- Most are metabolized by the liver via glucuronidation
 - Terpenes undergo metabolism via cytochrome P450 enzymes
 - Often enterohepatic recirculation
- Elimination
 - Mostly via lungs and kidneys
 - Minor fecal elimination



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EO Constituents and Chemotypes

100% Chemical-Free*

*Except for all of the atoms and molecules that make up the matter you interact with every day. So, actually quite a lot of chemicals, really.

Lavandula sp.

Linalool
Linalyl acetate
Camphor

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Chemotype

- Chemotype: plants within a genus that may be identical in appearance, but their essential oil constituents may be markedly different
 - Chemotype can affect toxicity
 - Genetically determined but can be affected by growth conditions, environment, harvesting time
- Sometimes harmful compounds will be removed from the oil during processing


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Exposure Risk Factors

- Higher risk with concentrated oils vs dilute or low concentration oils/products
- Route of exposure
 - Oral > dermal > inhalation
 - Often a combination
- Dose
- Acute vs chronic use
- Injured and/or inflamed skin can enhance dermal absorption




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Species and Individual Sensitivities

- Cats
 - Glucuronidation deficiency affects liver metabolism of essential oils
- Birds
- Health factors
 - Feline asthma, liver disease
- Pediatrics, geriatrics
- Pregnancy and lactation
- Individual sensitivities
 - Allergic hypersensitivities
 - Idiosyncratic sensitivities



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Product and Ingredient Issues

- No regulatory control for quality and safety
 - EO based flea products are not EPA regulated
 - FDA generally considers EOs as cosmetics
 - Some EO home products (air fresheners, laundry products, etc.) managed by Consumer Product Safety Commission
- Specific ingredients, concentrations, safety may be unknown

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Product and Ingredient Issues

- Plants and their extracts are not standardized
 - Variability in cultivars and chemotypes, part of plant used, growth conditions, geography, maturity, time when harvested
 - Which is the active chemical component? Which components are beneficial, which are harmful? Are they synergistic?
- Potential for plant name or ID confusion
- Potential for adulteration
 - Other plants, herbicides, pesticides
 - Other oils or carriers may be added but not declared

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Other Factors

- Lack of published research and testing in veterinary medicine
 - Extrapolations from human, rodent, and in vitro testing
 - Sporadic case reports may not provide an accurate clinical picture
- Drug interactions are possible
 - Some essential oils can affect cytochrome P450 enzyme activity and can affect metabolism and efficacy of other drugs


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Watch Out for Red Herrings!

- Cat exposed to Vicks Vaporub and developed lethargy, tachypnea to dyspnea, drooling – later dx with cardiomyopathy and pulmonary edema
- Dog vs neem oil topically developed azotemia – later determined to have an earlier grape ingestion
- Multiple kittens diagnosed with FIP/other viral diseases
- Multiple marijuana/THC cases
- Dog licked EO cuticle oil off owner's foot mydriatic, hypersalivating, ataxic, and somnolent – later found to have ingested alprazolam



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Potential General EO Adverse Effects

<ul style="list-style-type: none"> • GI <ul style="list-style-type: none"> – Salivation, vomiting, diarrhea, anorexia • CNS <ul style="list-style-type: none"> – Lethargy, hiding – Weakness, ataxia – Tremors, seizures • Cardiovascular <ul style="list-style-type: none"> – Hypotension – Tachycardia, bradycardia • Hypo- or hyperthermia 	<ul style="list-style-type: none"> • Respiratory <ul style="list-style-type: none"> – Coughing, sneezing, bronchospasm – Aspiration • Liver +/- renal injury • Reproductive effects • Dermal and mucous membrane injury <ul style="list-style-type: none"> – Direct irritation – Hypersensitivity reactions – Phototoxicity – Idiopathic reactions – Corrosive injury
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EOs and the GIT

- Taste reactions
- GI irritation – vomiting, diarrhea
- Aspiration risk with larger ingestions
- Mucous membrane irritation, erosions
 - Concentration dependent
 - Higher risk with oils that contain cinnamaldehyde (cinnamon, cassia), eugenol (clove, cinnamon), carvacrol (oregano, savory, thyme), thymol (thyme, oregano)



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Liquid Potpourri



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Liquid Potpourri

- Essential oils + **cationic detergents**
- Cats are most sensitive
- Cationic detergents cause corrosive injury to mucous membranes
- Signs usually develop within 4-6 hours but may take up to 12 hours to show full extent of injury

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Schildt JC, Beal MW, Jutkowitz LA. Potpourri oil toxicity in cats: 6 cases (2000-2007). JVECC 2008; 18(5):551-516.

