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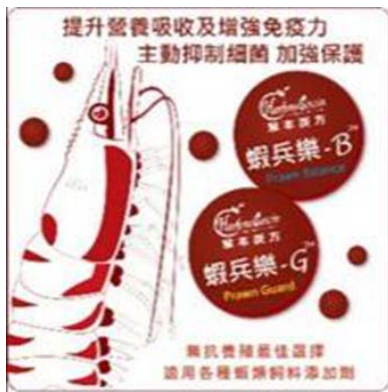
炬鉸生物科技



Herbmedotcin 「草本炭方」 有效替代抗生素

-水產養殖篇

蝦兵樂 Prawn B/G 與 魚常健 Fish B/G



林怡岑

炬鉸生物科技

海洋大學衍生新創企業

細菌，一直是人類頭痛問題



UDN.COM

超級細菌有多凶險？美國每15分鐘1人喪生！聯合新聞網

美國有線電視新聞網（CNN）13日報導，根據美國疾病管制及預防中心...



UDN.COM

北市抽驗水產 台北魚市有午仔魚動物用藥違規！聯合新聞網

北市衛生局執行今年第六波水產品抽驗專案，共抽檢29件，其中1件抽自...

抗生素濫用，造成抗藥性細菌盛行，威脅人類健康

養殖抗生素，用不用？漁民內心的糾結....

疾病感染！農牧業面臨嚴重的危機



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Thai Shrimp

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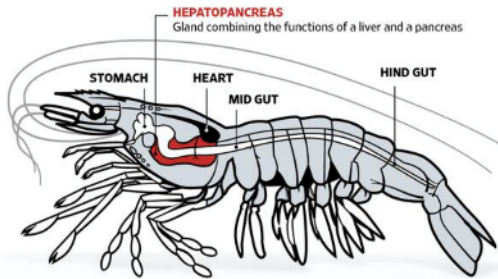
- ASIA BUSINESS
- Updated July 12, 2013, 5:19 a.m. ET

Disease Kills Shrimp Output, Pushes U.S. Prices Higher

Asia is fighting a new disease that has reduced shrimp output in Thailand as much as 40%, driving prices higher for Western restaurants and retailers.

A Punch to the Gut

Shrimp farmed in Thailand and elsewhere in Asia are dying from a bacterial disease called early mortality syndrome or acute hepatopancreatic necrosis syndrome.

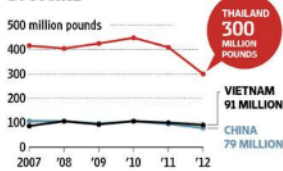


SPECIES AFFECTED
Pacific white shrimp
Black tiger shrimp

WHAT HAPPENS

- 1 The disease usually occurs within 45 days in ponds with newly stocked postlarvae shrimp.
- 2 *Vibrio* bacteria in the stomach prompt shrimp to stop eating and release toxins that damage the hepatopancreas.
- 3 As hepatopancreas cells die, secondary bacteria attack the gland. Mortality in ponds can approach 100% in a few days.
- 4 The disease is inactivated by freezing and thawing. Affected shrimp pose no concerns to human health.

U.S. SHRIMP IMPORTS, BY SOURCE



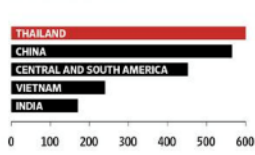
PRICES

Thai shrimp prices have jumped since the disease has cut output, in baht per kilogram*



PRODUCERS

World's top shrimp producers in 2011, in thousands of tons



100 baht = \$3.19 *For 60 shrimp/kilogram lots
Sources: Univ. of Arizona, Global Aquaculture Advocate (disease description); U.S. Dept. of Commerce (imports); Thailand Fisheries Dept. (prices); Thai Shrimp Assoc. (producers)

Graphic by Alberto Cervantes; Research by Willa Plant/The Wall Street Journal

疾病的代價高昂
以水產為例
全球年產值 2000 億美元
平均因為疾病損失 400 億美金

可以有效解決的方案不多

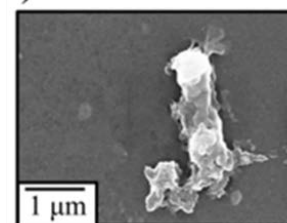
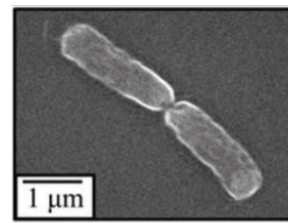
- 抗藥性細菌增加，抗生素失效
- 消毒劑不可以用於活體動物中(不安全!)
- 缺乏有效替代停藥期的產品

對抗病原菌解決方案--草本炭方技術



giant bio

- 「**食用級**」抗菌原料
- **天然植物**萃取**有效成分**
- 分子草藥**獨家專利**關鍵技術
- 可對抗各種病原菌，包含**抗藥性細菌**！



抗菌力增加
2500倍!

