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Arthur L. Craigmill
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CARBON-MONOXIDE POISONING RESULTING FROM EXPOSURE TO SKI-BOAT EXHAUST GEORGIA, JUNE 2002

Carbon monoxide (CO) is an odorless, colorless gas produced from the incomplete combustion of carbon-based fuels such as gasoline or wood. In the United States, CO poisoning causes approximately 500 unintentional deaths each year. Although CO poisonings often have been reported to occur in enclosed and semi-enclosed environments, they can also occur in open-air environments. This report describes two related cases of CO poisoning that occurred in children who were participating in recreational activities on a ski boat. **Recreational boaters should be aware of the dangers of open-air CO poisoning, and engineering solutions are needed to reduce the amount of CO in boat exhaust.**

On June 1, 2002, a family of two adults and three children (two boys aged 4 and 12 years and a girl aged 2 years) and three friends went to a lake in Georgia to water ski. The ski boat was placed in an idling position while one parent put on a ski vest. During this time, the girl climbed over the back of the boat onto the swim platform (a wooden platform attached to the stern a few inches above the surface of the water) and lay in a prone position to push back and kick the water. In <1 minute, she became unconscious and unresponsive. The girl's father, a family physician, observed that her pupils were constricted and her jaw was firmly clenched. She had a pulse but no chest movement. He performed rescue breathing; after 15-20 assisted ventilations, the child resumed unassisted breathing. Local emergency medical services (EMS) personnel were notified. Approximately 35 minutes later, EMS personnel arrived and started the child on 100% oxygen through a nonrebreather mask and transported the child to the local hospital. Nearly 3 hours after exposure, the child's carboxyhemoglobin (COHb) level was 14.3% (normal: <5.0%). Back calculations of COHb levels estimated that her COHb level was 50%-57% immediately after exposure on the swim platform.

During the initial resuscitation of the girl, her youngest brother was removed from the swim platform and watched by friends during his sister's transport to the hospital. Several hours after being removed from the water, he complained of severe headache, vomited, and fell asleep. He was transported to the hospital for evaluation. Approximately 4 hours after exposure, his COHb level was 10.1%. Back calculations of COHb levels estimated that the boy's COHb level was 18%-21% immediately after exposure. Both children were transported to another hospital, admitted to the pediatric intensive care unit, and treated with 100% oxygen. They were discharged the following day.

Editorial Note:

Open-air CO-related morbidity and mortality has been reported to occur with exposure to exhaust from gasoline-powered electricity generators on houseboats. However, this report describes CO poisoning resulting from direct exposure to CO in the exhaust of a ski boat. **Ambient CO concentrations have been measured as high as 27,000 parts per million (ppm) in the stern of boats involved in CO-poisoning fatalities.** In comparison, the World Health Organization has set a ceiling limit on a person's exposure to CO at 87 ppm during a 15-minute interval. Although the introduction of the catalytic converter to automobiles reduced CO concentrations in automobile exhaust by >90%, emissions-control devices have not been introduced to the propulsion engines of recreational boats.

Since 1990, a case listing compiled by an interagency working group consisting of the U.S. Department of the Interior, National Park Service, CDC's National Institute for Occupational Safety and Health, and the U.S. Coast Guard has documented 17 fatalities and 37 nonfatal poisonings on U.S. waters resulting from exposure to the propulsion engine exhaust of ski boats and cabin cruisers. Although many poisoning victims were exposed while on or near the swim platform, several fatalities also occurred among persons seated in the stern of the boat. This case listing was compiled from media reports and probably underrepresents the national burden of these incidents. In addition, because COHb measurements are obtained infrequently from victims of unwitnessed drownings, the actual number of drownings resulting from CO poisoning remains unknown.

On inhalation, CO binds to hemoglobin with a binding affinity 200-270 times greater than that of oxygen. At COHb concentrations of 10%-20%, symptoms of CO poisoning might resemble those of motion sickness or heat exhaustion and can include headache, nausea, dizziness, and vomiting. Although seizures, coma, and death might occur at COHb concentrations >30%, COHb concentrations of >50% have been found after minutes of outdoor exposure to boat exhaust. Health-care providers should consider immediate COHb measurements any time a drowning occurs near a boat or boat occupants present with signs and symptoms consistent with CO poisoning.

