

Copper Naphthenate: Beyond the myth!

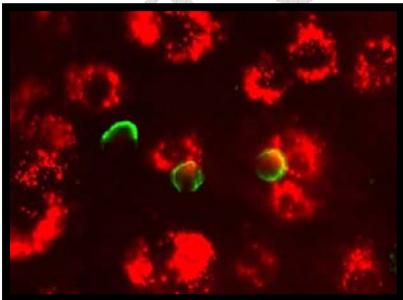
The myth...

Widely used as a wood preservative and also in many polymeric applications for protection against insects and rodents. Copper naphthenate or more specifically copper naphthenate solution which consists of 20% copper naphthenate mixed with white spirits or mineral turps type solvents have been popularly reintroduced in the market as a formulation which is effective in its primary purpose of being a wood preservative and yet provide positive benefits with respect to safety of human health and environment. Thus a win-win solution to a problem with no minimal side effects is what has been propagated.

But dig deeper and you would find yourself busting a myth and getting closer to the truth which is that it is not only not harmless but in fact much more toxic than it claims in its so called 'non toxic' status.

The facts...

...that it is carcinogenic!:



While copper naphthenate is said to be comprising of copper naphthenate in combination with white spirits/ mineral turps type solvents, the truth is that it contains about 20% copper salts of naphthenic acids which comprise of an unknown mixture of certain petroleum by products and contaminants and about 80% secret unknown ingredients. These contaminants and by products haven't been researched enough to conclude that they have no side effects: harmful or otherwise in the long or short run. **Most petroleum based constituents are known acutely toxic, chronically toxic and**

carcinogenic compounds! Moreover they are volatile which means that at any point of time the air surrounding you could be laden with lethal carcinogens: not a very comforting thought especially since you are told that what you are using is non toxic!!!

...that there are disorders!:

Moreover copper naphthenate is an oil-based wood preservative. Most oil based preservatives are easily absorbed through the skin as also by inhalation. Chronic exposure to these preservatives can lead to anemia and it also increases the permeability of membranes which can accelerate the uptake of other toxic substances. **Children in particular are more susceptible as they can easily ingest these chemicals within their systems!** They are also neurotoxic and can affect nerve transmission and damage the central nervous system. Tests submitted to EPA have found that Copper Naphthenate induces DNA damage. Inhalation of copper dusts and fumes is reported to lead to nasal congestion as also congestion of the upper digestive and perforation of the nasal septum.

...the various reports:

A report by the Department of Medicine, Pharmacology and Psychiatry, Vanderbilt University School of Medicine, Nashville, Tennessee correlates the widespread application of copper naphthenate and copper absorption in humans and animals. It studied a family of three individuals who lived in a home where copper naphthenate was sprayed on the inner foundation. In two of these individuals, serum copper levels were elevated when first measured months after copper naphthenate was sprayed in the home! This report suggests the need for further study of the absorption and relative toxicity of copper naphthenate. Now isn't that a direct contradiction to the so called consolidated facts that copper naphthenate is non toxic??

Another report by the Department of



QUICK FACTS:

- ✓ Tests submitted to EPA have found that **Copper Naphthenate induces DNA damage.**
 - ✓ A significant high release mechanism as a result of which they can spread rapidly in the groundwater and surface water reserves.
 - ✓ Metal fume fever, wheezing and rales have been reported in workers exposed to fine copper dust.
 - ✓ Vapors of copper salts may form explosive mixtures with air which can travel to the source of ignition and flash back.
-

Diagnostic Medicine/Patho-biology, College of Veterinary Medicine, Kansas State University studied the effects of copper naphthenate toxicosis in cattle. The results were quite alarming as fourteen cattle on a Kansas pasture died from ingestion of a wood preservative compound containing copper naphthenate. Clinical signs included depression, anorexia, ataxia, diarrhea, and recumbency. Grossly visible lesions included perirenaledema, pale kidneys, and stomach ulceration. All the cows that had postmortem evaluations had extensive renal cortical tubular necrosis. The findings indicated that the copper naphthenate may have contributed to abomasal ulceration.