獨家專利
關鍵技術

萃取

有療效
植物

天然有
效成分

草本
炭方





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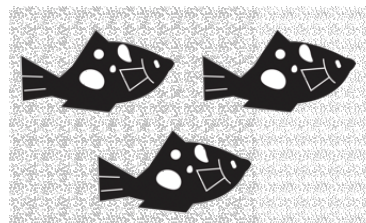
「草本炭方」飼料添加應用

草本炭方原料 可廣泛抑制各種病原細菌

✓ 常見細菌		✓ 水生動物細菌		✓ 抗藥性細菌	
菌種	抑菌率 (%)	菌種	抑菌率 (%)	菌種	抑菌率 (%)
大腸桿菌 Escherichia coli	> 99.9%	副溶血弧菌 Vibrio parahaemolyticus	97.5 %	耐甲氧西林金黃色葡萄球菌 Methicillin-resistant Staphylococcus aureus (MRSA)	> 99.9%
金黃色葡萄球菌 Staphylococcus aureus	> 99.9%	創傷弧菌 Vibrio vulnificus	98.0%		
		吳郭魚鏈球菌 Streptococcus iniae	> 99.9%		

在病菌攻擊下，明顯提昇動物存活率

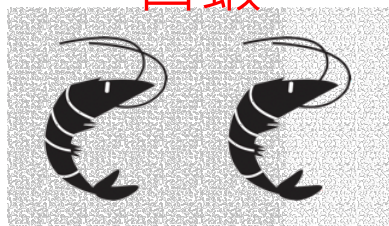
石斑魚



【Herbmedotcin 為您增加的營收！】

存活率 (%)	對照組	Herbmedotcin	產能增加 (倍)
第一批魚	40	80	1
第二批魚	20	67	2.35
