UNIVERSITY OF FLORIDA
IFAS EXTENSION

FCS3205

Indoor Air Quality in Florida: Formaldehyde[1]

Virginia Peart[2]

Formaldehyde

An organic chemical that is very prevalent in our environment.

General Description

- Formaldehyde (HCHO) – colorless gas with a pungent odor from a family of gases called **aldehydes** (acrolein and acetaldehyde). HUD
- A 1980-84 study in NC measured formaldehyde levels at 0.76 ppm average for mobile homes to 0.165 ppm for site-built houses.

Health Effects

- More than 40% of the exposed population is affected by formaldehyde, more than 300 excess nasal cancers annually can be attributed to excess formaldehyde exposure.
- Eye, nose and throat irritations have been reported at levels of 0.05 to 0.5 ppm.
- **High levels** (more than a few ppm) can cause headaches, nausea, dizziness, vomiting, skin rash and coughing (possible hyperallergic reaction).
- Suspected carcinogen from animal studies.
- Acceptable exposure level is around 0.1 ppm. HUD has ruled that formaldehyde emissions not exceed 0.2 pm for plywood and 0.3 ppm for particle board. (Manufactured homes must use materials that meet these standards and have been certified.)

Research on formaldehyde effects has been spotty and results of tests often vary from study to study. (See Table 1.)

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2. Written by Virginia Peart, former Associate Professor, Housing, Department of Family, Youth and Community Sciences, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611 and reviewed by Nayda I. Torres, Professor, Family and Consumer Economics, Department of Family, Youth and Community Sciences, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida; Lewis Johnson, CIH, Coordinator, Industrial Hygiene, University of Florida; and Dale Dorman, Extension Housing and Environment Specialist – Emeritus, Cooperative Extension Service, University of Georgia.

Table 1.

Formaldehyde Effects	
Concentration (ppm)	Effects
0 - 0.5	None
0.01 - 0.20	Eye Irritant
0.05 - 1.0	Odor
0.10 - 0.25	Upper Airway Irritant
5.0 - 30	Pulmonary Effects
50 - 100	Edema, Pneumonia
>100	Death

Note: This table is an accumulation of results from several studies which produced varying results.

Sources

- Building and insulating materials, furniture, numerous consumer products, and combustion.
- Formaldehyde resins have superior bonding properties and are low in cost. (Carpet glue. Carpeting pile made in the U.S. no longer contains formaldehyde.)
- Urea-formaldehyde (UF) resin is the most common adhesive used for interior-grade plywood and particleboard (pressed wood products).
- Particleboard is composed of small wood shavings glued together with UF resin and is used in buildings for subfloors, partition walls, paneling, cabinets, and furniture.
- Urea formaldehyde foam insulation (UFFI) contains UF resins and has been used as insulation in walls.
- High temperature and humidity increase the rate of emission.
- Fabrics and other building surfaces can absorb formaldehyde and become secondary sources when the primary sources are removed.
- Additional sources of formaldehyde include adhesives, deodorants, dyes, food, cosmetics, detergents, fertilizers, hair products and paper products.

Formaldehyde "Identifier's" used by industries include: BFV, Fannoform, Formaldehyde, Formalin, Formality, Formic Aldehyde, Methyl Aldehyde, Superlysoform, Karsan, Lysoform, Forol, Fyde, Ivalon, Paraform, Morbicide, Oxomethane, Osymethylene. Cosmetics and medication identifiers include: Dowicil 200R and Bronopol'r.

Identification

- Characteristic of "**new house**" smell. Can be detected at levels around 1 ppm or less.
- There are portable detectors: Reliable passive monitoring badges are available which can be worn on clothing or placed in suspected areas of the home.

Control

- We need more "safe products" on the market with lower emission rates. Industry, government and consumer groups working together.
- Remove or reduce products using formaldehyde. (Many manufacturers of pressed-wood products have modified the process to reduce formaldehyde – West Germany has manufacturing standards.)
- Coatings (sealants) and solid barriers can be used to cover pressed wood products.
- Use materials that do not have formaldehyde.
- Clean the air with chemical adsorption (activated alumina or activated carbon).
- A 70% reduction in formaldehyde can occur with the temperature reduction from 75 to 68° F.

- A 40% reduction in formaldehyde can occur by reducing the relative humidity from 70 to 40%.
- Ammonia gas or petroleum distillates can reduce formaldehyde levels 50 to 60%, but the process can discolor finishes. (Should be done professionally.)
- Sulfur candles can be burned to neutralize formaldehyde, but exposed metals in the home will be discolored.
- Ventilation, which can help in drier climates, will make formaldehyde emissions worse in Florida because of the high humidity.