under fluorescence microscope. FDA can enter directly into the live cells where it reacts with the intracellular esterase enzyme and activate fluorescence while PI can penetrate only into the cells and bind with nuclei when the cellular membrane is ruptured or damaged [38]. A large proportion of green and red fluorescence was observed in Figure 6a and c for control and treated *E. coli* bacterial cells after 30 min of incubation, respectively. After 15 min of incubation as shown in Figure 6b, the Gram-negative *E. coli* sample treated with 50 μg/mL ZnO NPs had nearly equal proportion of live and dead bacterial cells.

CONCLUSION

In conclusion, a simple, rapid green synthetic approach was adopted to synthesize biogenic ZnO nanoparticles by using aqueous leaf extract of *C. halicacabum*. UV-vis absorption spectrum showed the formation of crystalline ZnO NPs with the characteristic SPR peak. FESEM and TEM micrograph showed the nano-spherical and nano-rod shaped nanoparticles and elemental composition of ZnO was demonstrated by EDX profile. The crystalline structure and average size of ZnO NPs was confirmed with the XRD technique. Cotton fabric with ZnO NPs showed high antibacterial activity against Gram-negative bacteria than the Gram-positive one. Result of the study revealed the bactericidal properties of the metal oxide nanoparticles on the textile materials and ZnO NPs impregnation of cotton fabrics will be a useful tool as bactericidal bandage materials in hospitals.

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