

Enhanced Protection of Shrimp *Litopenaeus vannamei* against Yellow Head Virus through Delivery of Virus-specific dsRNA via a Composite Nanomaterial

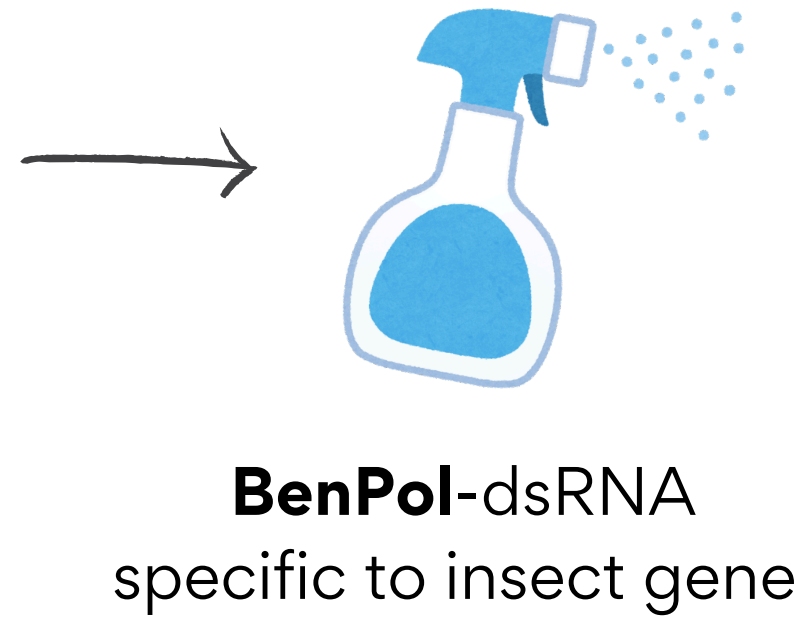
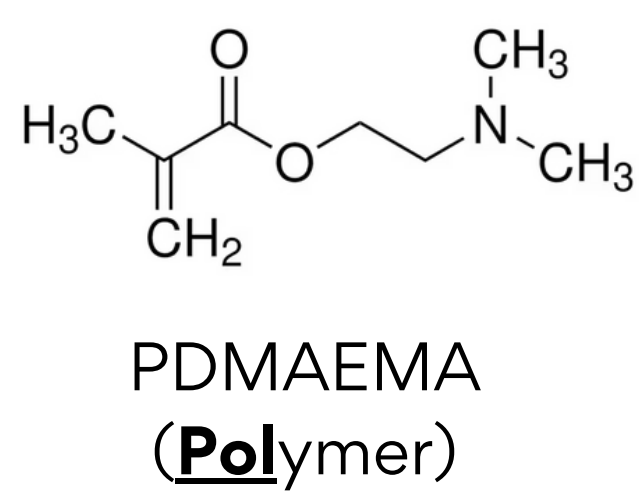
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THE BACKGROUND



This can protect the crop from the insect pest (Yong et al., 2022)



THE DEMAND

As the dsRNA is required in large amounts to inhibit Yellow Head Virus (YHV) by RNA interference, the delivery system helps protect dsRNA from the enzymatic degradation required in shrimp.

BenPol is promising, but its application in an aquatic environment still needs to be discovered.

THE PURPOSE

This study explores BenPol's potential as a delivery system for dsRNA in an aquaculture setting, focusing on its application in combating YHV infection in shrimp, specifically *L. vannamei*.

