

CHITOSAN-BASED MEMBRANES FOR IN VITRO PERMEABILITY ANALYSIS OF TRACE ELEMENTS FROM COSMETIC AND PERSONAL CARE PRODUCTS USING INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY (ICP-MS). **Birhan Gezahegn** and Nausheen Sadiq. Mount Royal University, Department of Chemistry and Physics, 4825 Mt Royal Gate SW, Calgary, AB T3E 6K6, Canada. (bgeza741@mtroyal.ca)

As cosmetic and personal care products are ubiquitous and often used daily, the determination of trace elements is imperative to ensure their safety. Through risk assessment studies, regulations to protect environmental and human health can be strengthened. Quantitative and qualitative risk assessments often involve in vitro and animal studies that evaluate exposure to individual elements. These studies may not account for real-world factors such as multi-elemental exposure, chemical interactions, and varying exposure frequency. The development of in vitro study models for risk assessment of trace elements, especially their permeation across the skin is important to address these shortcomings. ICP-MS was used to determine the concentration of trace elements (Al, V, Cr, Mn, Ni, Zn, As, Se, Cd, Hg, Pb) in commercially available cosmetics. Using chitosan-based membranes, synthesized to mimic human skin, and 3D-printed diffusion cells, the concentrations of trace elements that permeate across the dermal layers were determined. The membranes were designed to represent varying skin thicknesses which offers flexibility at low-cost while being biodegradable. Through modification and optimization of membrane thickness and composition, the aim of this model is to address the anatomical variations of skin relating to different body sites, age, sex, pigmentation, and health conditions.