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Evaluation of therapeutic potential of folk plants extracts against Acanthamoeba *in vitro*

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Statement of the Problem: Acanthamoeba is an opportunistic protozoan pathogen and one of the most prevalent organisms in our natural environment (i.e., air, soil and water). It is recognized to cause fatal brain infection (*Granulomatous encephalitis*) and eye infection (blinding keratitis). Treatments for both infections are problematic because of the amoebic cysts resistance to therapeutic agents. That is why there is no effective anti-amoebic drug available to date. The purpose of the present study was to evaluate in vitro strength of plants extracts on the viability and biological properties of *Acanthamoeba castellanii* (T4 genotype) and its cytotoxic effects on human corneal epithelial cells (HCEC).

Methodology & Theoretical Orientation: Using HCEC, adhesion, cytotoxicity and amoebicidal, amoebic growth assays were performed.

Findings: Normally, Acanthamoeba exhibited >90% binding and >80% cytotoxicity to HCEC cells which was remarkably inhibited by plant extracts to >70 and 60% respectively. It was also observed that extracts (ranging from 0.1 to 1.5 mg/ml) exhibited amoebicidal effects, i.e., >50% of trophozoites were killed at 1.5 mg/ml within 1 hour. However, the residual amoeba remained static for quite some time. Furthermore, extracts also inhibited >50% amoeba numbers up to 7 days during growth assay. Furthermore, plant extracts (1 to 30 mg/ml) exhibited amoebicidal effects against Acanthamoeba cysts. Furthermore, Acanthamoeba encystment was also inhibited in concentration dependent manner with maximum inhibition at 2 µg/ml after 48 hours. Among all Peganum harmala seed extracts showed optimal activity against amoeba. Our results confirmed that extracts have toxic effects against both cysts and trophozoite.

Conclusion & Significance: Overall, we reported for the first time that selected plant extracts exhibited inhibitory effects on biological properties of Acanthamoeba without any toxic effects on HCEC cells in vitro.

Recommendations: Further experiments are required with purified fractions of plant extracts to identify the active ingredients and to elucidate the mechanism of action of the effective compounds both in vitro and in vivo which may provide a new series of chemotherapeutic agents.

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