

Antiviral activity of traditional Chinese medicinal plants *Dryopteris crassirhizoma* and *Morus alba* against dengue virus

ABSTRACT

Dengue virus (DENV) has emerged as a major virus that is spread by mosquitoes. Recently, it has spread to more than a hundred nations but continues to lack specific treatable medication. Many traditional Chinese medicinal (TCM) plants are in practice for dengue fever in dengue endemic regions. These traditional medicines persevere with treatments, which modern medicines lack. The study aims to substantiate the anti-dengue potential of some traditional herbs and make them available for further studies to facilitate TCM users. Twelve TCM plants aqueous extracts were evaluated, which are described as cool herbs used for the diseases with high fever. Lead plants were established through detailed in vitro foci forming unit reduction analysis (FFURA) against all four serotypes and validated through quantitative real-time RT-PCR (qRT-PCR). Four plants potentially inhibited the virus in primary phenotypic in vitro evaluation. Two lead plants *Dryopteris crassirhizoma* (DC) and *Morus alba* (MA) were identified with half minimal inhibitory concentration (IC₅₀) 130 and 221 $\mu\text{g mL}^{-1}$, respectively, while the selectivity indices (SI) were 4.21 and 4.62, respectively. Lead plants equally inhibited all four serotypes of DENV. Time-of-addition analysis suggested that, DC was active at later stages of viral replication, whereas MA was active during the early stages and even showed some prophylactic activity. Liquid chromatography-mass spectrometry (HPLC/MS) analysis revealed presence of flavonoids. DC and MA are identified as potential anti-dengue plants, active against varied stages of dengue virus replication cycle. These results may serve as the base knowledge for further investigation on their combined treatments or integrative treatment with western medicines, which may improve the overall anti-dengue activity in future.

Keyword: Dengue virus; Traditional Chinese medicines; TCM; Complementary medicines; Plant extracts; Anti-dengue