Recreational boaters should be aware that boat exhaust can flow back into the rear of the boat and that CO in the exhaust is undetectable because it is odorless and colorless. In addition, they should **avoid swimming or body surfing near the exhaust system while the boat or generator is running.** Studies of CO concentrations in the air

around boats and of COHb levels in recreational boaters are needed to determine the extent of boat-related CO poisonings, and public health campaigns to warn of the danger of boat-related CO poisonings require further evaluation. The use of emissions-control devices in recreational boats can reduce CO emissions and the risk for CO poisoning.

REF: *Morbidity and Mortality Weekly Report,* 51(37), September 20, 2002.

CHILDHOOD LEAD POISONING ASSOCIATED WITH TAMARIND CANDY AND FOLK REMEDIES CALIFORNIA, 1999-2000

Lead poisoning affects children adversely worldwide. In the United States, elevated blood lead levels (BLLs) (>10 µg/dL) result primarily from exposure to lead-based paint or from associated lead-contaminated dust and soil; however, other sources of lead exposure, including folk remedies, Mexican terra cotta pottery, and certain imported candies, also have been associated with elevated BLLs in children. This report describes five cases in California of lead poisoning from atypical sources. Health-care providers should be aware of the potential hazards of certain food products, and community members should be educated about potential sources of lead poisoning for children.

Case Reports

Cases 1 and 2. In March 1999, two Hispanic children residing in Stanislaus County in the Central Valley, a boy aged 4 years and his sister aged 6 years, were identified during routine screening by California's Child Health and Disability Prevention (CHDP) Program. The boy had a BLL of 88.0 g/dL and the girl a BLL of 69.0 µg/dL. Both children underwent chelation therapy. Their parents had not traveled recently outside the United States but had used greta, a Mexican folk remedy (taken commonly for stomachache or intestinal illness) that usually contains high levels of lead. No pottery in the home tested positive for lead, and tests on paint and dust from their home did not indicate high lead levels. **Greta powder collected from the family's home had 770,000 parts per million (ppm) of lead, and miniblinds on the windows of the home tested positive for lead by swab. Imported candies, including Dulmex-brand Bolirindo lollipops, which were identified later to be contaminated with lead, were found in the home.**

Case 3. In May 2000, a Hispanic boy aged 4 years residing in Fresno County was identified during routine CHDP screening with a BLL of 26 µg/dL. His family had moved to California recently from Oaxaca, Mexico, where they had used a ceramic bean pot and water jug regularly. An environmental investigation did not reveal high lead levels in dust, paint, or soil, but **tests on imported candies collected from the home revealed a candy wrapper with a lead level of 16,000 ppm.** The child's BLL had decreased to 13.2 µg/dL by February 2002.

Case 4. In June 2000, a Hispanic boy aged 2 years residing in Orange County was identified through routine screening as having a BLL of 26 µg/dL. The family's house was built in 1963 and had been renovated during early 2000. Tests on soil, paint, and dust in and around the child's home did not reveal high lead levels. The child had been given greta and azarcon (a folk remedy that usually contains substantial amounts of lead) and had eaten various imported tamarind fruit candies purchased routinely by his family in Mexico. High lead levels were found in one of the three brands of imported candies the child had eaten. A Dulmex-brand Bolirindo lollipop had levels of 404 ppm and 21,000 ppm of lead in the stick and wrapper, respectively, and 0.2 ppm and 0.3 ppm in the candy and seed, respectively.

Subsequent tests by the Food and Drug Administration (FDA) confirmed high lead levels in the wrapper of this product, and a public health warning was issued by FDA and the California Department of Health Services (CDHS).

Case 5. In August 2000, a Hispanic boy aged 4 years residing in Los Angeles County was identified through routine screening by California's Medicaid program with a BLL of 22 µg/dL. When the child was tested at age 1 year, he had an acceptable BLL of 5 µg/dL. Family members reported that he had been eating Mexican candies regularly for 3 years but denied use of folk remedies and imported pottery. An environmental investigation of their apartment, which was built in 1986, did not reveal high lead levels. The child was born in the United States and had not traveled to Mexico, and investigators identified no other potential sources of lead other than the Mexican candies. The family was advised not to allow the child to eat Mexican candies. As of December 2001, the boy's BLL had decreased to 11 µg/dL.

Editorial Note: The findings in this report underscore the importance of routine screening for lead and of conducting a thorough risk assessment of children with elevated BLLs including taking a complete history and environmental sampling. Although household paint and resulting contaminated dust and soil are the most common sources of exposure, all sources of lead poisoning should be identified and removed.