Liquid Potpourri Signs

- Lethargy, hiding
- Hypersalivation
- Vomiting, gagging
- Anorexia
- Burns in mouth, on tongue, palate
- Tachypnea, coughing
- Fever

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Liquid Potpourri Treatment

- Bathe if dermal exposure
- Rinse mouth if recent
- Do NOT induce emesis
- AC contraindicated
- Fluids as needed for hydration

- GI protectants including sucralfate slurry
- Analgesia
- Soft diet +/- feeding tube
- +/- antibiotics
- +/- radiographs if respiratory signs


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Essential Oils and the Liver

- Injury can occur from the compound alone or metabolites
- Essential oils/compounds known to be hepatotoxic:
 - Pulegone: Pennyroyal (European, American, and Turkish), calamint, buchu
 - p-Cresol: Birch tar
 - Tea tree: cats>dogs
 - Cassia bark and cinnamon oil




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Essential Oils and the Liver

- Liver injury theorized to be caused by glutathione depletion
 - Known cause with pulegone (pennyroyal)
 - Highly suspected with p-Cresol (birch tar) and cassia bark oil
- Treat with NAC to replenish glutathione




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Essential Oils and Seizures

- Essential oils that can cause seizures (oral)
 - Hyssop oil (pinocamphone)
 - Thujone-containing oils: wormwood, sage, thuja
 - Pennyroyal oil (pulegone)
 - Eucalyptus oil
 - Wintergreen and birch (methyl salicylate)
- Thujone
 - Inhibits GABA-A receptor leading to CNS excitation and seizures




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Essential Oils and Renal System

- Renal effects are rare
- Potentially renal toxic oils (oral)
 - Wintergreen and birch (methyl salicylate)
 - Wormseed and wormwood oils
 - Birch tar oil (p-Cresol)




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Pennyroyal Oil



- *Mentha pulegium* – mint family
- Historically used as a flea/tick repellant, to give a mint flavor to foods, and to attempt to induce menstruation and abortion
- Pulegone the toxic component – 62-97%
– Metabolites are hepatotoxic - menthofuran

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Pennyroyal Oil Signs

- Lethargy, vomiting, weakness within 2 hours
- Hepatic necrosis
- Hemorrhage – DIC, secondary to liver failure
– GI, pulmonary and cardiac hemorrhages; epistaxis
- Seizures
- Deaths reported in humans and dogs (oral and dermal exposures)

Sudekum M, Poppenga RH, & Ralu N.
Pennyroyal oil toxicosis in a dog. JAVMA
1992; 200:617-618.


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Citrus Oils

- Lemon, lime, mandarin, orange, grapefruit, bergamot, neroli
- Limonene and linalool
- Insecticidal activity vs all life stages of fleas
- Many citrus oils are phototoxic but may be processed to remove phototoxic components



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Citrus Oil Signs

- GI signs, salivation, lethargy, hypothermia
- Potential for dermal irritation +/- phototoxicity
- Reports of more serious effects in cats with concentrated dermal exposures (shampoos, dips)
 - Tremors, weakness, ataxia, dermal lesions, recumbency, coma, deaths reported
 - Hypotension
 - Case report of toxic epidermal necrolysis, sepsis, and death in a cat – thought to be idiosyncratic


Lee JA, Budgin JB, Mauldin EA. Acute necrotizing dermatitis with septicemia following application of a d-limonene-based insecticidal shampoo in cat. J Am Vet Med Assoc 2002; 221(2):258-262.

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Wintergreen and Birch Oils

- Wintergreen is 98% methyl salicylate
- Birch oil is 90-98% methyl salicylate
- Typically used topically for muscle pain
- 1 teaspoon (5 ml) of pure wintergreen oil is equivalent to 21.7 tablets of 325 mg aspirin (7052.5 mgs of aspirin)



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Wintergreen and Birch Signs

- Vomiting +/- blood
- Lethargy
- Anorexia
- Tachypnea (panting)
- Hyperthermia
- Potential for liver, renal injury, bleeding, seizures, death with high doses




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Cinnamon and Cassia Oils

- Undiluted oil irritating to skin and mucous membranes
- Cats more sensitive
 - Oral irritation
 - Dermal redness and irritation
 - Paw/limb swelling
 - Lethargy, drooling, vomiting
 - May decrease glutathione activity – liver risk




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Eucalyptus Oil

- Contains eucalyptol (1,8-cineole), other terpenes
- Early nausea, vomiting
- CNS signs: depression, ataxia, drowsiness, tremors, seizures, coma
- Respiratory signs: pneumonitis, bronchospasm, pulmonary edema
- Urine and breath tend to smell of eucalyptus



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Lavender Oil

- Main constituents are linalool, linalyl acetate, 1,8-cineole, beta-ocimene, terpinen-4-ol and camphor
- Suspected to have endocrine disruptor effects in children
 - Prepubertal Gynecomastia Linked to Lavender and Tea Tree Oils, Henley et al, NEJM 2007
 - Ramsey JT, Li Y, Arafat Y, Naidu A, Coons LA, Diaz A, Korach KS. 2019. Lavender products associated with premature thelarche and prepubertal gynecomastia: case reports and EDC activities. J Clin Endocrinol Metab;