第三批魚	58	100	0.72

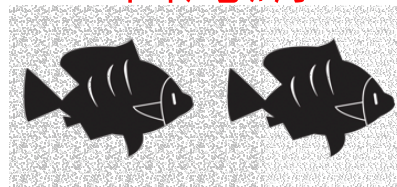
白蝦



【Herbmedotcin 為您增加的營收！】

存活率 (%)	對照組	Herbmedotcin	產能增加 (倍)
第一批白蝦	50	68	0.36
第二批白蝦	33.3	96.2	1.89

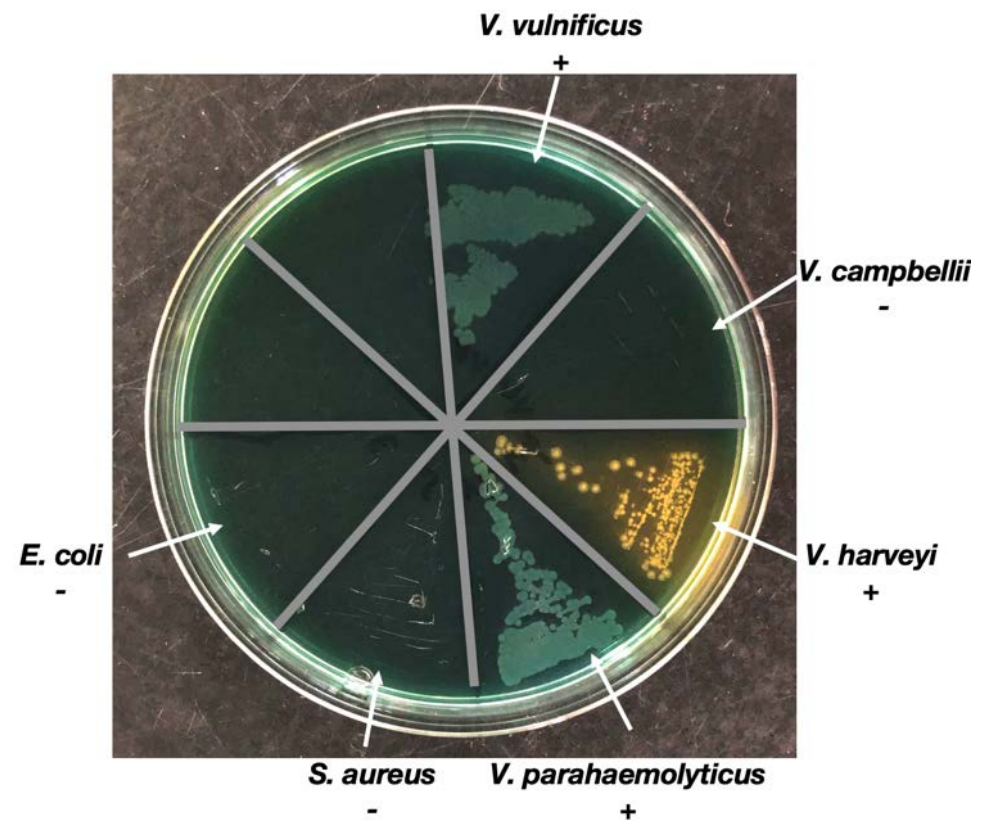
台灣鯛



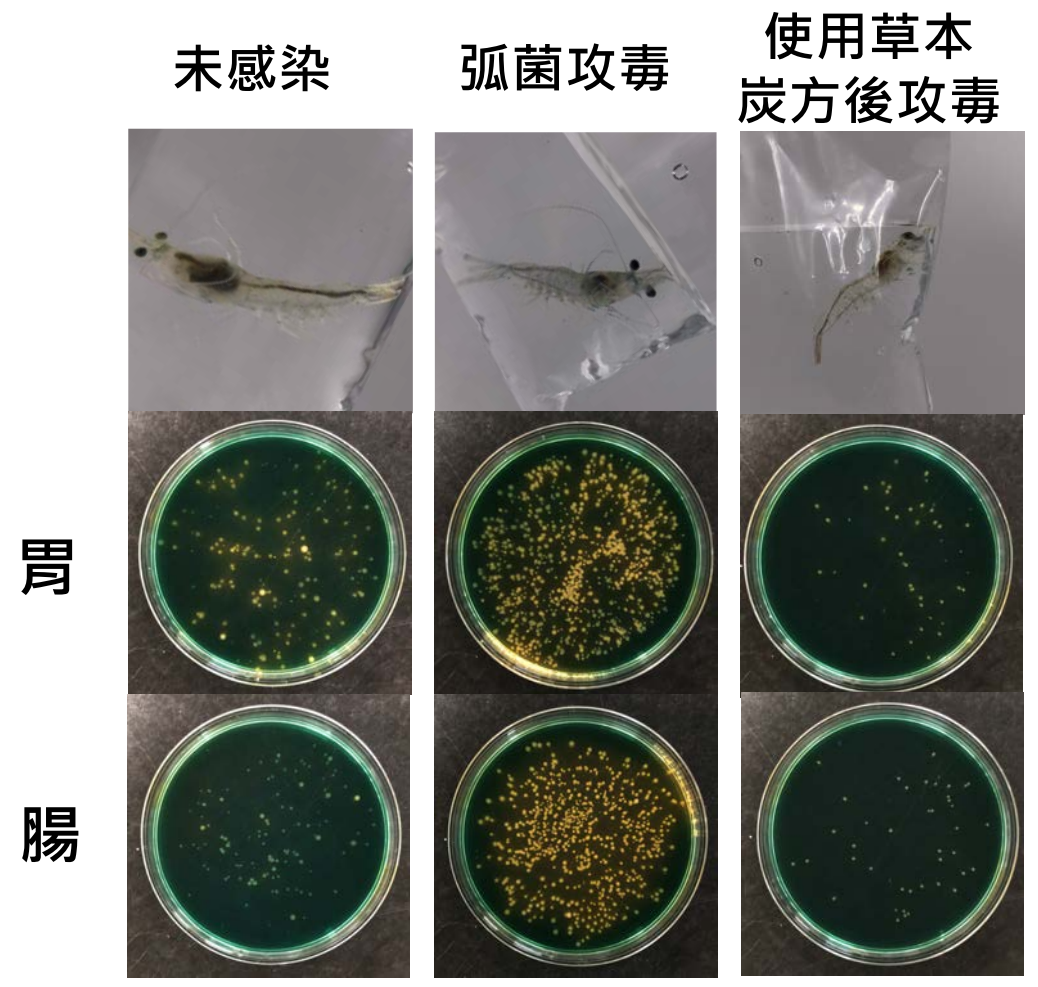
【Herbmedotcin 為您增加的營收！】

	對照組	Herbmedotcin	產能增加 (倍)
存活率 (%)	41.7	73.9	1.8

「草本炭方」有效減少蝦腸胃道病原菌



TCBS Vibrio selective agar



『草本炭方』對抗病毒的能力也很好！



研究證實：以EV71型腸病毒感染的細胞測試，草本炭方可將原料提升1000倍抗病毒能力



研究證實：實際以白蝦進行WSSV白點病毒攻毒測試，草本炭方可提升白蝦10%存活率

FULL PAPER
Antiviral Carbon Dots

High Amplification of the Antiviral Activity of Curcumin through Transformation into Carbon Quantum Dots

