

VISIBLE REFLECTANCE SPECTROSCOPY TO OBSERVE THE EFFECT OF COPPER EMBEDDED SOCKS ON ERYTHEMA IN FEET

LISA JEAN HUHMAN

Dr. John A. Viator, Thesis Supervisor

ABSTRACT

Objective assessment of skin characteristics is necessary to aid in the clinical detection of erythema and debilitating skin conditions. The ability to treat different skin pathologies based on individual patient skin conditions will lead to fewer amputations and complications experienced by amputees, diabetics and the elderly. Copper has been used in medical applications for over a hundred years. A process has recently been developed that incorporates copper into textile materials. As an antimicrobial fabric, copper impregnated socks have a broad spectrum of potential including reduction or elimination of erythema. Though previous studies have concluded that copper ion socks reduce or eliminate erythema, those studies were based on clinical observation only and not empirical data. Expanding on preliminary studies, we were interested in scientifically measuring the change in erythema utilizing VRS methods. This study focused on the detection of erythematic changes associated with copper socks using a visible reflectance spectrometer in two randomized, double blind studies. Using the spectral data collected over the duration of the pilot study using a visible reflectance spectrometer, optical diffusion theory and knowledge of normal and pathological skin components, we were able to determine the amount of erythema in skin by determining an erythema index.