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Lavender Oil and Dogs

- Evaluation of the effect of topical application of lavender oil on autonomic nerve activity in dogs. Komiya et al, Am J Vet Res. 2009
 - Undiluted lavender oil applied to pinnae of 5 beagles, no AEs reported
 - Some evidence that topical application of lavender oil affected vagal activity in dogs (lower HR), though equivocal
- Aromatherapy for travel-induced excitement in dogs. Wells DL, JAVMA. 2006
 - Lavender-soaked cloths placed on car headrest, no AEs reported
 - More time resting and sitting and less time moving and vocalizing compared to control dogs


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Peppermint Oil

- Menthol 19-54%, menthone 8-31%, pulegone 0.3-4.7%
- Fairly wide margin of safety – mild GI or dermal irritation
- Massive doses may result in hepatotoxicity and seizures due to pulegone
- Avoid use in pregnancy




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EOs and Nose Work Dogs

- Birch, clove, or anise oil typically placed on scented swabs in an enclosed container for dogs to find

<https://www.akc.org/expert-advice/lifestyle/why-not-give-akc-scent-work-a-try/>



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Nose Work Essential Oils

- Aniseed (*Pimpinella anisum*)
 - May inhibit blood clotting, may affect BG, case report of seizures in a neonate
- Sweet Birch (*Betula lenta*)
 - 90.4% methyl salicylate
- Clove Bud (*Eugenia Caryophyllata* or *Syzygium Aromaticum*)
 - Case reports of acidosis, liver failure in children



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EOs and Nose Work Dogs

- Michigan State 2013 newsletter
- Will dogs search out and ingest the oils?
- Theoretical increased xylitol risk?

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General EO Treatment

- Asymptomatic animals with inhalation or minor dermal or taste/lick exposure
 - Fresh air
 - Bathe
 - Snack
 - Monitor closely and evaluate if signs
 - Mild signs (drooling, lethargy, sneezing) will often self-resolve

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Symptomatic/Large Exposures

- Do not induce emesis
- Activated charcoal
- Fluids
- GI support
- Hepatoprotectants
 - NAC 5%: 140 mg/kg to load, then 70 mg/kg q 6 h x 7-17 doses IV or PO
 - SAME
- Consider chest rads, blood gas if resp signs
- Lab work if a liver toxic oil, large and/or concentrated oil exposure, ill pet
- Anticonvulsants
- ILE?

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Essential Oil Safety Tips

- Prevent ingestion of oils – keep out of reach of pets and children!
- Do not apply concentrated oils to pets
- Avoid use of particularly toxic oils
- Ideally consult with a veterinarian who is knowledgeable about essential oils and pets, especially for pets with health concerns and/or medications

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EO Diffuser Safety Tips

- Ideally keep pets out of the room while diffusing
 - At least be sure pets have the option to leave the room if they choose
- Do not run the diffuser for prolonged periods – generally <30 min is recommended
- Do not diffuse in an enclosed space – ventilate
- Use a diffuser that uses dilute oils
- Do not let pets lick or directly access oils or diffusers
- Discontinue use if adverse effects are noted and seek DVM care

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Thank you!

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Top 100, Top 100, Top 100, Top 100, Top 100, Top 100

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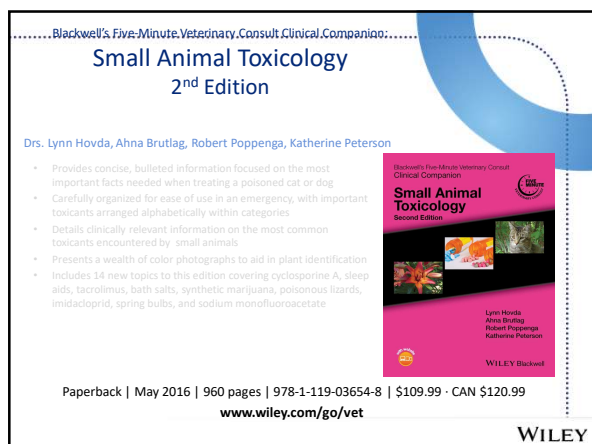
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Drs. Lynn Hovda, Ahna Brutlag, Robert Poppenga, Katherine Peterson

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2020 Webinars Announced

- **April 7th**
 - Warm Weather Toxins. A Short Review of Timely Woes.
- **June 2nd**
 - Hot Topic TBD
- **October 6th**
 - Worst of the Worst. Evaluating the Most Dangerous Toxins for Pets.
- **November 10th**
 - Hot Topic TBD



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- I attended the webinar but wasn't the person who logged in. Can I still get interactive CE credit?** Yes. Send your name and email address to info@petpoisonhelpline.com by **1pm central time on Feb. 5th, 2019** (strict deadline).
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