Chin-Jung Lin, Lung Chang, Han-Wei Chu, Han-Jia Lin, Pei-Ching Chang, Robert Y. L. Wong,* Binesh Unnikrishnan, Ju-Yi Mao, Shiou-Yi Chen,* and Chih-Ching Huang*

It is demonstrated that carbon quantum dots derived from curcumin (Cur-CQDs) through one-step dry heating are effective antiviral agents against enterovirus 71 (EV71). The surface properties of Cur-CQDs, as well as their antiviral activity, are highly dependent on the heating temperature during synthesis. The one-step heating of curcumin at 180 °C preserves many of the moieties of polymeric curcumin on the surface of the so-synthesized Cur-CQDs, resulting in superior antiviral characteristics. It is proposed that curcumin undergoes a series of structural changes through dehydration, polymerization, and carbonization to form core-shell CQDs whose surface remains a polymeric curcumin-like polymer, bearing the antiviral activity. The results reveal that curcumin possesses insignificant inhibitory activity against EV71 infection in RD cells [half-maximal effective concentration (EC₅₀) >200 µg mL⁻¹] but exhibits high cytotoxicity toward EC cells [half-maximal cytotoxic concentration (CC₅₀) <13 µg mL⁻¹]. The EC₅₀ (0.2 µg mL⁻¹) and CC₅₀ (0.2 µg mL⁻¹) of Cur-CQDs are >1000-fold lower and 334-fold higher, respectively, than those of curcumin, demonstrating their far superior antiviral capabilities and high biocompatibility. In vivo, intraperitoneal administration of Cur-CQDs significantly decreases mortality and provides protection against virus-induced skeletal paralysis in new-born mice challenged with a lethal dose of EV71.

1. Introduction
Enteroviruses are nonenveloped, single-stranded, positive-sense RNA viruses belonging to the family Picornaviridae that infect worldwide populations, especially infants and young children.^{1,2} Enteroviruses can cause a variety of clinical illnesses, including acute hemorrhagic conjunctivitis, aseptic meningitis, and several sporadic diseases.^{3,4} Human enterovirus serotypes include four species (enterovirus A, B, C, and D), categorized by sequence differences, genome organization, and biological properties.⁵ Among the family members of enteroviruses, enterovirus 71 (EV71; species Enterovirus A) is notorious for causing epidemics of hand-foot-and-mouth disease and severe fatal neurological or cardiac complications such as meningitis, brainstem encephalitis, acute flaccid paralysis, and skeletal polymyositis in young children.^{6,7} EV71 is a nonfatal virus 20–30 nm in

OPEN **Synthesis and evaluation of polyamine carbon quantum dots (CQDs) in *Litopenaeus vannamei* as a therapeutic agent against WSSV**

Huai-Ting Huang¹, Han-Lin Liu¹, Hai-Ju Huang¹, Chih-Ching Huang¹, Juhn-Han-Yun Lin¹ & Li-Li Chen^{1,2,3,4}

White spot syndrome virus (WSSV) is the causative agent of white spot syndrome (WSS), a disease that has led to severe mortality rates in cultured shrimp all over the world. The WSSV is a large, enveloped, double-stranded DNA virus with a wide host range among crustaceans. Currently, the main antiviral method is to block the receptor of the host cell membrane using recombinant viral proteins or virus antibodies. In addition to interference with the ligand receptor binding, disrupting the structure of the virus envelope may also be a means to control viral infection. Carbon quantum dots (CQDs) are carbon-based nanoparticles that have many advantageous characteristics, including small size, low cytotoxicity, cheap, and ease of production and modification. Polyamine-modified CQDs (polyamine-CQDs) with strong antibacterial ability have been identified. In this study, polyamine CQDs are shown to inhibit the WSSV envelope and inhibit the virus infection, with a virus-dependent effect. The results also show that polyamine CQDs can upregulate several immune genes in shrimp and reduce the mortality upon EV71 infection. This is the first study to identify that polyamine CQDs could act against the virus. These results, indeed, provide a direction to develop effective antiviral strategies or therapeutic methods using polyamine CQDs in aquaculture.