Of approximately 1,000 cases of elevated BLLs among California children that were reported to CDHS during May 2001-January 2002, candy produced in Mexico was identified as a possible exposure source in approximately 150 cases. When children eat lead-contaminated candies, exposure can exceed FDA's provisional tolerable daily intake level (PTIL) for lead of 6 µg in a typical 30-g food serving. FDA's PTIL corresponds to a lead intake capable of elevating the BLLs of a small child by 1 µg/dL. In the cases described in this report, the wrappers often contained amounts of lead that could greatly exceed FDA's PTIL if the lead were to leach into the candy. In addition, a substantial quantity of the lead could be released into saliva by a child licking the wrapper. When conducting investigations of lead exposures, clinicians and health educators are encouraged to consider inquiring about these products, together with folk remedies and the use of imported pottery, as potential sources of lead poisoning.

Increasing education efforts are needed to inform persons in Hispanic communities that certain Mexican candies, pottery, and folk remedies can be potential sources of lead poisoning for children. Additional information about childhood lead poisoning is available from CDHS at http://www.dhs.ca.gov/ps/deodc/childlead and from CDC at http://www.cdc.gov/nceh/lead/lead.htm.

REF: *Morbidity and Mortality Weekly Report*, 51(31), August 9, 2002.

CHILDHOOD CANCER AND AGRICULTURAL PESTICIDE USE: AN ECOLOGIC STUDY IN CALIFORNIA

The authors of this study analyzed population-based childhood cancer incidence rates throughout California in relation to agricultural pesticide use. During 1988-1994, a total of 7,143 cases of invasive cancer were diagnosed among children under 15 years of age in California. Building on the availability of high-quality population-based cancer incidence information from the California Cancer Registry, population data from the U.S. Census, and uniquely comprehensive agricultural pesticide use information from California's Department of Pesticide Regulation, the authors used a geographic information system to assign summary population, exposure, and outcome attributes at the block

group level. The Poisson regression was used to estimate rate ratios (RRs) by pesticide use density adjusted for race/ethnicity, age, and sex for all types of childhood cancer combined and separately for the leukemias and central nervous system cancers. **The authors generally found no association between pesticide use density and childhood cancer incidence rates.** The RR for all cancers was 0.95 [95% confidence interval (CI), 0.80-1.13] for block groups in the 90th percentile and above for use of pesticides classified as probable carcinogens, compared to the block groups with use of < 1 lb/mi2. The RRs were similar for leukemia and central nervous system cancers. **Childhood leukemia rates were significantly elevated (RR = 1.48; 95% CI, 1.03-2.13) in block groups with the highest use of propargite, although they saw no dose-response trend with increasing exposure categories. (***Editorial Note: the lack of dose-response relationship with increasing exposure categories does not support a hypothesis that propargite is causing the elevated increase in rates. More studies will be needed to determine if this is the case.)* Results were unchanged by further adjustment for socioeconomic status and urbanization.

Although follow-up studies that can better address timing of exposure will be important in assessing the etiologic significance of pesticide exposures, this study does address the public concern about whether rates of childhood cancer are higher in areas of heavy agricultural pesticide use.

The observed lack of association in this study stands in contrast to evidence on household use from the case-control literature, but does not necessarily imply a lack of association with pesticide exposures in general. The current study focuses on residence in areas of high agricultural pesticide use.

REF: *Environ Health Perspect* 110:319-324(2002).

Toxicology Tidbits

COMPARATIVE EFFICACY OF INSECT REPELLENTS AGAINST MOSQUITO BITES

The worldwide threat of arthropod-transmitted diseases, with their associated morbidity and mortality, underscores the need for effective insect repellents. Multiple chemical, botanical, and "alternative" repellent products are marketed to consumers. The authors of the study sought to determine which products available in the United States provide reliable and prolonged complete protection from mosquito bites. The study involved 15 volunteers to test the relative efficacy of seven botanical insect repellents; four products containing N,N-diethyl-m-toluamide, now called N,N-diethyl-3-methylbenzamide (DEET); a

repellent containing IR3535 (ethyl butylacetylaminopropionate); three repellent-impregnated wristbands; and a moisturizer that is commonly claimed to have repellent effects. These products were tested in a controlled laboratory environment in which the species of the mosquitoes, their age, their degree of hunger, the humidity, the temperature, and the light–dark cycle were all kept constant.

