Additive biocomponents from catfish by-products enhance the growth of shrimp *Litopenaeus vannamei*

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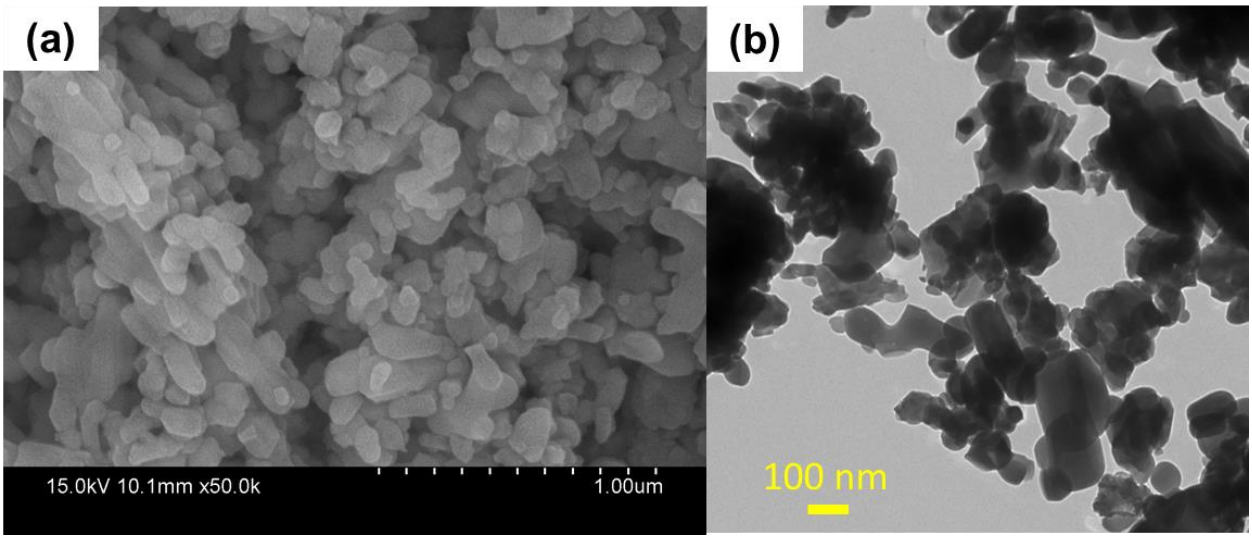
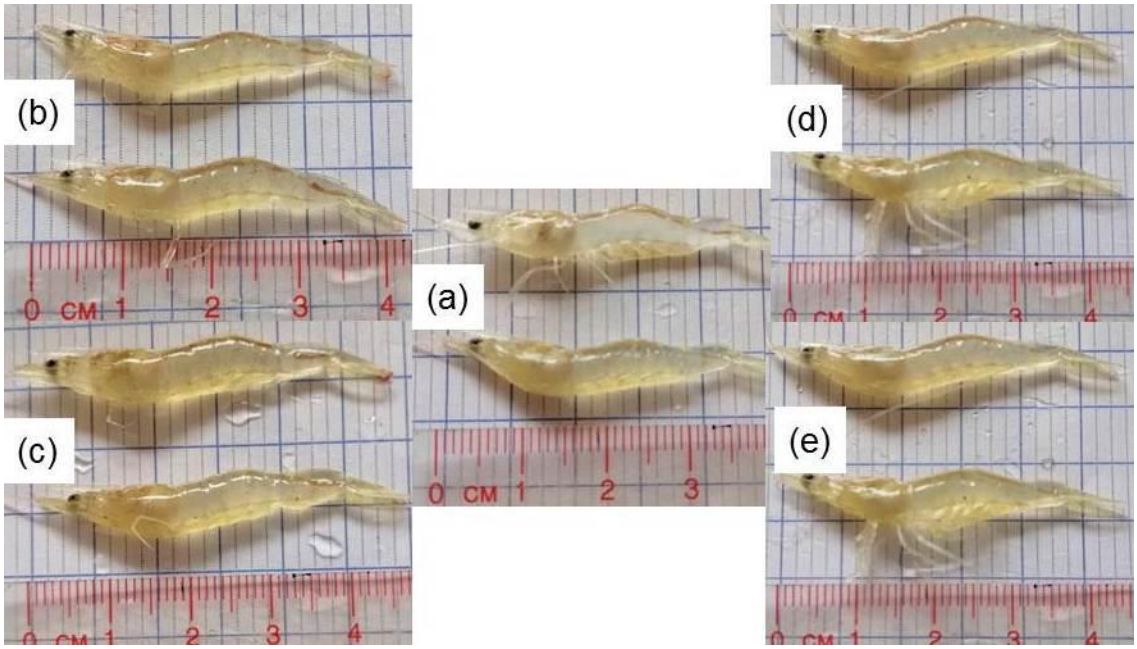
Running title: Fish protein hydrolysate and nano-hydroxyapatite enhances *Litopenaeus vannamei* growth

Supplementary materials

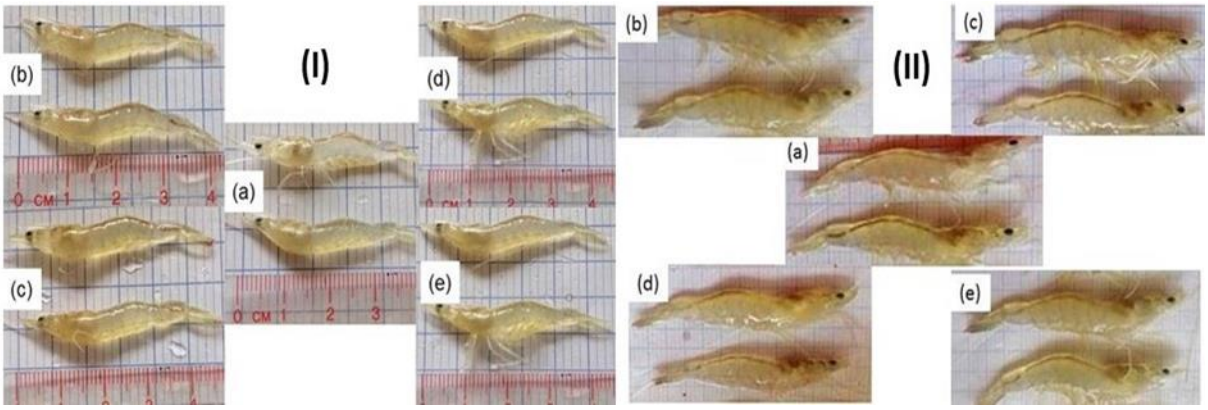
Supplementary Fig. S1. Photo of fish protein hydrolysate prepared from catfish bones.



Supplementary Fig. S2. (a) scanning electron microscope and (b) transmission electron microscope images of hydroxyapatite prepared from catfish bones.



Supplementary Fig. S3. Photographs of *Litopenaeus vannamei* at the age of 27 days of the 5 treatments (a) Treatment 1, (b) Treatment 2, (c) Treatment 3, (d) Treatment 4 and (e) Treatment 5.



Supplementary Fig. S4. Photographs of *Litopenaeus vannamei* of the 5 treatments (I) 27 days and (II) 41 days old.