ANTIVIRAL ACTIVITY OF PLANT EXTRACTS AGAINST VIRAL HEMORRHAGIC SEPTICEMIA VIRUS

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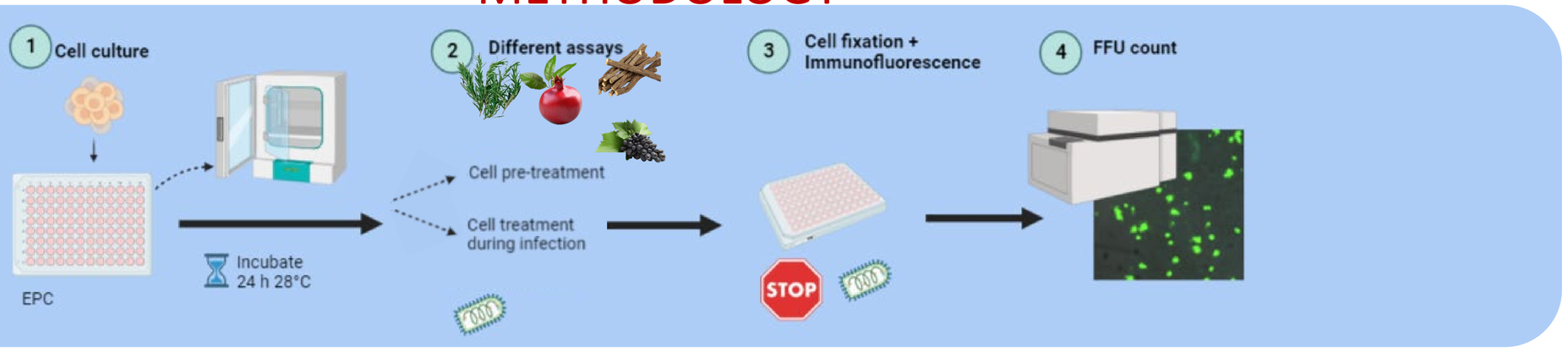
SUMMARY

In the last decades aquaculture seems to be the only real alternative for global fish food supply. However, diseases affecting aquaculture produce high economic losses, so chemical agents are usually used, but they can affect the ecosystem. Plant extracts are an alternative because of their pharmacological properties. In this work, we evaluated the antiviral activity of four plant extracts: *Vitis vinifera, Rosmarinus officinalis, Glycyrrhiza glabra* and *Punica granatum*, which have shown their activity as immunostimulants or antivirals, to search for new antiviral compounds against the viral hemorrhagic septicemia virus (VHSV).

The antiviral activity of the plant extracts was evaluated in EPC (epithelioma papulosum cyprini cell line from *Pimephales promelas*) cell line, which is susceptible to VHSV infection. Working concentrations of the plant extracts were selected based on bibliography and firstly assessed by a cytotoxicity assay. Then, the antiviral activity of the plant extracts, before or during the course of infection, were assessed: i) by pretreating the cell monolayer with the extracts 24 hours prior to infection; and ii) by treating the cells during the course of infection, 2 hours after infection. Viral loads were evaluated by means of a focus forming units assay.

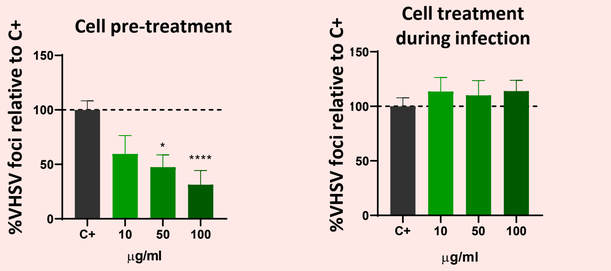
The results showed that all plant extracts had antiviral activity, reducing the viral load *in vitro* more than a 50% in all of the cases. Further research will be focused on their application in fish feed and administration *in vivo*. In conclusion, the use of these plant extracts as antivirals is presented as an alternative to mitigate viral diseases in aquaculture.