Results: DEET-based products provided complete protection for the longest duration. Higher concentrations of DEET provided longer-lasting protection. A formulation containing 23.8 percent DEET had a mean complete-protection time of 301.5 minutes. A soybean-oil-based repellent protected against mosquito bites for an average of 94.6 minutes. The IR3535-based repellent protected for an average of 22.9 minutes. All other botanical repellents we tested provided protection for a mean duration of less than 20 minutes. Repellent-impregnated wristbands offered no protection.

Currently available non-DEET repellents do not provide protection for durations similar to those of DEET-based repellents and cannot be relied on to provide prolonged protection in environments where mosquito-borne diseases are a substantial threat.

REF: New England Journal of Medicine, 347(1):13-18, July 4, 2002.

HHS TO STUDY EPHEDRA, STEP UP ENFORCEMENT AGAINST ILLEGAL MARKETING

Health and Human Services Secretary Tommy G. Thompson has announced new efforts to expand research on the safety of herbal ephedrine alkaloids, commonly referred to as ephedra. Marketed in the United States as weight loss, energy, and sports supplements, ephedrine alkaloids are active chemicals found naturally in a number of plants. They can also be produced synthetically.

Adverse event reports have raised questions about the safety of these products, and the FDA has advised that further scientific research is needed. HHS recently funded the RAND Corporation to conduct a review of the existing science on ephedrine alkaloids, particularly in dietary supplements. The National Institutes of Health will use this information to guide an expanded research effort on the safety of ephedrine alkaloids.

Thompson also announced plans to aggressively pursue the illegal marketing of non-herbal synthetic ephedrine alkaloid products. In June, the FDA sent six warning letters to firms unlawfully selling these products over the Internet. The FDA also warned another company for illegally promoting its ephedrine product as an alternative to street drugs. The firms that do not correct the violations described in the warning letters face further enforcement actions. This could include seizure of the illegal product and injunction from manufacturing and distributing the product, as well as prosecution of the companies and individuals. "These products are not for everyone," says FDA Deputy Commissioner Lester M. Crawford, D.V.M., Ph.D. "Consumers should read the labels carefully to ensure their proper use."

Consistent with industry standards and warnings that appear on many products, **consumers under the age of 18 and women who are pregnant or nursing should not use these products.** Consumers should consult a health-care provider before using such products if they are using a prescription drug or if they have ever had high blood pressure, heart or thyroid disease, a seizure disorder, depression, diabetes, difficulty urinating, prostate enlargement, or glaucoma.

Anyone using a monoamine oxidase (MAO) inhibitor (a drug used in the treatment of selected atypical depression) or any allergy, asthma, or cold medications containing ephedrine, pseudoephedrine, or phenylpropanolamine should consult with a physician before using dietary supplements containing ephedrine alkaloids. Phenylpropanolamine may also be found in over-the-counter (OTC) weight-loss products. Because of safety concerns, the FDA recommended in November 2000 that consumers stop using products with phenylpropanolamine and has proposed that it be removed from the market. Consumers may still have products containing the ingredient in their medicine cabinets.

Consumers should discontinue use of ephedrine alkaloids if any of the following symptoms are experienced: rapid or irregular heartbeat, chest pain, severe headache, shortness of breath, dizziness, loss of consciousness, sleeplessness, or nausea.

Thompson urged manufacturers to include the FDA's MedWatch telephone number, 1-800-FDA-1088, on product labels to encourage consumer reporting of adverse events.

REF: *FDA Consumer magazine*, September-October 2002

FDA WARNING ON CHINESE DIET PILLS CONTAINING FENFLURAMINE

The FDA is alerting the public about Chinese weight-loss products, Chaso (Jianfei) Diet Capsules and Chaso Genpi, because they pose a potential public health risk. The agency is alerting the public to this health risk because several people in Japan have become ill, and some have died, after consuming these diet products. "FDA is taking this action as a precautionary measure to help assure that people are not exposed to this potentially dangerous product," says FDA Deputy Commissioner Lester M. Crawford, D.V.M., Ph.D.

Products of this type are often sold in small urban markets as alternatives to Western medicine. In 2001, the FDA issued a nationwide alert on the recall of 13 "Treasure of the East" herbal products because of a dangerous ingredient, aristocholic acid which is toxic to the kidney.

The deaths in Japan linked to these Chinese weight-loss products may have resulted from the presence of such active drug ingredients as fenfluramine in the capsules.

