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A modified MS2 bacteriophage plaque reduction assay for the rapid screening of antiviral plant extracts

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ABSTRACT

Introduction Traditional methods of screening plant extracts and purified components for antiviral activity require up to a week to perform, prompting the need to develop more rapid quantitative methods to measure the ability of plant based preparations to block viral replication. We describe an adaption of an MS2 plaque reduction assay for use in S. aureus. Results MS2 bacteriophage was capable of infecting and replicating in B. cereus, S. aureus and F+ E. coli but not F- E. coli. Indeed, both B. cereus and S. aureus were more sensitive to MS2 induced lysis than F+ E. coli. When MS2 bacteriophage was mixed with Camellia sinensis extract (1 mg/ml), Scaevola spinescens extract (1 mg/ml) or Aloe barbadensis juice and the mixtures inoculated into S. aureus, the formation of plaques was reduced to 8.9 +/- 3.8%, 5.4 +/- 2.4% and 72.7 +/- 20.9% of the untreated MS2 control values respectively. Conclusions The ability of the MS2 plaque reduction assay to detect antiviral activity in these known antiviral plant preparations indicates its suitability as an antiviral screening tool. An advantage of this assay compared with traditionally used cytopathic effect reduction assays and replicon based assays is the more rapid acquisition of results. Antiviral activity was detected within 24 h of the start of testing. The MS2 assay is also inexpensive and non-pathogenic to humans making it ideal for initial screening studies or as a simulant for pathogenic viruses.

KEYWORDS

Aloe vera . antiviral assay . Camellia sinensis . MS2 bacteriophage . plaque reduction assay . Scaevola spinescens

REFERENCES