November 22, 2010

Mr. Michael Wood
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Dear Mr. Wood:

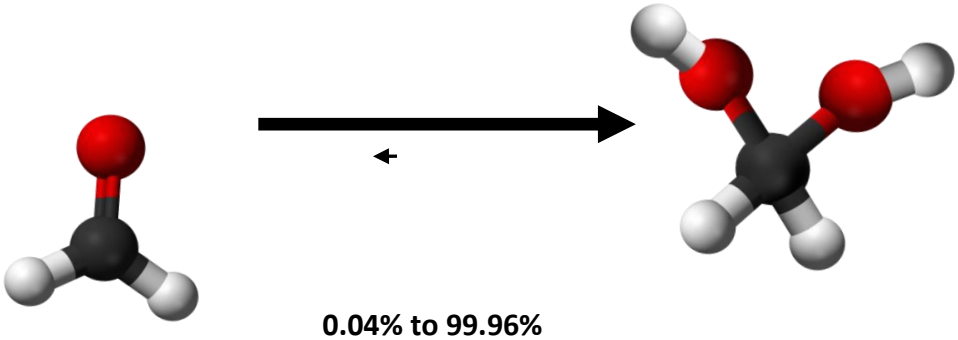
I would like to thank Oregon OSHA for performing air monitoring in salons and publishing its findings. This information will go a long way toward providing salon professionals with factual information they can use to make more appropriate decisions, especially concerning ventilation. As a salon safety advocate, I have been speaking about the need for better ventilation in salons for more than 20 years. I believe this is a perfect opportunity for OSHA to do the same. It would be extremely helpful and of great value if OSHA were to become more active in providing salons with useful information and advice about ensuring ventilation appropriate for the services being performed. When it comes to ventilation and improving salon air quality, cosmetologists and salon owners need OSHA's expertise to help them better understand what works and what doesn't work, and why having proper ventilation is important.

I would like to take this opportunity to bring a related matter to your attention. An Oct. 29, 2010 Oregon OSHA News Release claimed that some cosmetic products contain Formaldehyde as a cosmetic ingredient, when in fact it is not. No cosmetic product has ever "contained formaldehyde" as an ingredient. Only ONE substance can truly be Formaldehyde: HCHO, Chemical Abstracts Service Registry No. 50-00-0, and that substance cannot be added as an ingredient to cosmetics since it is a highly reactive anhydrous gas that reacts instantly with water and is almost completely (99.96%) consumed in the reaction to produce a stable reactant. [1]

Of course, traces of Formaldehyde (HCHO), Chemical Abstracts Service Registry No. 50-00-0) can be found in water-containing cosmetic products, at a level usually less than 0.002% (20 ppm). The same is true for so-called "Formaldehyde releasing" preservatives which typically release into the product about 0.15 ppm "free anhydrous Formaldehyde," according to 13C-NMR studies which accurately measure Methylene Glycol: H_4CO_2, Chemical Abstracts Service Registry No. 463-57-0. [2,3]

From a scientific standpoint, Oregon OSHA is in error to continue claiming that "Methylene Glycol" (H_4CO_2, Chemical Abstracts Service Registry No. 463-57-0) is a "synonym" for Formaldehyde (HCHO, CAS# 50-00-0). This erroneous position is contrary to the scientific understanding of the chemical structures and properties of these two substances, as well as, the definition of a "chemical synonym." This error is rooted in a 100+ year old mistake that erroneously claimed that Formalin is nothing more than "Formaldehyde water." Oregon OSHA is perpetuating the same misinformation as are many other regulators around the world, then claiming that since other regulators are making this chemical error, Oregon OSHA is correct in doing so as well. Oregon OSHA should NOT find solace in repeating this misinformation, but should instead move past this incorrect and out-of-date notion. Chemical synonyms should have identical chemical structures and chemical registry numbers and in this case, they do not. The fact that these two unique and different substances exist in chemical equilibrium, does not alter the scientific fact that they are two different substances, with different chemical structures, existing in different chemical families and having different physical properties. Consequently, they are NOT synonyms despite Oregon OSHA's claims to the contrary.

FORMALDEHYDE - anhydrous gas **HCHO**	**METHYLENE GLYCOL - liquid** **H_4CO_2**
CAS 50-00-0	CAS 463-57-0
EINECS 200-001-8	EINECS 207-339-5
Chemical Family – Aldehyde	Chemical Family - Alcohol
INCI Name – Formaldehyde	INCI Name – Methylene Glycol



0.04% to 99.96%

(Equilibrium in the presence of water shift very strongly toward formation of MG)

Formaldehyde Methylene Glycol

It is important to note that the Oregon OSHA Formaldehyde Rule very clearly and specifically defines Formaldehyde as: "**"Formaldehyde" means the chemical substance HCHO, Chemical Abstracts Service Registry No. 50-00-0."** [4] This is the scientifically correct definition and as stated previously, this substance cannot be added as a cosmetic ingredient to any water-containing cosmetic or personal care product, and it would be incorrect to suggest otherwise.