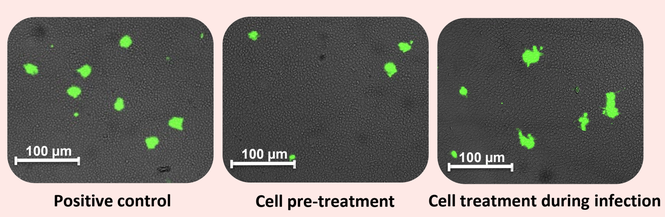
METHODOLOGY



RESULTS

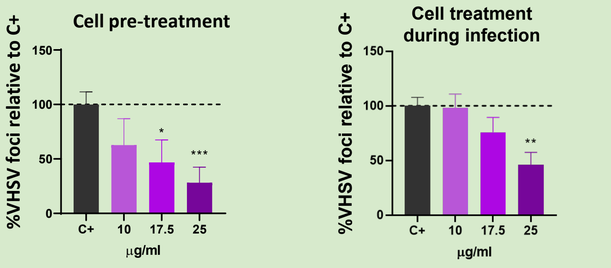
I - Evaluation of the antiviral activity of *Rosmarinus officinalis* extract

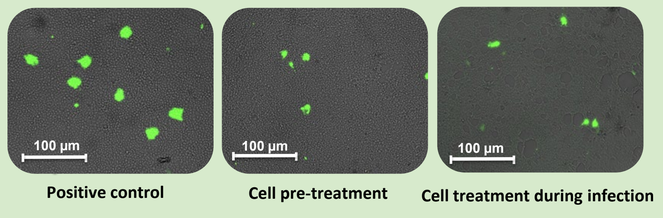




- Reduced VHSV infectivity >60% when used as cell pre-treatment.
- Showed no effect against VHSV in the treatment during infection.

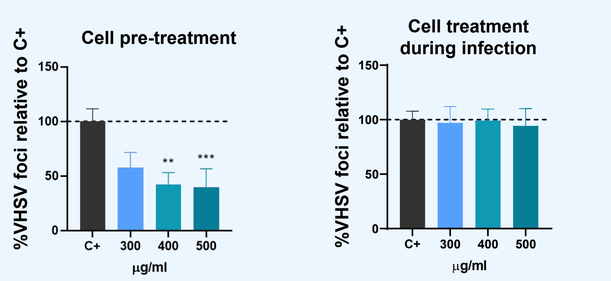
II - Evaluation of the antiviral activity of *Vitis vinifera* extract

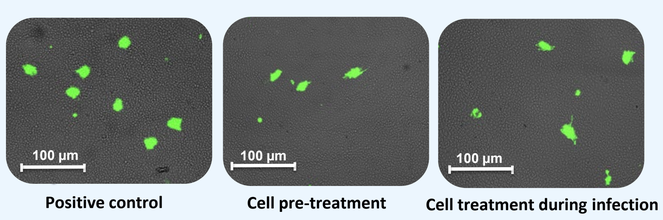




- Reduced VHSV infectivity >70%
- The extract was effective before and during the infection

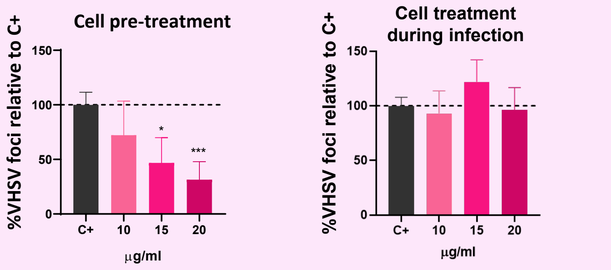
III – Evaluation of the antiviral activity of *Glycyrrhiza glabra* extract

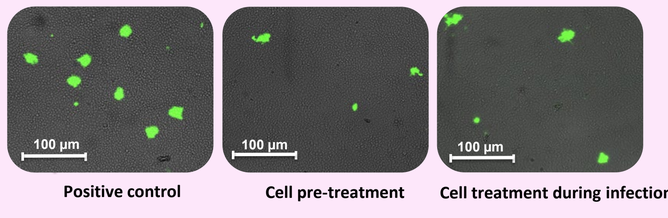




- Reduced VHSV infectivity >60 % when used as a cell pre-treatment.
- Showed no effect against VHSV in the treatment during infection.

IV – Evaluation of the antiviral activity of *Punica granatum* extract





- Reduced VHSV infectivity >60% when used as cell pre-treatment.
- The extract showed no effect against VHSV either in the treatment during infection.

CONCLUSIONS

We have evaluated the antiviral activity of four comercial plant extracts (obtained from NATAC Biotech and SHAANXI SHENGKANG Health Biotech), using VHSV and rainbow trout as working model. The results obtained pointed out the four plant extract as promising therapeutic agent against viral diseases in aquaculture.