

Hidden chemicals found in menstrual products and their impact on the menstrual cycle

Kyley Drach¹

Supervisors: Dr. Heidi Huttunen-Hennelly² & Dr. Kingsley Donkor³

Committee Members: Dr. Heidi Huttunen-Hennelly, Dr. Kingsley Donkor, and Dr. Mark Rakobowchuk⁴

¹ *MSc, Environmental Science, Thompson Rivers University,* ² *Department of Chemistry, Thompson Rivers University,* ³ *Department of Chemistry, Thompson Rivers University,* ⁴ *Department of Biology, Thompson Rivers University.*

Nearly 7 years of a female's life is spent bleeding, when the average length of a period (5 days) and female reproduction (40 years) are considered. Therefore, over their lifetime, women have chronic exposure to sanitary products. This is of concern, as the vagina contains a large number of blood vessels and is highly permeable, allowing for the absorption of chemicals found in sanitary products into the bloodstream. These chemicals are mainly introduced into sanitary products under three conditions: (1) through bleaching of cotton, (2), through the use of non-organic cotton, and (3) through the plasticizing process of various plastics used in sanitary products. Many chemicals found in typical sanitary products (such as dioxins, phthalates, pesticides, and volatile organic compounds) have various adverse health effects including the promotion of inflammation and endometriosis, decreased fertility, endocrine disruption, and menstrual irregularities (painful cramps and increased/decreased bleeding). Unfortunately, there is little data on the concentrations of these chemicals in sanitary products. However, with an increasing shift to environmental alternatives, many reusable menstrual products have claimed not to contain these harmful chemicals, resulting in reduced menstrual pain and bleeding. Additionally, many of the chemicals found in disposable sanitary products can lead to the pollution of both soil and water environments and impact the species that live there. A more direct path of pollution comes from the waste generated by the use of disposable sanitary products. The objectives of my research are therefore: (1) to qualitatively and quantitatively assess these claims and determine if there is a difference in the chemical concentrations present in disposable and reusable products, (2) to determine if there is a difference in chemical concentrations present in products that contain plastics, bleached cotton, and non-organic cotton and products that do not contain plastics, bleached cotton, and non-organic cotton, regardless of if these products are disposable or reusable, and (3) to determine if switching to products with fewer chemicals effects pain and bleeding individuals experience during menstruation through human trials. I will determine the chemical concentrations within various menstrual products by applying 1-2mL of saline solution every hour for four hours to each menstrual product to simulate menstruation before extracting the saline solution. Gas Chromatography Mass Spectrophotometry (GC-MS) and Capillary Electrophoresis (CE) techniques will be used to identify and determine the concentrations of chemicals present. After it has been determined which products have the most and least chemicals present these products will be used for human trials, where for 6 months women will use products with high chemical concentrations before switching to products with low chemical concentrations for the following 6 months. Survey data will be collected from participants to determine if their pain and bleeding decreased during the study period. The results and outcomes of my research will provide insight

into the effect of various chemicals on the female reproductive system and will help determine whether switching to reusable pads and tampon alternatives (or disposable products with fewer chemicals) has a positive effect on pain and bleeding during menstruation. If this is the case, I hope to encourage women to switch to reusable menstrual products for their own benefit and the benefit of the environment, or at least switch to disposable products with fewer chemicals to lessen chemical pollution.