

ABSTRACT

*Organdy cotton fabric is one of the widely used textile materials, but it naturally lacks adequate hydrophilicity and antibacterial properties. To enhance its functionality, surface modification is required to improve water absorption as well as to introduce antimicrobial activity. One potential method involves combining positive corona plasma treatment with coating of ZnO (zinc oxide) nanoparticles, which are known for their photocatalytic and antibacterial properties. In this study, organdy cotton fabric samples measuring 5×5 cm were treated with plasma under variations of electrode distance (D) and fabric position (r), followed by immersion in a 2% ZnO suspension. The samples were characterized by water absorption time test, contact angle measurement, surface morphology analysis using SEM, and antibacterial testing using the disk diffusion method against *Escherichia coli*. The results showed that the optimal condition was achieved at an electrode distance of $D = 1.9$ cm and tip radius $r = 0$ mm with 30 minutes of continuous plasma exposure. Plasma treatment reduced the water absorption time from 40 second to 9 seconds and decreased the contact angle from 98° to 44° . After ZnO immersion, the water absorption time further decreased to 1 second, with an average contact angle of 38° , indicating a significant increase in surface hydrophilicity. SEM observations revealed structural changes on the fiber surface, including peeling and damage to the outer fiber layer due to plasma activation. Antibacterial tests showed a larger inhibition zone on samples receiving both plasma and ZnO treatments compared to plasma treatment only.*

Keywords: *positive corona plasma, organdy cotton, zinc oxide, antibacterial.*