

Special Advisory Bulletin



A Special Report of the Mulch & Soil Council

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Carbon Black in Mulch Colorants

Overview

There is a safe history of carbon black when used in tires, plastics, automobile components, inks, adhesives, paints, dyes and ceramics. Taking into consideration all available information on carbon black, EPA has determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to carbon black when used as inert ingredient in pesticide formulations when considering the dietary exposure and all other non-occupational sources of pesticide exposure for which there is reliable information.

Acute Toxicity

The literature contains very little information on the acute or short-term toxicity of carbon black, and considers carbon black to be a non-specific respiratory irritant and nuisance dust as free particles. In general, data indicates that acute effects of carbon black exposures are the same as those observed for other insoluble particulates.

Sub-chronic/Chronic Toxicity

Sub-chronic and chronic inhalation exposure studies have been performed in rats and mice. IARC (1996) considers that the body of evidence contained in these studies indicate that “once a certain lung burden has been achieved,

inhalation of carbon black in rats results in significant [pulmonary] inflammatory responses.” This study was based on free particles. ‘ Long-term dietary studies of laboratory rodents fed large concentrations of carbon black (free particles) did not provide any indication of pathological effects in rodent GI tracts (Buddingh et al., Pence and Buddingh, 1985, 1987; all as cited in IARC, 1996).

Developmental Toxicity

No developmental studies with the free or bound carbon black were identified, but no effects on reproductive organs of either male or female rats were reported in long-term studies.

Carcinogenicity

Carbon black has been evaluated for carcinogenicity. Nine studies of workers in the US, UK, Sweden and Canada were examined in detail by IARC (1996 & 2010), which “considered the whole body of evidence rather weak and the results conflicting.” The majority of carcinogenicity studies of carbon black are by the inhalation route. These studies have shown conflicting results. Nau et al. (as cited in IARC, 1996) determined that repeated and prolonged painting of various carbon black suspensions onto the skin of mice demonstrated no dermal carcinogenic

effect. IARC classifies carbon black as a Group 2 “possible” carcinogen.

Special Consideration for Infants and Children

Carbon black has low sub-chronic and chronic toxicities. Although no developmental or reproductive studies, per se, were identified, long-term studies have not demonstrated any effects on the reproductive organs of male or female rats. Additionally, the poor to nil absorption of carbon black as demonstrated by the lack of significant adverse effects by the oral route even at high doses would mitigate any concerns. Based on the available exposure and toxicity information, safe history of similar uses, a safety factor analysis has not been used to assess the risks resulting from the inert pesticidal use of carbon black, and therefore, an additional tenfold safety factor for the protection of infants and children is unnecessary.

Environmental Fate Characterization /Drinking Water Considerations

Carbon black is not soluble in water or any other commercial solvents. Carbon black is not subject to degradation, per se, because it is not expected to photolyze, hydrolyze, or subject to metabolic degradation. It is adsorbed to the soil and does not harm soil or the crops grown on such soils.

Other Workplace Considerations

When using carbon black in dry powder form:

1. Carbon black is classified as a hazardous combustible dust by the United States 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200) and the Canadian Hazardous Products Regulation (HPR) 2015. The signal word, hazard statement and precautionary statements in the United States and Canada are: WARNING May form combustible dust concentrations in air. Keep away from all ignition sources including heat, sparks and flame. Prevent dust accumulations to minimize explosion hazard
2. Wear appropriate personal protective equipment and respiratory protection to avoid skin soiling and possible mechanical irritation to eyes and upper respiratory tract from airborne dust. Approved

air purifying respirator (APR) should be used where airborne dust concentrations are expected to exceed occupational exposure limits. Use a positive-pressure, air supplied respirator if there is any potential for uncontrolled release, exposure levels are not known, or in circumstances where APRs may not provide adequate protection. When respiratory protection is required to minimize exposures to carbon black, programs should follow the requirements of the appropriate governing body for the country, province or state.

3. Ensure adequate ventilation to control dust to below current occupational exposure limits. Avoid dispersal of dust in the air (e.g., refrain from clearing dust surfaces with compressed air).
4. Spills: Wet carbon black produces very slippery walking surfaces.

Small spills should be vacuumed when possible. A vacuum equipped with HEPA (high efficiency particulate air) filtration is recommended. Large spills may be shoveled into containers. Dry sweeping is not recommended. Water spray will produce very slippery walking surfaces and will not result in satisfactory removal of carbon black contamination.

Summary

Carbon black used in liquid mulch colorants have been process treated, are bound to the product, and mulch consumers are not exposed to “free particulate” carbon black dust. Dry carbon black colorants may require workplace precautions, but will not generate “free particulate” concentrations in outdoor garden use to pose any threat to consumers.