

Cyclosiloxanes

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Cyclosiloxanes

- ▶ Cyclosiloxanes have silicon–oxygen atoms singly bonded in a ring structure
- ▶ Cyclosiloxanes in common usage:

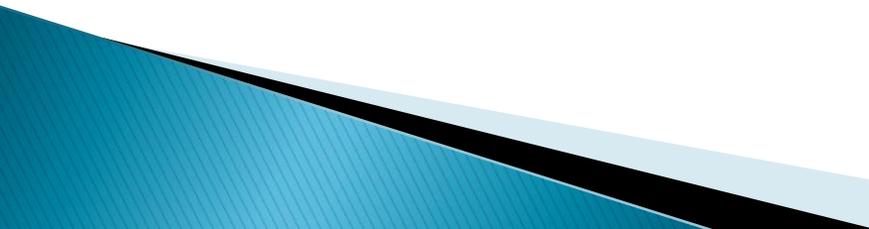
D4

D5

D6

Octamethylcyclotetra– Decamethylcyclopenta– Dodecamethylcyclohexa–

Summary of discussion at December SGP meeting

- ▶ CECBP staff presented summary document on cyclosiloxanes
 - ▶ Cyclosiloxane industry representatives provided comments
 - ▶ SGP voted 4–4 to defer a decision on whether to recommend cyclosiloxanes as designated chemicals pending additional information
 - ▶ SGP requested follow up discussion at this meeting
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Process since December SGP meeting

- ▶ Silicones Environmental, Health and Safety Council (SEHSC) submitted written comments and references to CECBP
 - SEHSC materials were mailed to the SGP and made available to the public in advance of this meeting
- ▶ CECBP staff reviewed additional materials and supplied additional references to the SGP in advance of this meeting

Exposure issues

- ▶ Widespread, likely increasing use
- ▶ Detected in fish and other aquatic organisms
- ▶ OEHHA reviewed and re-ran PBPK model (prior to publication)
 - Found that D5 levels were still increasing in fat compartment at 15 months
 - Model does not rule out bioaccumulation of D5
- ▶ Rapid elimination less relevant under constant exposure conditions

Known or suspected health effects

▶ D4

- Weak estrogenic effects
 - Functional and histological abnormalities in rats
 - Benign uterine tumors (adenomas) in rats

▶ D5

- Uterine endometrial adenocarcinomas in female rats
 - Relevance to humans has been questioned
- Effects on neurotransmitter dopamine and hormone prolactin

▶ D6

- Liver and thyroid enlargement
- Reproductive effect in rats

Laboratory considerations

- ▶ Methods available
 - ▶ Contamination, evaporation are potential issues
 - ▶ Absence of cyclosiloxanes in certain samples suggests widespread laboratory contamination is not occurring
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Recent conclusions of Health Canada and Environment Canada

- ▶ “Considering D4’s potential to bioaccumulate in biota and its high toxicity to sensitive aquatic organisms, long-term environmental exposure to D4 may cause adverse effects to aquatic organisms in certain Canadian environments....D4 has the potential to cause ecological harm.”
- ▶ “Considering the persistence of D5 under colder Canadian water conditions and its potential to bioaccumulate in biota, long-term environmental exposure to D5 may potentially cause adverse effects to aquatic organisms in certain Canadian environments.”
- ▶ “Given the low bioavailability and low potential for effects, it is concluded that D6 has low potential to cause ecological harm.”
- ▶ Neither D4, D5, nor D6 are entering the environment “in a quantity or concentration or under conditions that constitute or may constitute a danger in Canada to human life or health.”

Canadian risk management

- ▶ “The Government of Canada will consider imposing regulations to
 - Limit the quantity or concentration of D4 and D5 that may be contained in certain personal care products and, where appropriate, in other consumer products that are manufactured in and imported into Canada; and
 - Prevent or minimize releases to the environment from industrial users of these substances”

Summary

- ▶ Exposure of humans to cyclosiloxanes is significant, chronic, and increasing
 - ▶ Cyclosiloxanes found in aquatic organisms
 - ▶ Studies in laboratory animals have raised toxicity concerns that are relevant to humans
 - ▶ Canada concluded that D4 and D5 warrant risk management
 - ▶ Human biomonitoring studies, while limited, suggest the ability to measure these chemicals in humans
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