

# Household Items that Contain Explosive Compounds: A Guide for Explosive-Detecting Canine Handlers

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## INTRODUCTION

A common question posed by canine trainers and handlers centers on everyday materials to which explosive-detecting canines have alerted. The phenomenon of false alerts is not unheard of, and can arise due to improper recognition of a material by the canine. However, if an ordinary item is contaminated with explosives at a trace level, a correct alert may result. Thankfully, this type of alert is highly useful in the field and forms a cornerstone of the ATF approach for detecting hidden firearms, improvised explosive devices (IEDs) or other objects that have been in contact with explosives.

Another potential explanation for an alert to a legitimate household item is that explosive compounds are used in some household products. It is important for canine handlers to be aware of these products given that they may be encountered in the field and a canine alert to such material is, in fact, correct. Some examples of household products that contain explosive compounds were compiled from The Household Products Database of the National Library of Medicine, which is based on the Consumer Product Information Database (<http://householdproducts.nlm.nih.gov/index.htm>). This database compiles information from Material Safety Data Sheets (MSDS) such as chemical ingredients, their health effects, and product manufacturers. Additional websites were consulted for information on nitromethane-containing fuels for remote controlled vehicles (<http://www.rcplanet.com>) and DUCO cement (<http://www.devcon.com>).

A number of useful examples were found that have been encountered in the past and will undoubtedly be encountered in the future by explosive-detecting canines. Some of the examples are well known (e.g., ammonium nitrate is found in some fertilizers). Other examples were more surprising (e.g., some inkjet cartridges also contain ammonium nitrate; some brands of toothpaste contain potassium nitrate). These lists should not be considered to be exhaustive, however. For example, various pyrotechnic compositions are used to initiate air bags and seat belts in automobiles. These types of materials generally will not appear in lists related to consumer products.

It is important to note that deliberately training on these items is not recommended given that these products will contain numerous other ingredients to which a canine may become imprinted. Conversely, these products are not appropriate for use as distracters given that they do, in fact, contain compounds found in authentic explosive formulations. The compromise position adopted by the ATF is that if a handler recognizes that their canine has alerted to one of these items, the canine should be verbally praised. However, the canine does not receive a full food or play reward. Overall, it is important to be aware of these materials so that any canine alerts to these products can be placed in context.

## RESULTS

Table I lists the explosive compounds that were identified in various consumer products and the explosive formulations in which they are normally found.

TABLE I: Known explosive compounds that were identified in household items

CHEMICAL NAME	EXPLOSIVE FORMULATIONS
Ammonium Nitrate	ANFO, binaries, dynamite, emulsions/water gels
Calcium Chlorate	*
Calcium Nitrate	emulsions/water gels
Hydrogen Peroxide	improvised liquid explosives**
Methyl Nitrate	rocket fuel
Nitrocellulose	smokeless powder, gelatin dynamite, flexible sheet explosive
Nitroethane	binaries
Nitromethane	binaries
Potassium Nitrate	black powder, Pyrodex, Triple Seven, pyrotechnics, fuse
Sodium Nitrate	emulsions/water gels

\* Calcium chlorate is not a known ingredient in explosive formulations. However, this compound is in the same chemical family as sodium chlorate and potassium chlorate, which are utilized in some pyrotechnic compositions and improvised explosive mixtures. It is therefore possible that a canine who is imprinted on sodium and/or potassium chlorate will alert to calcium chlorate.

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\*\* The ATF has successfully imprinted and certified numerous explosive-detecting canines on concentrated hydrogen peroxide. Unfortunately, the fact that lower levels of hydrogen peroxide have legitimate uses in a number of consumer products means that these items may illicit a canine alert. While this cannot be avoided, the context of a canine alert to products with hydrogen peroxide is crucial and can guide the subsequent actions of first responders.

In the tables that follow, products are categorized by their end use (in and around the home, landscaping/yard, or personal care). The explosive compounds they contain are listed and, when possible, classified as a major component (>10%), minor component (<10%) or trace component (<1%). In some cases, a number of similar products and brands contained the same ingredient, such as products containing ammonium nitrate or hydrogen peroxide. Readers are referred to the Household Products Database for detailed listings of those items.

## CONCLUSIONS

Explosive-detecting canines are called upon to find hidden explosives in a variety of environments. Unfortunately, explosive compounds are not only found in explosive formulations but in a number of legitimate consumer products. Given that a canine cannot discern this difference, it is up to the canine handler and other first responders to be aware of these products and put a canine alert in its proper context.