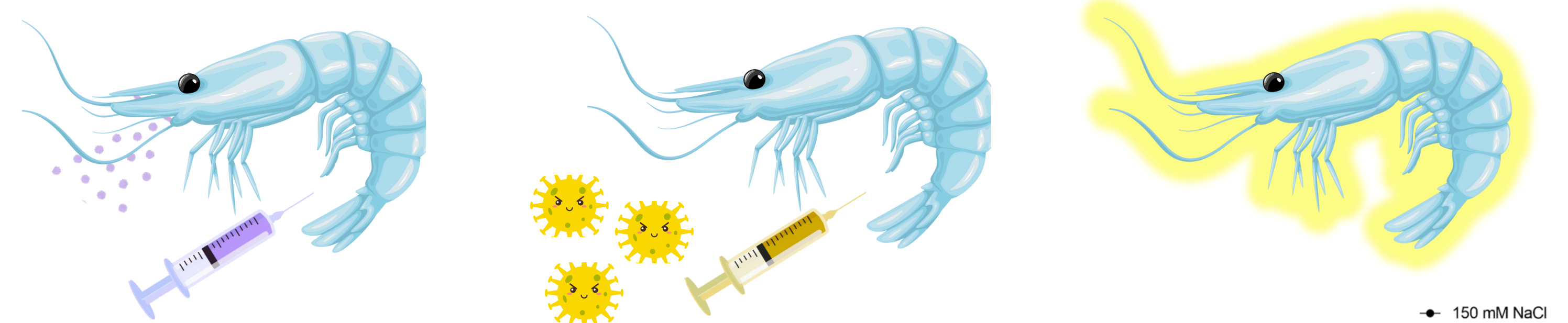
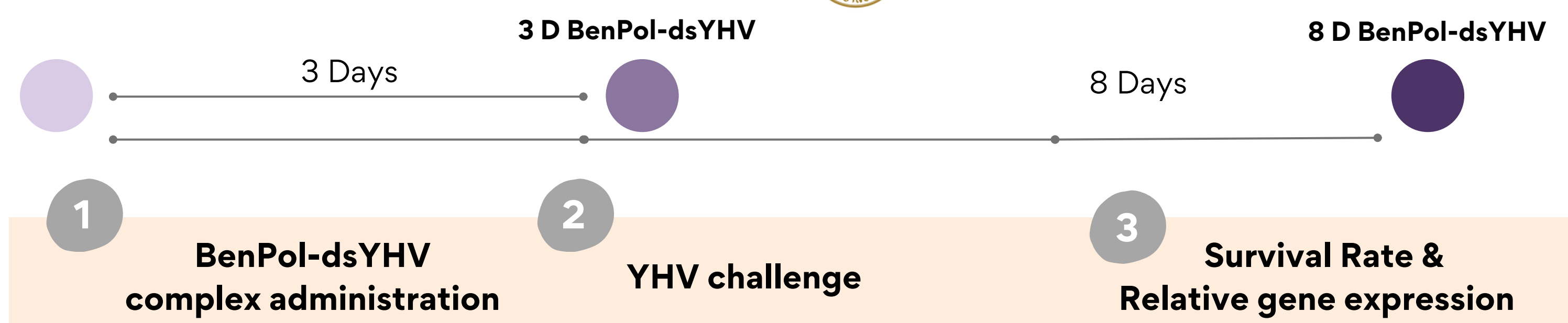
THE METHOD



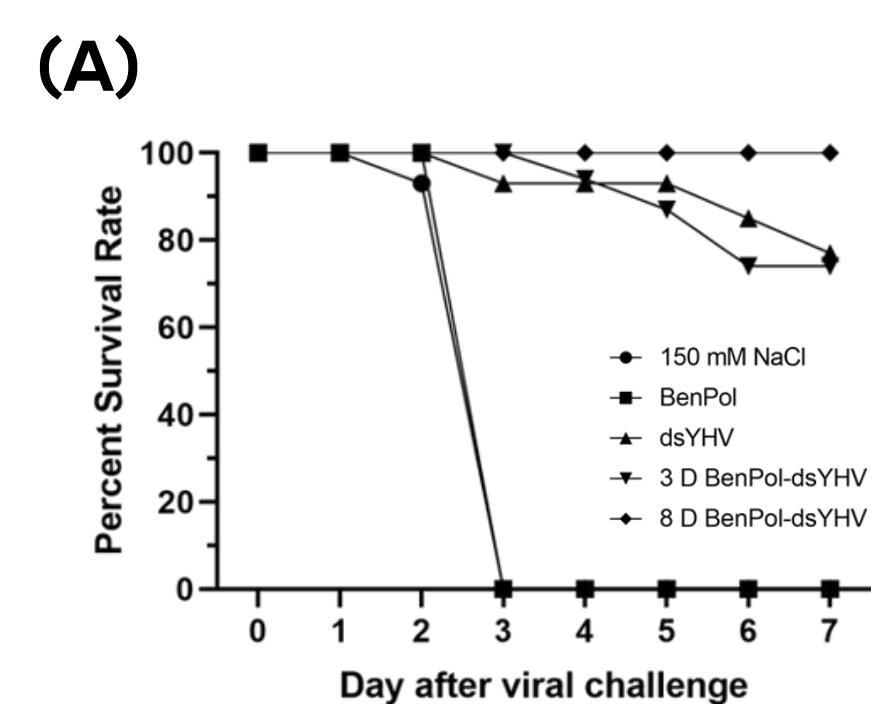
BenPol-dsYHV Complexes formation (at 4 °C)