Fenfluramine and another diet drug, phentermine, were used in combination for weight loss until it was determined that the combination of drugs was linked to valvulopathy, a serious and sometimes fatal heart disease. Fenfluramine and

a chemically similar drug, dexfenfluramine, were removed from the market in 1997. Phentermine, when used alone, has not been associated with valvulopathy and remains on the market.

The FDA has advised its import operations personnel to be on the alert for Chaso Diet Capsules and Chaso Genpi. The agency is urging consumers not to take these diet pills and to notify their local FDA office if the products are found in their area.

REF: *FDA Consumer magazine*, September-October 2002

NEW USDA ORGANIC STANDARDS SEAL

Products bearing a new USDA Organic Seal will begin appearing on supermarket shelves on October 21, 2002 when the new USDA regulations are fully implemented. On that date, only makers of foods that are 95-100 percent certified organic can display the new USDA Organic Seal on their products.

All organic products meeting the new USDA national organic standards are required to follow new organic labeling guidelines, which are based on the percentage of organic ingredients in a product. According to the new labeling guidelines, the USDA seal can only be displayed on products that are 95 to 100 percent organic. Organic products that are 70-94 percent organic cannot carry the USDA organic seal, however, the front label can read 'made with organic ingredients' and can list up to three of the organic ingredients or food groups. Also, products that are less than 70 percent organic cannot carry the seal, nor can the word 'organic' be displayed anywhere on the front label.

For more information link to USDA/AMS National Organic Program: http://www.ams.usda.gov/nop/index.htm

REF: AGNET Online, September 18, 2002

VETERINARY NOTES.....

News From FDA/CVM ---

TREATING MINOR SPECIES: A MAJOR ANIMAL HEALTH CONCERN

Each October, when the mountain wind begins to carry a hint of winter chill, Lyle Johnston of Rocky Ford, CO, loads hundreds of wooden boxes containing a special cargo onto flatbed trucks. He wants those trucks and their valuable cargo—30 million honeybees per truck—to be well down the road and on their way to California before the season's wintry blasts sweep through the Rockies. The bees are destined to be put to work pollinating the almond fields of California, the source of more than half of the world's almonds. Johnston relies on the almond industry, and the almond industry relies on him and his fellow beekeepers. "Without the bees, the growers get only 300 to 400 pounds of almonds per acre," says Johnston. "With good hives, they get 2,200 to 2,800 pounds per acre." American farmers rent honeybees to pollinate almonds, apples, melons, and more than a dozen other crops, raising the value of agricultural production by more than $14 billion per year, say entomologists at Cornell University.

- Fish farming, or aquaculture, is one of the fastest growing segments of American farming, says the USDA. Yet to satisfy America's taste for seafood, the United States imports over $9 billion worth of fish each year—more than three times as much as it exports.
- Alternative Meat Animals. Although much of its minor species research centers on aquatic animals, the Minor Use Animal Drug Program also is investigating the needs of other animals used in agriculture. Some of this research is motivated by the needs of American farmers seeking healthful alternatives to the traditional red-meat market.
- Sustaining the Sheep Industry. The U.S. sheep population has been steadily decreasing since the 1940s—from its peak at 56 million in 1942 to less than 7 million in 2002, says the USDA.
- Big Birds. Powell Anderson, D.V.M., splits his time between his veterinary hospital in Dillwyn, VA., and his ostrich ranch next door. An ostrich breeder since 1996, Anderson sees the future of agriculture and the rebirth of small farms in businesses like his. It's a healthy and environmentally sound alternative to some other forms of animal food production, says Anderson, who doesn't use growth hormones or antibiotics in his birds.

Read the entire article at: FDA Veterinarian, Sept/Oct, 2002.

THE USE OF STEROID HORMONES FOR GROWTH PROMOTION IN FOODPRODUCING ANIMALS

The Food and Drug Administration (FDA) is responsible for ensuring that animal drugs and medicated feeds are safe and effective for animals, and that food from treated animals is safe for humans to eat. Certain steroid hormones have been approved for use at very low concentrations to increase the rate of weight gain and/or improve feed efficiency in beef cattle. No steroid hormones are approved for use in poultry. All of the steroid hormonal growth-promoting drugs are available for over-the-counter purchase in the U.S., and are generally administered by the livestock producer at specific stages of production. Residue levels of these hormones in food have been demonstrated to be safe, as they are well below any level that would have a known effect in humans.