I question how Oregon OSHA can accept and use this definition while claiming that Methylene Glycol (H_4CO_2, Chemical Abstracts Service Registry No. 463-57-0) is also Formaldehyde. Oregon OSHA should accept the chemical reality that Methylene Glycol and Formaldehyde are completely different substances and regulate them accordingly, especially given that Methylene Glycol is a cosmetic ingredient and Formaldehyde is NOT. The public, scientific researchers, and health care professionals would also appreciate receiving accurate and factual information, not dramatically inflated numbers such as those produced by Oregon OSHA. These inflated values would be better characterized as the "theoretical" maximum potential to produce Formaldehyde under extreme and unusual conditions, not the "actual" measurement of Formaldehyde found in a product. Therefore Oregon OSHA is misleading the public by claiming to "find" the theoretical maximum levels of Formaldehyde in cosmetic products, while the "actual" amounts of Formaldehyde (HCHO) in the cosmetic product may be many hundreds or thousands of times lower. This applies to many types of products ranging from lotions and creams to products for nails and hair.

These same methods are applied to other potential formaldehyde releasers, e.g. Quaternium-15, Diazolidinyl Urea, DMDM Hydantoin, Imidazolidinyl Urea, Sodium Hydroxymethylglycinate, Dehydroxyacetic Acid, tris-Hydroxymethylglycinate, and Benzylhemiformal, which are also incorrectly reported as Formaldehyde (HCHO, CAS# 50-00-0), ignoring the fact that for every 1,000 molecules of Formaldehyde released into a water-containing cosmetic, 996 convert into Methylene Glycol almost instantly, while only 4 remain as Formaldehyde. This demonstrates that Formaldehyde greatly prefers to become and remain Methylene Glycol, which is further demonstrated by the fact that Formalin is predominantly Methylene Glycol (i.e. 99.96%) until heated to above 392^{o}F (200^{o} C). [5] This occurs because the chemical bonds that hold Methylene Glycol together and prevent formation of Formaldehyde are "covalent bonds," considered the strongest of all types of chemical bonds. This helps explain why a significant amount of energy (i.e. heat) is required to force Methylene Glycol to release Formaldehyde in significant quantities.

The test method presented in Appendix B of the Oregon OSHA Formaldehyde Rule is scientifically incorrect. It uses 37% Formalin (59% Methylene Glycol) as the "standard" for 37% Formaldehyde, when according to Professor Winkleman's scientific research, Formalin contains

only 0.0466% Formaldehyde. [1] Why use a "glycol" from the "alcohol" family as the scientific basis for measuring the amount of Formaldehyde (HCHO, CAS# 50-00-0) in water-containing cosmetics? Most methods do not make scientific sense, are contributing misinformation and creating confusion about these chemicals. Identical samples analyzed by different labs using various test methods produced results that can vary a thousand fold, which is strongly indicative of the magnitude of this problem and demonstrates that these methods produce inconsistent results which are fundamentally flawed when applied to water-containing cosmetic products.

Oregon OSHA should utilize the equilibrium constant measured by Professor Winkleman in 2002 to properly determine the correct concentration of Formaldehyde (HCHO, CAS# 50-00-0) in water-containing cosmetic products. Application of this equilibrium constant to the methods used by Oregon OSHA would correct the results to allow for more accurate reporting of Formaldehyde (HCHO, CAS# 50-00-0). Additionally, Oregon OSHA can utilize ^{13}C-NMR testing to correctly and accurately measure Methylene Glycol and then apply the equilibrium constant to determine the correct concentration of Formaldehyde. If Oregon OSHA wishes to report the theoretical maximum potential of a product to produce free Formaldehyde, then it can do so, but it should not misrepresent this as the concentration of Formaldehyde (HCHO, CAS# 50-00-0) "found" in a cosmetic product. This misleads the public and provides no useful information.

I hope you will carefully consider this information. OSHA must be able to understand and recognize this problem or it will be unable to properly deal with these issues. Around the world, OSHA is a highly respected agency and will remain so, but only if the organization is able to understand the key issues involved and to utilize scientific technology and the proper terminology and be willing to acknowledge this information, even if it challenges "accepted" notions and ideologies.

Respectfully Yours,

Doug Schoon
President,
Schoon Scientific

References:

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