...heavy metal poisoning:

Being a heavy metal based compound there are many risks with handling copper which also need to be taken into account: Metal fume fever, wheezing and rales have been reported in workers exposed to fine copper dust. Dyspnea has developed after oral copper exposure. Pulmonary edema and alveolar inflammation have been noted in animals. **Skin exposure could result in severe irritation, itching, erythema, dermatitis and eczema.** Moreover ingestion of copper salts can even lead to gastroenteritis with severe vomiting. Menke's disease which is an anemia disorder was recognized as a copper absorption disorder according to a report prepared by Rutgers the State University of New Jersey. The report also relates several other diseases with accumulation of toxic levels of copper in the liver and



other tissues without excessive intake of the same. Mucosal erosions and burning epigastric sensations with diarrhea have been reported. Vapors of copper salts may form explosive mixtures with air which can travel to the source of ignition and flash back. Most vapors are heavier than air which spread along the ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion and poison hazard indoors, outdoors or in sewers



...extrusion problems: stink, hazards et al:

Moreover application of copper naphthenate for protection of polymeric applications such as wires and cables would entail the extrusion of copper naphthenate master batches along with the polymer. This process itself is quite replete with inconveniences like the **extremely offensive smell of the master batch which the workers are often subjected to over a significant stretch of time as also various hazards related to the process itself.** Copper naphthenate can pose as a fire hazard at higher temperatures which is generally the case with extrusion processes. Moreover it forms explosive mixtures with oxygen which can be fatal to workers who might be handling the extrusion process. **Moreover the volatile fumes that are caused can be really lethal because with every 10°C rise in temperature the toxicity rises by three to four times which means that at polymer processing temperatures the workers in contact would be subjected to a deadly cocktail of carcinogenic compounds.**

Beyond the myth...!

Probably the reason why copper naphthenate has been classified as non toxic and relatively harmless is because of lack of extensive research undertaken to explore its various problems and side effects. But the above reported results show how it has been found to be toxic and therefore extensive study of the same is the need of the hour which would then probably reveal in alarming proportions whatever has been found so far to have affected humans and animals alike! What however we

Finland, Indonesia, Korea, Netherlands, New Zealand, Saint Lucia, Sweden, Australia, Austria, Cyprus, Norway and Sri Lanka have banned the use of the Copper Naphthenate.

can do is stop or reduce the use of such compounds as ultimately it is us the end users who suffer the consequences and not the ones who supply it or market it claiming that it is non toxic because as Mark Twain famously quoted that 'what appears to be may not always be the case!' And it certainly isn't the case with copper naphthenate!

References:

<http://www.beyondpesticides.org/wood/pubs/poisonpoles/chemicals.html>

<http://informahealthcare.com/doi/abs/10.3109/15563659208994449?journalCode=ctx>

<http://jvdi.org/cgi/content/full/19/3/305>

http://digitalfire.com/4sight/hazards/ceramic_hazard_copper_compounds_329.html

<http://webcache.googleusercontent.com/search?q=cache:http://www.epa.gov/oppsrrd1/REDs/naphthenate-salts-red.pdf>

http://www.chemicalbook.com/ProductMSDSDetailCB3205514_EN.htm

http://69.59.152.188/Detail_Chemical.jsp?Rec_Id=PC39772

<http://pestreg.cdpr.ca.gov/docs/whs/memo/hsm94009>

<http://www.cdpr.ca.gov/docs/county/cacltrs/penfltrs/penf2002/2002atch/attch44.pdf>

http://www.ccl.rutgers.edu/reports/ICA/ICA2002_copper1.pdf

Building Materials: Dangerous properties of materials in MasterFormat Divisions, by Leslie H Simmons and Richard J Lewis, Sr.

Wiley guide to Chemical incompatibilities, by Richard P Pohanish and Stanley A Greene.

C Tech Corporation