

ANTI-PROTOZOAL ACTION OF PLAIN NANOFIBER AND COMPOSITE ZINC OXIDE NANOFIBER MEMBRANES AGAINST *CYCLOSPORA CAYETANENSIS* IN POLLUTED DRINKING WATER SAMPLES.

Maha Reda Gaafar, Rasha Fadly Mady, Thanaa Ibrahim Ahmed Shalaby*, Nehal Nassef Ismail Hezema, Sherifa Mohamed Shaban Korayem

Department of Medical Parasitology, Faculty of Medicine, Alexandria University
Department of Medical Biophysics and biomedics Faculty of Medicine Medical Research Institute*

Introduction

All biological processes on earth are purely dependent on it. However, water plays a major role in transmitting many pathogenic microorganisms such as protozoa including *Cyclospora*. Accordingly, drinking water should be well-treated. One of the highly efficient ways for water treatment is nanofiltration technique which depends on the use of membrane containing nanopores for filtering water from variable size pollutants. Furthermore, coating of these membranes with Zinc oxide (ZnO) nanoparticles (NPs) has improved its filtration power.

Aim of the work

Our study aims at evaluating the efficacy of nanofiber composite membranes coated with ZnO NPs in filtrating polluted drinking water and studying its antiprotozoal action against *C. cayetanensis*.

Patients and Methods

One hundred different drinking tap water samples were collected. Water samples were stained using Safranin stain. Nanofibers were prepared using electrospinning. After filtration of water samples further staining was done to confirm absence of any protozoa in the filtered water, with scanning of the trapped protozoa on the nanofilters using SEM to demonstrate structural changes.

Results

Staining of collected water samples confirmed the presence of *Cyclospora* in 18% of samples. After filtration of positive samples, *Cylospora* was trapped on the membrane with massive structural changes observed by SEM in those trapped on ZnO composite membranes as compared to plain membranes. After staining of the filtrated water, no protozoa were detected.

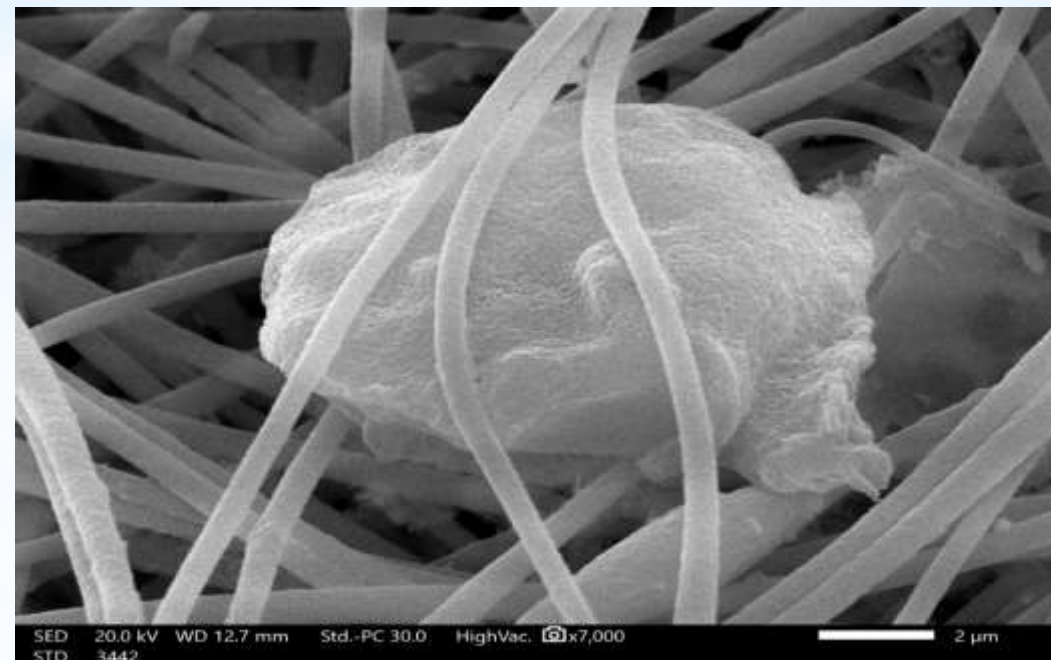


Figure 1: SEM of *Cyclospora* trapped on ZnO NF membrane.

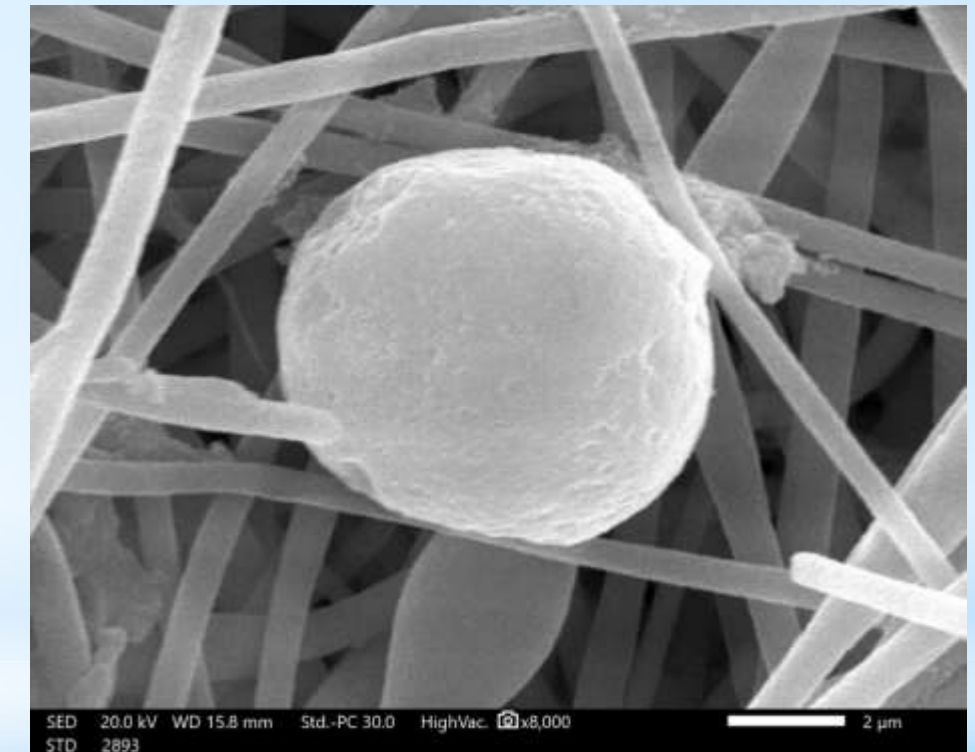


Figure 2: SEM of *cyclospora* trapped on ZnO NF membrane.

Conclusion

Our study proved the effectiveness of composite nanofiber membranes coated with ZnO NPs in filtrating water from *Cyclospora* oocysts. These membranes induced marked structural distortion in the oocysts.