

Rope, buoy cleaning; endotoxin dust



This is the third and final installment in a series of articles based on a 2003 study of indoor air hazards in lobstermen's workshops conducted by Richard Donahue, MD, medical director of Islands Community Medical Services, and researchers from the Harvard School of Public Health (HSPH).

By this time of the year, most lobstermen have completed their rope cleaning activities and have set their traps for the season, but here's something to think about for next winter.

According to our 2003 study, rope cleaning activities, as well as the process of sanding buoys in preparation for a new coat of paint, can release endotoxin.

Endotoxin is a complex fat/sugar (lipopolysaccharide) molecule found in the cell wall of Gram negative bacteria that has been shown to be the major contributor to respiratory problems

suffered by textile workers.

Strands of seaweed (algae) and bacteria accumulate on ropes and buoys while they are in the water. When the gear is removed and dried, both the algae and the bacteria die and decompose.

We don't know if the bacteria help in the decomposition of the algae, but we do know that certain kinds of bacteria are present on the ropes and buoys. We found substantial quantities of endotoxin present in the dust produced during rope cleaning and buoy sanding.

Endotoxin to blame?

During a winter 2002 survey, several lobstermen commented that they were experiencing a persistent cough, which we found out later disappeared in the spring.

Suspecting that rope cleaning was the cause of this cough because the process generates so much dust, we took a few air

by Ann Backus, MS
 Director of Outreach
 Department of Environmental Health
 Harvard School of Public Health, Boston MA
 Phone (617) 432-3327;
 E-mail <abackus@hohp.harvard.edu>

samples while several lobstermen cleaned ropes. Analysis of these air samples showed the presence of endotoxin.

In March 2003, with pilot project money from the Occupational Health Program at HSPH, we undertook a more extensive study of this dust exposure. Results showed that the endotoxin exposure ranged from 0.08 endotoxin units (EU) per cubic meter to 77.5 EU/m³ (see table at left).

Health impact

Dr. Donald Milton of HSPH studies endotoxin and mold exposures in a variety of industries and advised the 2003 team of researchers on the endotoxin portion of the study.

Endotoxin exposure may produce symptoms such as cough, chest tightness, and/or chronic nasal congestion, all of which may also occur from other causes. In the presence of these symptoms, the exposure to endotoxin should be limited to no more than 10 times the background level of endotoxin of 1 EU/m³, according to Milton's interpretation of study results, based on current literature.

Levels 30-70 times the background level plus symptoms constitute a highly toxic exposure.

For these studies, the background level of 1 EU/m³ is a measurement taken outdoors in Massachusetts in March of 2002.

The take-home message is that lobstermen who clean rope indoors are

many have already taken steps to reduce their exposure to this rope dust. Some dip their ropes in a hot water barrel either on the boat or on shore. Some only clean rope outdoors, thus diluting the dust.

Other means for reducing exposure include working on rope under an exhaust hood or in a glove box. Wearing a respirator also would be a good approach.

It is important to keep dusty rope away from your breathing zone and to keep dust out of the shop in general by cleaning frequently and being careful about storing rope inside.

Many lobstermen prefer to store rope indoors because outdoor storage can expose it to degradation from UV light. That's fine as long as the rope has been dipped in a hot water bath first.

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Workshop # 1	42.7 EU/m ³	38.2 EU/m ³			
Workshop # 2	12.7 EU/m ³	17.8 EU/m ³			
Workshop # 3	0.08 EU/m ³				
Workshop # 4	58.7 EU/m ³	15.2 EU/m ³	14.5 EU/m ³	0.53 EU/m ³	77.5 EU/m ³

Table of endotoxin values from four lobstermen's workshops, March 2003.

- High density polyethylene Bait Basket
- Works better than a bait bag.
- Lasts for years.

FISH SAFE:

- Dip rope in a hot water bath prior to storing or working on it.
- Use an exhaust hood or other mechanism to keep dust away from your breathing zone.
- Keep dust out of the shop and clean frequently.
- Seek medical attention for symptoms such as persistent cough, chest tightness, and/or chronic nasal congestion.
- If you have been cleaning ropes or sanding buoys, advise

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The take-home message is that
lobstermen who clean rope indoors are
susceptible to endotoxin exposure that
ranges from mildly to highly toxic.

As we learned from lobstermen at the
Maine Fishermen's Forum last March,

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- If you have been cleaning ropes or sanding buoys, advise your health care provider that your symptoms may be related to endotoxin exposure.

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