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TABLE II: Products used in and around the home

PRODUCT	FORM	EXPLOSIVE	LEVEL
2000 Flushes Automatic Bowl Cleaner	granules	calcium chlorate	minor
Cascade Rinse Aid with Hydrogen Peroxide	liquid	hydrogen peroxide	-
Clorox Dual Action Toilet Bowl Cleaner 1 Pt. 9 Fl. Oz. (Chambered Bottle)	liquid	hydrogen peroxide	minor (yellow chamber)
DAP Wood Dough, All Colors	paste	nitrocellulose	minor/major
Drano Crystal Clog Remover	powder	sodium nitrate	major
Drano Professional Strength Foamer	liquid	hydrogen peroxide	trace
DUCO Cement	liquid	nitrocellulose	major
Elmers Probond Woodfiller (all colors)	paste	nitrocellulose	minor
Evercoat Professional Liquid Hardener	liquid	hydrogen peroxide	trace/minor
FolkArt Finishes - Aerosol Sanding Sealer, 11 oz.	aerosol	nitrocellulose	minor
HP Inkjet Printing Ink Cartridges No. 28, 57, 95, 97 (cyan, magenta, yellow)	liquid	ammonium nitrate methyl nitrate	minor
Kilz UpShot Overhead Stain Sealer	aerosol	nitroethane	minor
Laundry Bleach (multiple brands and products)	liquid	hydrogen peroxide	minor
Laundry Detergent (multiple brands and products)	liquid	hydrogen peroxide	minor
Liquid Plumr Foaming Pipe Snake	liquid	hydrogen peroxide	trace
O'Donnell Racing Fuel (multiple products)	liquid	nitromethane	major
Revenge Rodent Smoke Bomb	solid	potassium nitrate	major
Shur Stik All-In-One Powdered Adhesive	powder	potassium nitrate	minor
Shur Stik Heavy Duty Clear Strippable Adhesive	paste	sodium nitrate	minor/major
Spot & Stain Removers (multiple brands and products)	liquid	hydrogen peroxide	minor
Traxxas Top Fuel (multiple products)	liquid	nitromethane	major
Trinity Monster Fuel (multiple products)	liquid	nitromethane	major
Water White Rubbed Effect Clear Lacquer (Professional)	aerosol	nitrocellulose	minor

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TABLE III: Landscaping/yard products

PRODUCT	FORM	EXPLOSIVE	LEVEL
Adjust Non-Phosphoric Acid Nutrient Buffer	liquid	potassium nitrate	minor
Customblen CRF Palm Fertilizer	coated prills	ammonium nitrate	-
Miracle Gro Excel 15-0-0 Cal-Lite	powder	calcium nitrate	-
Miracle Gro Fertilizer, Plant Food, Potting Soil (multiple products)	liquid, powder, granules	ammonium nitrate potassium nitrate	-
Monsanto Bullet Herbicide (agricultural)	liquid	sodium nitrate	minor
Ortho RosePride Systemic Fertilizer 8-12-4	granules	potassium nitrate	minor
Osmocote Plant Food and Controlled Release Fertilizer (multiple products)	granules	ammonium nitrate	-
Peters Professional Pansy, Salvia, and Vinca 15-2-20	powder	ammonium nitrate calcium nitrate potassium nitrate	-
Schultz Expert Gardener Orchid Food 19-31-17	powder	potassium nitrate	-
Schultz Liquid Plant Food Plus 10-15-10	liquid	potassium nitrate	-
Scotts Enriched Lawn Soil with Scotts Starter Fertilizer 0.08-0.03-0.02	granules	potassium nitrate	-
Sierra Controlled Release Fertilizer Plus Minors 17-6-12	prills	ammonium nitrate	-
Spectracide Stump Remover	granules	potassium nitrate	major (100%)
Super Sock It Pool Cleaner	powder	calcium chlorate	minor
Up Start Vitamin B 1 Plant Starter with 3-10-3 Fertilizer	liquid	potassium nitrate	minor

TABLE IV: Personal care products

PRODUCT	FORM	EXPLOSIVE	LEVEL
Aosept Clear Care, No Rub Cleaning & Disinfecting Solution for Contact Lenses	liquid	hydrogen peroxide	minor
Aquafresh Sensitive Toothpaste	paste/tube	potassium nitrate	-
Avon NAIL EXPERTS Speed Dry Top Shine	viscous liquid	nitrocellulose	minor
Avon Speed Dry Nail Enamel	viscous liquid	nitrocellulose	major
Cover Girl Nailslicks (multiple colors)	liquid	nitrocellulose	-
Crest Sensitivity Protection Mild Mint Paste	paste/tube	potassium nitrate	-
Crest Whitening Strips (multiple products)	strips	hydrogen peroxide	-
Haircolor (multiple brands and products)	developer/optimizer	hydrogen peroxide	-
Lacquer Spraying, Clear, TT-L-58E	spray	nitrocellulose	-
Mentadent Fluoride Toothpaste (multiple products)	pump dispenser	hydrogen peroxide	-
Nair Cream Bleach for Face & Body Hair	cream	hydrogen peroxide	-
New-Skin Liquid Bandage	liquid	nitrocellulose	minor
Revlon Nail Enamel (multiple colors)	liquid	nitrocellulose	-
Revlon Professional Firma Nail-Extra Strength Basecoat	liquid	nitrocellulose	-
Revlon Top Speed Nail Enamel Steel	liquid	nitrocellulose	-
Sally Hansen Teflon Tuff Nails (multiple colors)	liquid	nitrocellulose	-
Sensodyne Toothpaste (multiple products)	paste/tube	potassium nitrate	minor

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