Cytotoxicity and Antiviral Activity of *Kyllinga nemoralis* Methanolic Extract

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Abstract

Herpes Simplex Virus (HSV) is a double-stranded DNA virus in the Herpesviridae family. The most prevalent in humans is Human Simplex Virus Type 1 (HSV-1). It can reach the brain without causing the symptoms [1]. Currently, the most antiviral drug used is Acyclovir (ACV); nucleotide analogues target DNA polymerase inhibiting viral replication. However, ACV drug-resistant occurs, especially in immunocompromised patients [2]. Therefore, alternate therapy for patients with established resistance was required. Plant extract is commonly used as antiviral agent. *Kyllinga nemoralis* is known as White Spike Head had antiviral, antibacterial, antibleeding and anti-poisoning properties [3]. It contains antiviral sources such as the highest flavonoid and flavonol concentrations [4].

The objective of this experimental study was to investigate the potential of *K. nemoralis* methanolic extract as antiviral agent against HSV-1. The root of *K. nemoralis* methanolic plant extract, Vero Cells and HSV-1 were used in this study. The Cytotoxic Concentration (CC50) of the *K. nemoralis* methanolic extract against Vero Cells and the antiviral activity of *K. nemoralis* methanolic extract against HSV-1 by using post-treatment, pre-treatment and virucidal assay were performed in this study.

Results showed that the percentage of cell population versus concentration of root of *K. nemoralis* methanolic extract (figure 1). The CC50 of this extract was determined at 0.91 mg/mL. This showed that the root of *K. nemoralis* methanolic extract was considered not toxic to the cells as the CC50 of extract showed more than 4 µg/mL [5].
Figure 1: The effect of different concentrations of root of *K. nemoralis* methanolic extract towards the population of Vero cells.

Figure 2 shows the antiviral activity of root of *K. nemoralis* methanolic extract against HSV-1 via post-treatment, pre-treatment and antiviral assay. In post-treatment, the SI value of extract was 12.64 which is more than 10. When the SI value is higher than 10, it is considered to possess a high potential of antiviral agent [6].

The results indicate that the root of *K. nemoralis* methanolic extract was more effective in protecting the Vero cells. In pre-treatment, the SI value of the extract was 8.27. This finding shows that the root of *K. nemoralis* methanolic extract had a moderate ability to bind to the Vero cells and inhibited the binding of HSV-1 to the cell surface of the Vero cells. In a virucidal test, the root extract towards HSV-1 showed the SI value was 8.125. This data suggests that the root of the extract was moderately inactivates the extracellular component of HSV-1.

In conclusion, the findings of this study show that *K. nemoralis* methanolic extract was non-toxic to the Vero cells and has the potential to be an antiviral agent against HSV-1.

**Keyword**
Antiviral assay, Herpes simplex virus type 1, *Kyllinga nemoralis*

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