

UNIVERSITI TEKNOLOGI MARA

**EFFECTIVENESS OF MULTIPURPOSE
CONTACT LENS DISINFECTING
SOLUTIONS AGAINST CYSTS OF
Acanthamoeba T4 GENOTYPE**

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the degree of

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DECLARATION BY STUDENT

Project entitled “Effectiveness of Multipurpose Contact Lens Disinfecting Solutions against Cysts of *Acanthamoeba* T4 Genotype” is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor, Associate Professor Dr Tengku Shahrul Anuar Bin Tengku Ahmad Basri. It has been submitted to the Faculty of Health Sciences in partial fulfilment of the requirement for the Degree of Bachelor of Medical Laboratory Technology (Hons.)

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ABSTRACT

Acanthamoeba is a genus of free-living amoebae that widely distributed in various ecological environments. It is classified into three distinct morphological groups (I-III) based largely on the cyst morphology of the species and encompassing more than 25 nominal species. Currently, *Acanthamoeba* has been classified into 17 different genotypes (T1-T17), based on 18S rRNA nucleotide sequencing by molecular techniques. However, T4 was the most frequently genotype associated with *Acanthamoeba* keratitis which commonly occurs among contact lens users. The main risk factors for this infection were ineffective multipurpose disinfecting contact lens solutions (MPDS) and contaminated contact lens storage. The present study was conducted to evaluate the effectiveness of four different commercially available MPDS as well as to investigate the amoebicidal effects of four MPDS against *Acanthamoeba* T4 cysts isolated from contact lens paraphernalia. This study was performed on 180 contact lens paraphernalia obtained from the previous study. A total of fourteen *Acanthamoeba* T4 cysts that confirmed with PCR assay were cultivated on 1.5% non-nutrient agar seeded with *E. coli*, harvested and adjusted in a final concentration of 2×10^4 of cysts. The cysts of 14 samples were tested against four different MPDS; Renu[®] Fresh[™], Complete[®], Opti-Free[®] Express[®] and Unica[®] sensitive within manufacturer's minimum recommended disinfection time (MMRDT) (4 or 6 hours) and extended time (12 hours). After the incubation time, the cysts counts were enumerated using haemocytometer under light and inverted microscopes using x40 objective. The viability was confirmed by reinoculation onto non-nutrient agar seeded with *E. coli*. Paired T-test and One-Way ANOVA test were used to determine the significant value of the results. None of the solutions was effective towards *Acanthamoeba* T4 cysts within the MMRDT and extended time. These results were confirmed by survival assays which appeared that the *Acanthamoeba* might transform from cyst to trophozoite stages. Nevertheless, with regard to cells reduction, Opti-Free[®] Express[®] solution showed statistically significant at the MMRDT (6 hours) ($p=0.015$) and at the extended time (12 hours) ($p=0.004$). In conclusion, these findings revealed that none of the MPDS was effectively to kill cysts of *Acanthamoeba* T4 genotype. Though, Opti-Free[®] Express[®] solution was the most effective MPDS as compared to Renu[®] Fresh[™], Complete[®] and Unica[®] sensitive. Hence, new concentration of active ingredients should be reviewed and new MPDS should be developed in order to effectively kill *Acanthamoeba* cysts.