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Letter to the Editor

Assessing an Overall Toxicological Implication of Nail Care Product for Occupational and Consumer Health Improvement

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Dear Editor-in-Chief

The nail care industry has been rapidly growing in recent decades in response to emerging consumer demand. Increasing number of registered manicurists has been reported worldwide, and nail care service becomes popular particularly among women and youngsters due to its easily applicable environment without any regulation unlike drinking or smoking. Nail care product is a mixture of chemical ingredients including plasticizers, solvents and acids that may affect both nail salon workers and consumers through multiple exposure routes. Although more than 75% of nail technicians concern about the potential health risks of nail polishes because of strong or irritating smell that cause eye, skin, nose and headache (1), much of general population was rarely knowledgeable about toluene, dibutyl phthalate (DBP), formaldehyde and triphenyl phosphate (TPhP) in the nail care products (2, 3).

Chemical ingredients that toluene, DBP, formaldehyde and TPhP play significant roles for better nail coloring with enhanced flexibility and durability, and those chemicals could finally bring a great satisfaction to the consumers for their well-presented beauty. Despite of remarkable performance, the exposures to toluene, DBP and formaldehyde are reported to cause central nervous system, respiratory irritation, reproductive complication as well as cancer, and thus these chemicals are nicknamed the 'toxic trio' (2)." When TPhP is absolved into the body, it is rapidly metabolized into diphenyl phosphate (DPhP) including several other metabolites, and excreted in urine". However, emerging toxicological literatures indicate that TPhP exposure is closely associated with endocrine disrupting, developmental/reproductive harm and genotoxic problem (3, 4). In study on zebrafish provide clear evidence that TPhP exposure significantly modified neurotransmitters and histamine (5), and disturbs hepatic carbohydrate/lipid metabolism (6). Notably, carcinogens, respiratory irritants, allergens and reproductive/developmental toxicants in nail care products are at a higher risk to the women, who are mainly working in the nail salon and/or consuming nail care products, because most of them are childbearing age.

"Then, why don't we try to shift from using the injurious chemicals to eco-friendly or harmless ingredients in the nail care products?" In fact, several attempts as establishing the governmental regulations to inhibit chemical abuse have been conducted. However, the California Environmental Production Agency (CalEPA) investigated seven 3-Free (toxic-trio excluded) nail care products and discovered four still contained toluene up to 180,000 ppm and one contained DBP at 82,000 ppm (7), which are considerably exceeded the no-

observed-adverse-effect levels (NOAEL) (8). Enhancing the knowledge about toxic chemicals to both nail solon workers and product consumers is also important to assist them in making the best purchasing decisions. Concurrently, health education about nail care product and its chemical ingredient will be helpful to increase students' consciousness of nail polish-associated health impact. There are wide range of possible pathways of toxicants in the nail care product to different environmental media (Fig. 1). Nevertheless, overall fate and toxicological active in various nature bodies are still unknown. Detailed and strict legislation for life-cycle of nail polish (production-consumption-disposal-treatment), nail care service and its indoor environment, occupational/consumer health protection and toxicity evaluation should be further considered. Meanwhile, advanced removal technology of nail polish-associated chemicals in municipal wastewater treatment plant (MWTP) should be also developed for public health and safety.

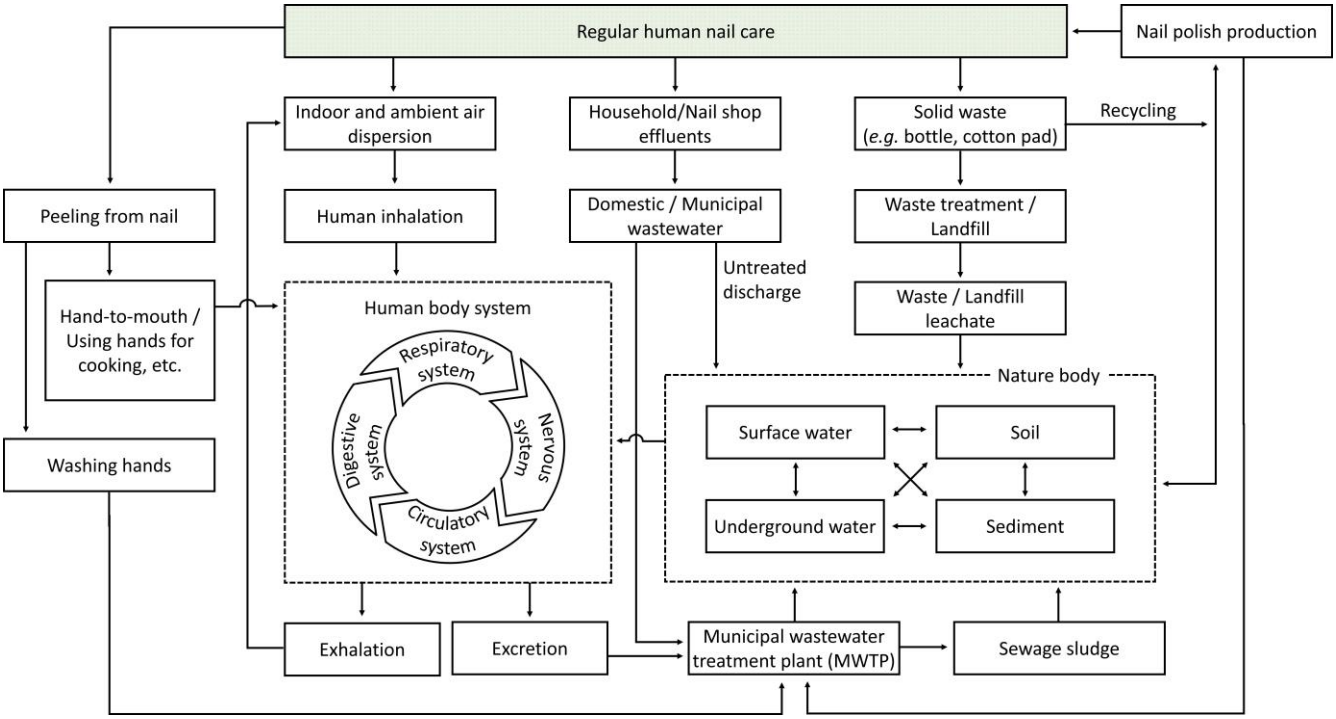

Fig. 1: Possible pathways of nail care product chemicals in various environmental media

Conflict of interest

The author declares that there is no conflict of interest.

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