

Public Comment via Email

June 28, 2017

Jill Schilling

Safe Healthy Play Fields Coalition

A. Identified Conflicts of Interest, Faulty Test Methods and Further Recommendations for EPA's "Tire Crumb and Synthetic Turf Field Literature and Report List as of Nov. 2015"

Please see table below referencing EPA's "Tire Crumb and Synthetic Turf Field Literature and Report List as of Nov. 2015". Conflicts of interest are identified in the studies conducted on shredded waste tire crumb infill and tire playground surfaces.

Because conflicts of interest affect a study's conclusions, determining them is important. EPA should be aware of studies funded or conducted by industry, if the group/company makes profit from the product, or if the mission of the group interferes with safety, such as promoting use of recycled tires. This explains why time has been taken to study this issue. Provided comments are not a review of whether the studies have data gaps or are well done, although a few notes have been given in this regard.

Since the mid-1990s, **numerous studies have shown that industry-funded research tends to favor its sponsors' products.** This effect has been documented in research financed by chemical, pharmaceutical, surgical, food, tobacco, and, we have learned most recently, sugar companies. **For decades, industry-funded research helped tobacco companies block regulations by undermining evidence that cigarettes kill.** Precisely because of the **very real risk of bias**, prestigious scientific journals have long required researchers to disclose their sources of support.

Comments presented here include:

- –• □ Identification of conflicts of interest – EPA's "Tire Crumb and Synthetic Turf Field Literature and Report List as of Nov. 2015" (pp. 1-30)
- –• □ Recommendations for studies to be added with little or no conflicts of interest (pp. 31-59)
- –• □ Other data for consideration with little or no conflicts of interest (pp. 60-72)

[http://www.synturf.org/images/Conflicts-of-Interest-and Recs-for-EPA-CR-Lit-Report-List-20161129.pdf](http://www.synturf.org/images/Conflicts-of-Interest-and_Recs-for-EPA-CR-Lit-Report-List-20161129.pdf)

B. Tire Crumb toxicity- benzothiazoles, dioxin-like activity

(See attachments and citations).

Benzothiazoles, 2 mercapto-Benzothiazole and metabolites are omnipresent in all tire field studies that look for them. The attached and their citations (along with all the studies that show benzothiazoles in tires, released from tires and highly "bioaccessible" -migrating into synthetic body fluids) make a case: In the soup of tire crumb toxins, benzothiazoles may be one of the chemicals responsible for toxicity by activating the same receptors that dioxins and PAHs do (along with other uncharacterized dioxin-like components) :

1) **Benzothiazoles are clearly released at high levels from tire crumb synturf fields** indoors and out (even where the release of PAHs has been harder to show, Connecticut- Ginsberg study and others)

2) **Tire dust generated by tire abrasion is inhalable and contains benzothiazole toxins such as Mercapto-benzothiazole** (Agavayan 2014: "***Tire tread wear particles in ambient air—a previously unknown source of human exposure to the biocide 2-mercaptobenzothiazole***" R.Avagyan, I.Sadiktsis, C.Bergvall, R.Westerholm Email author :roger.westerholm@anchem.su.se)

Mechanism of toxicity?:

3) **Benzothiazoles** as well as PAHs and other chemicals in tire leachate **activate the same systems as toxic dioxins** which are carcinogenic, reprotoxic and endocrine disrupting (note many studies show **Tire leachate is demonstrated to be toxic to living systems**):

3a) **Tire rubber contains dioxin-like activity**

<<http://www.ncbi.nlm.nih.gov/pubmed/23441220>> PLoS One. 2013;8(2):e56860. 2013 Feb 18. "***Common commercial and consumer products contain activators of the aryl hydrocarbon (dioxin) receptor***". Zhao B1, Bohonowych JE, Timme-Laragy A, Jung D, Affatato AA, Rice RH, Di Giulio RT, Denison MS.

"Activation of the Ah receptor (AhR) by halogenated aromatic hydrocarbons (HAHs), such as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, dioxin), can produce a wide variety of toxic and biological effects. ...Solvent extracts of paper, ***rubber and plastic products*** contain chemicals that can bind to and stimulate AhR DNA binding and/or AhR-dependent gene expression in hepatic cytosol, cultured cell lines, human epidermis and zebrafish embryos. ...Solvent extracts of **rubber products** produce AhR-dependent developmental toxicity.... "

3b) **Benzothiazoles in tire leachate activate the same systems as toxic dioxins:** He, Zhao, Denison 2011:"***Identification of Benzothiazole Derivatives and Polycyclic Aromatic Hydrocarbons as Aryl Hydrocarbon Receptor Agonists Present in Tire Extracts***" Guochun He†, Bin Zhao†,‡, and Michael S. Denison†, *Corresponding

Author: Michael S. Denison, University of California, Davis Tel: 530-752-3879, msdenison@ucdavis.edu.

and BIOACCESSIBLE!

4) **Benzothiazoles from tire crumb are released and BIOACCESSIBLE (along with lead and others**

: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4038666/pdf/nihms565643.pdf>>

"Bio-accessibility and Risk of Exposure to Metals and SVOCs in Artificial Turf Field Fill Materials and Fibers", 2013 Brian T. Pavilonis¹, Clifford P. Weisel¹, Brian Buckley¹, and Paul J. Liroy¹; (One of the more revealing studies because identified Benzothiazoles from tire crumb and Lead from turf and tire crumb at variable levels... but up to and beyond actionable lead levels. **Both Benzothiazoles and LEAD migrated from plastic and tire crumb into synthetic biofluids used to assess "bioavailability" in this study**).

Also present in the syn-biofluids were: **4-tert-octyl phenol** was present in the lung and sweat ...

....**2,2 benzothiazole, a dimer of benzothiazole**, in the digestive fluid. along with a similar compound **Phenol, 2,5-bis(1,1-dimethylethyl)-** which is used as a UV stabilizer and has environmental toxicity **was also present in the total extract**

PRECEDENT FOR BANNING FROM EPA - CPSC SHOULD TAKE NOTE:

5) **EPA has BANNED 2 Mercapto-Benzothiazole and methyl ethyl ketone from pesticides.** <<https://www.regulations.gov/document?D=EPA-HQ-OPP-2014-0558-0056>>

So there is precedent to ban tire crumb because of this - *if it is too toxic for pesticides why should children or athletes be exposed to it??!* See attached - **Methyl ethyl ketone which is in synturf tire crumb and 2 mercapto benzothiazole were BANNED!**

also Phthalates likely present in the plastic rug were banned: Dioctyl phthalate, Dimethyl phthalate, Diallyl phthalate