**Background and Objectives**

Public transport is often the primary and only means of transportation for people. Furthermore, transit spaces are small, contained areas that have a high turnover of users and have many frequently touched surfaces. Copper (Cu), with its well-documented antimicrobial action, could reduce the risk of pathogen exposure on highly touched surfaces for transportation riders [1-3]. Following a Phase 1 pilot study with TransLink (TL) in 2020, as part of their COVID-19 response, Phase 2 of the study was launched in late 2021 with TL and Toronto Transit Commission (TTC) to determine if Cu installed on transit high touch surfaces will maintain its durability and antimicrobial efficacy over 12 months of use.

**Objective:** To evaluate the antimicrobial efficacy and durability of three formulations of Cu products on transit vehicles in Vancouver and Toronto after one year of use.

- Three different formulations and applications of Cu products were randomly installed on 110 stanchions on three buses and four skytrain cars in Vancouver; and three buses, two subway cars and two streetcars in Toronto. Each Cu product had a mirrored non-Cu control directly opposite. All audits were performed on transit vehicles after peak morning rush-hour traffic and prior to cleaning.
- **Microbial (bi-monthly):** IM™ Aerobic Count Petrifilm™ surface testing (in triplicate) and ATP bioluminescence assay.
- **Durability (monthly):** Colorimeter measurement, Waterloo test for Cu concentration and visual inspection. At 6 and 12 months, ex-situ microscopy used to assess Cu product durability.

**Results**

**Antimicrobial Results**

- Effect of the Group (Control vs Copper) on log.CFU by city
- Effect of the Group (Control vs Copper) on ATP bioluminescence by city

**Durability Results**

- Changes in surface morphology of the stanchions via SEM and colorimetric analysis. Surface appearance is described by the three coordinates, P* (red/magenta-green), B* (yellow-blue) and L* (lightness—black to white) in the CIE Lab colour reference space. LFT: dirt or corrosion products concentrate in surface aspexitin over time. RHS: products become tarnished and dulled due to surface oxidation as time progresses.

**References**


**Acknowledgements**

This study was generously funded by Teck Resources Inc. This study would not be possible without the help and dedication of the following organizations.

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