Read the entire article at: What's New at FDA

REF: *FDA Veterinarian* Sept/Oct 2002

NEW FDA/CVM INTERNET WEB SITE

The Food and Drug Administration's (FDA's) Center for Veterinary Medicine (CVM) has launched a new internet web site that provides Environmental Assessments (EAs), Findings of No Significant Impact (FONSIs), and Environmental Impact Statements (EISs) for New Animal Drug Applications (NADAs), Food Additive Petitions (FAPs), and Agency-initiated actions. The site may be found at http://www.fda.gov/cvm/efoi/ea/ea.htm.

Some of the more requested documents on this site include: EAs for bovine somatotropin, ractopamine, ivermectin, enrofloxacin, melengestrol acetate, progesterone and estradiol, and EISs for chloroflurocarbons, antibiotics in animal feed, and selenium.

REF: *FDA Veterinarian* Sept/Oct 2002.

REMINDER -- EXTRA-LABEL USE OF FLUOROQUINOLONES PROHIBITED

FDA's Center for Veterinary Medicine (CVM) would like to remind veterinarians that **extra-label use of fluoroquinolone antibiotics in food-producing animals is prohibited.** CVM has received some information indicating that fluoroquinolone antibiotics such as enrofloxacin are being prescribed for use in food-producing animals including lactating dairy cattle for which they are not approved. The prohibition against extra-label use of fluoroquinolones is based on a finding by CVM that the extra-label use of these antibiotics in food-producing animals presents a risk to the public health for the purposes of the Animal Medicinal Drug Use Clarification Act (AMDUCA) of 1994. These extra-label uses are capable of increasing the antibiotic resistance of the bacteria that can cause human illness and that are present in treated animals at the time of slaughter. Information about this prohibition was published in the May 22, 1997, Federal Register.

AMDUCA amended the Federal Food, Drug, and Cosmetic Act to allow licensed veterinarians to prescribe extra-label uses of approved animal drugs and human drugs in animals. Section 2(a)(4)(D) of the AMDUCA provides that the Agency may prohibit an extra-label drug use in animals if, after affording an opportunity for public comment, the Agency finds that such use presents a risk to the public health.

The following drugs (both animal and human), families of drugs, and substances are prohibited for extra-label uses in all food-producing animals:

Chloramphenicol;
Clenbuterol;
Diethylstilbestrol (DES);
Dimetridazole;

Ipronidazole;
Other nitroimidazoles;
Furazolidone, Nitrofurazone, other nitrofurans;
Sulfonamide drugs in lactating dairy cattle (except approved use of sulfadimethoxine, sulfabromomethazine, and sulfaethoxypyridazine);
Fluoroquinolones; and
Glycopeptides.

REF: http://www.fda.gov/cvm/index/updates/noeluflq.htm

News from the UC Davis California Animal Health and Food Safety Laboratory System ---

CYANIDE TOXICOSIS IN SMALL RUMINANTS

Cyanide toxicosis caused the death of four yearling and adult does that died within four hours after ingesting "olive" leaves. Rapid heart rates and depression were noted in seven others in a group of 60. The livers of all three animals contained cyanide while only the rumen contents showed identifiable leaves of *Heteromeles arbutifolia*, commonly called toyon or tollon, a cyanide-containing plant. Separate testing of "olive" leaves indicated it was toyon with cyanide levels of 345 ppm. Clinical signs of cyanide toxicosis includes salivation and rapid breathing, marked dyspnea, weakness, muscle faxciculations, urination, defecation, rapid heart rate, staggering and mydriasis.

RESPIRATORY DISTRESS IN CATTLE

Moldy sweet potatoes resulted in severe **respiratory distress** in 20 beef cows of which 10 died in a herd of 100. The deaths started three days after the farm began feeding sweet potatoes. Externally, the potatoes appeared normal but some were soft and on cut section were rotten. Ipomeanol was detected in rotten potatoes. A dead Longhorn cow submitted had typical diffuse emphysema and proliferative lung lesions.

REF: *Lab Notes* (UC Davis California Animal Health and Food Safety Laboratory System), 15(2), 2002.

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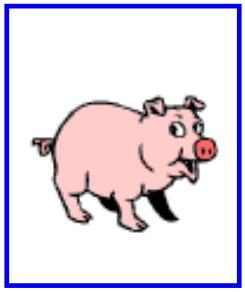

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