Mahidol University

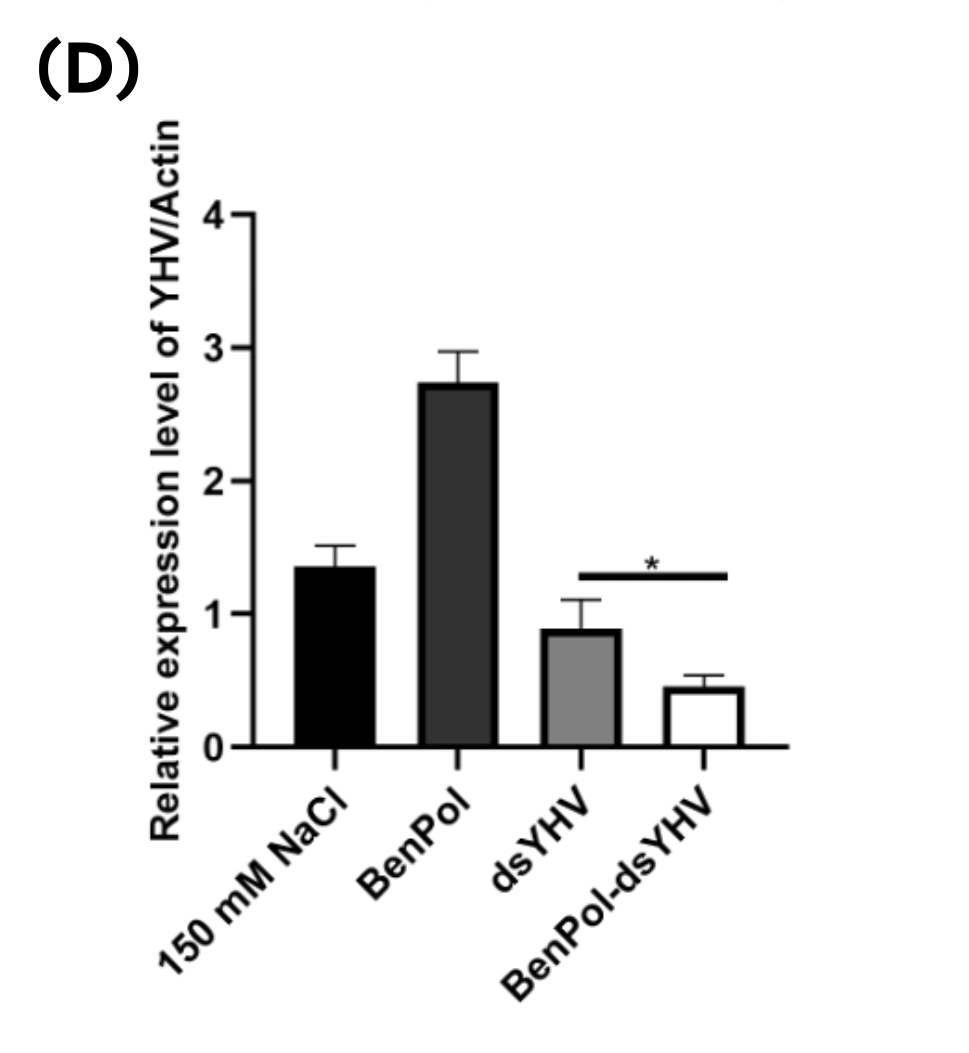
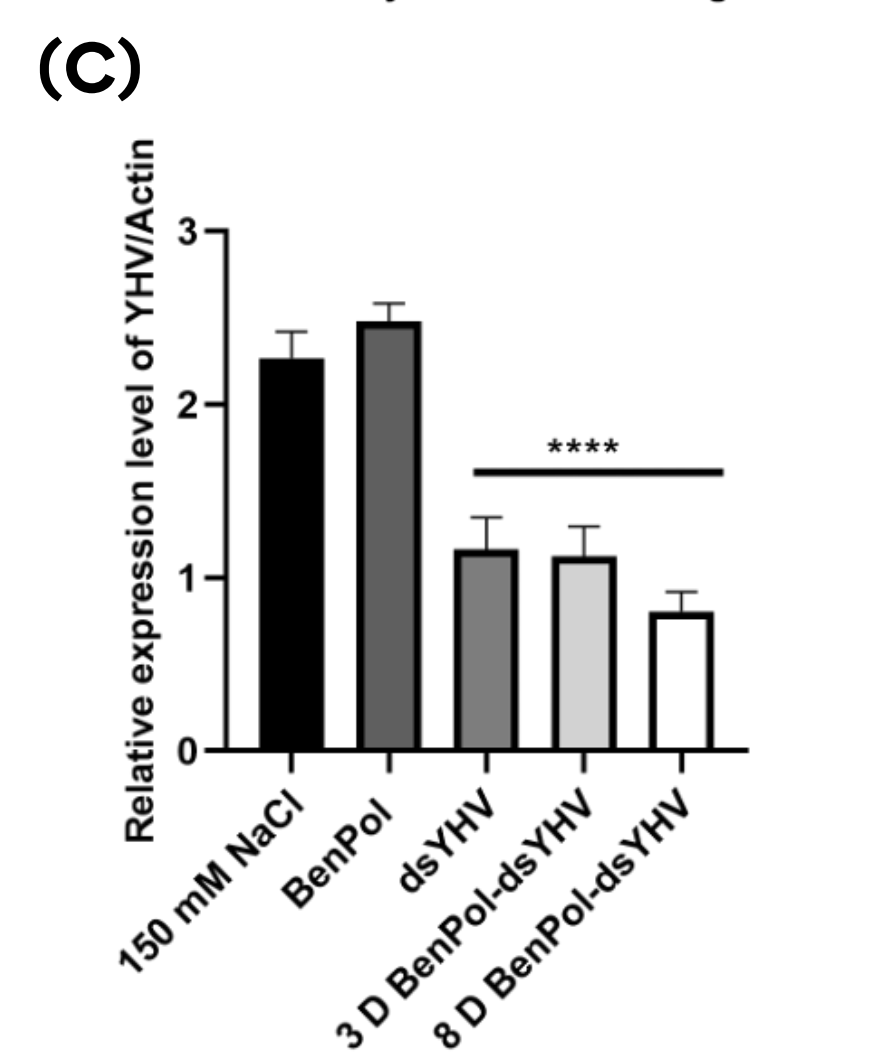
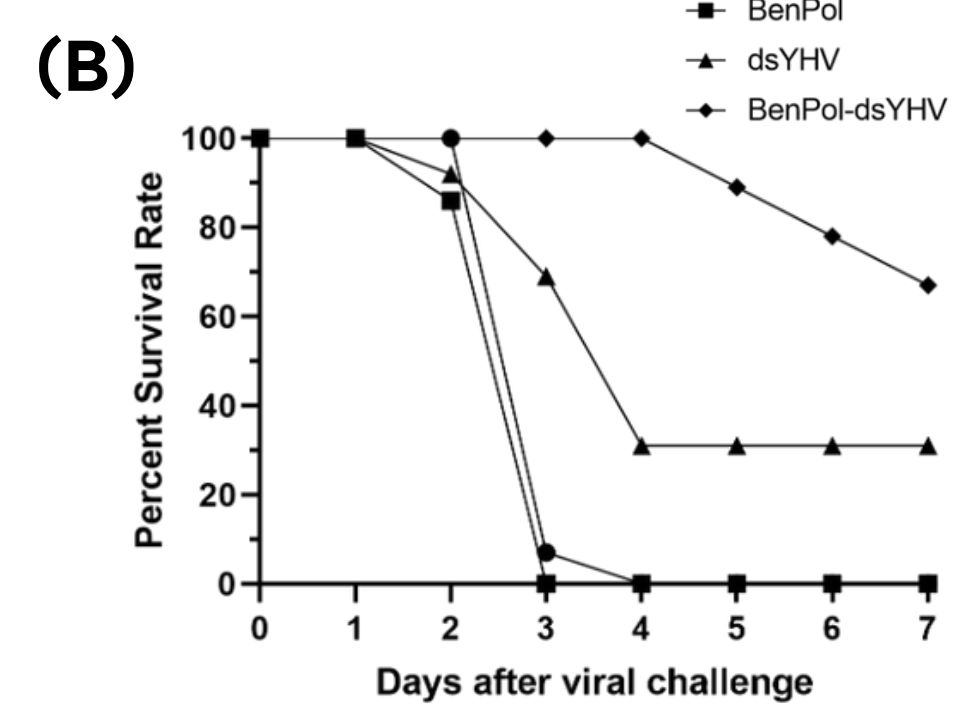


THE RESULTS



BenPol is a promising nanoparticle-based delivery platform for dsRNA, effectively protecting shrimp against viral infections in aquaculture.

- Shrimp treated with complexes prepared 8 days before injection exhibited a 100% survival rate, significantly higher than in other groups (A).
- Further tests on these 8-day prepared complexes revealed that shrimp injected with the complexes before a YHV challenge showed a 67% survival rate, compared to a 31% survival rate for dsYHV alone (B).
- Additionally, the relative expression of YHV helicase to shrimp actin showed significant differences, with a lower ratio observed in dsYHV and BenPol-dsYHV and an even lower trend in the BenPol-dsYHV group (C, D).



ACKNOWLEDGMENTS

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REFERENCE

Yong, J., Wu, M., Zhang, R., Bi, S., Mann, C.W.G., Mitter, N., Carroll, B.J., Xu, Z.P (2022). Clay nanoparticles efficiently deliver small interfering RNA to intact plant leaf cells. *Plant Physiology*. 190(4), 2187 - 2202.