A Phage Indicator Model for In-Vitro Evaluation of Antiviral Drugs Used in Ayurvedic and Traditional Medicine

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Finding new antiviral drugs for the emerging new viruses have become an outstanding scope of study. The analysis of anti-phage activity evaluation model based on plaque reduction assay has been performed by numerous researchers in evaluating antiviral properties of Western and Ayurvedic medicines. This has been performed by using phages with their corresponding hosts. This study was carried out to validate the antiviral sensitivity of a phage-indicator model to evaluate antiviral drugs used in Ayurvedic and traditional medical treatments in Sri Lanka

The host bacterium *Escherichia coli* was isolated with its corresponding coliphage from sewage effluents. Prior to the antiviral assay, the antibacterial effect of standard antiviral drugs, Acyclovir, Lamuvidine, Ribavarin and Oseltamivir on *E. coli* was determined. According to the results up to 80mg/ml for Acyclovir, Lamuvidine and Ribavarin did not show any antibacterial effect while Oseltamivir showed only up to 20mg/ml. The antiviral assay was performed in two approaches where the corresponding test drug was applied to a young culture of host bacterium and incubated overnight prior to the inoculation of the bacterium by phage suspensions. As the second approach, the test drug was applied to a phage suspension and incubated overnight prior to the inoculation of phage into the bacterium. According to the reduction of plaques on agar plates after performing the two approaches the mode of antiviral activity was determined.

There was a significant reduction of plaque formation observed when the host bacterium was treated with the western antiviral drugs, suggesting that their antiviral effects occur during the viral replication stages in the host cell and this complies with the available literature which describes the mode of action of these Western antiviral drugs. The model was also used to evaluate traditional herbal extracts to determine the presence of antiviral properties. Accordingly, the second approach revealed that the aqueous black tea extract showed an antiviral effect during the adsorption stages while crude papaya leaf extract in the replication stages of the virus life cycle.

However, the Ayurvedic product 'Sudarshana Churnaya' showed no effects in either the two stages of the virus life cycle. With these results it is concluded that this model is feasible, and efficient against laborious cell culture techniques in screening antiviral drugs.

Keywords: Anti-Viral Drugs, Coliphage, Ayurvedic Medicine, Lamuvidine, Acyclovir: Ribavarin, Oseltamivir

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