Several pathogens cause disease stress death in shrimp. Among them, the white spot syndrome virus (WSSV) is a serious disease that causes severe economic losses in shrimp culture industry.¹ WSSV causes all shrimp crustaceans and has the strongest infectivity and lethality in pond-cultured, including Penaeus monodon, Litopenaeus vannamei,² Shrimp and Macrobrachium japonicum. When the pond-cultured shrimp were infected with WSSV, the mortality rate can reach 100% within 3–7 days.³ This virus was first detected in Taiwan in 1987 and subsequently was found in eight other Asian countries, as well as South Korea, Ecuador and Brazil.⁴ Because of the broad host range, strong infectivity and high mortality, WSSV is very difficult to prevent and control. The WSSV is an enveloped virus, with outer virus shell protein (VP1 and VP2) and inner protein coat (VP3 and VP4) are about 110–430 nm in length and about 70–100 nm in diameter.⁵ Because shrimp have an open circulatory system, the virus can easily spread throughout the body via the hepatopancreas.⁶ WSSV mainly infects the anterior dorsal region (the hepatopancreas, the foregut intestine, hindgut, gill and nerve tissue) and secondary organs (hemolymph organs, genital gland, connective tissue and hemocytes) in shrimp, but are not restricted to the endodermal region (epidermis, pericardial shell and midgut epithelium).^{7–9}

Although the mechanism of virus entry is not fully understood, several proteins and receptors have been found to participate in WSSV infection.^{10–12} The virus first interacts with cell membrane proteins to enter into the host cell by endocytosis and starts to replicate. Thus, the interaction between the host receptor and the virus ligand is important.¹³ The main antiviral methods currently used block the receptor of host cell membrane using

SCIENTIFIC REPORTS
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SCIENTIFIC REPORTS | (2023) 13:16342 | https://doi.org/10.1038/s41598-023-46315-4

「草本炭方」平台嚴格的安全標準

- 只使用天然原料
- 加工後產品經 GLP 等級，第三方實驗室進行安全性試驗通過！
- 對動物無毒性、無刺激性
- 安全性超越法規要求



測試類別	測試項目	結果	測試單位
毒物	多環芳香烴 PAH 18 項	未檢出	SGS
毒物	丙烯醯胺	未檢出	SGS
毒理 (基本)	口服急毒 (2g/kg)	通過	SGS
毒理 (基本)	皮膚刺激性	通過	SGS
毒理 (基本)	過敏性測試	通過	SGS
基因毒	細菌逆突變試驗 (Ames Test)	通過	MDG
基因毒	微核試驗	通過	MDG
基因毒	產前發育(致畸)試驗	通過	MDG
毒理 (進階)	90 天重複劑量口服亞急毒 (100 ppm)	通過	MDG

『草本炭方』 以藥物開發的規格 開發飼料添加劑

主訴：處理魚蝦腸胃道中的病菌感染問題

- 第一期:實驗室活體安全性測試
- 第二期:實驗室活體與田野試驗
調整適當的劑量來處理不同的狀況
- 第三期:大規模田野 試售 與 正式上市
- 第四期:未發現副作用或不良反應 產品持續發售中

「蝦兵樂™」飼料添加劑

- **黃金比例**配方
 - 草本炭方技術
 - 增進營養成分
 - 誘引成分
- B 系列：平時保養，維持健康，提升生長
- G 系列：高風險期保護，改善症狀



「魚常健™」飼料添加劑

- 針對魚類的**黃金比例**配方
 - 草本炭方技術
 - 增進營養成分
- B 系列：平時保養，提升生長
- G 系列：停藥期取代抗生素





giant bio

最適合直接進飼料製程的抗菌添加劑



1 安全高效抑菌-廣效性抑菌

2 以食品級原料經由專利技術加工

3 高生物安全性 $LD_{50} > 2000$ ppm

4 耐鹽-0~3% NaCl
耐酸鹼-pH3-10
耐高溫-最高可達 200°C (5 分鐘)

每天拌料很麻煩!

從『飼料添加劑』到『機能型草蝦料』

『蝦兵樂草蝦料』

黃金比例草本炭方劑量
天天使用提供腸道保護力
維持腸道菌相平衡
提高收成率



『達文西草蝦料』

幫助蝦隻快速改善腸炎現象
幫助改善疾病感染症狀
高風險期積極介入
提早防範疾病入侵

漁民的心聲

- 魚蝦都在水裡面，怎麼知道它們健不健康？
- 養蝦像是靠天吃飯的產業，有沒有能讓養殖穩定的方法？

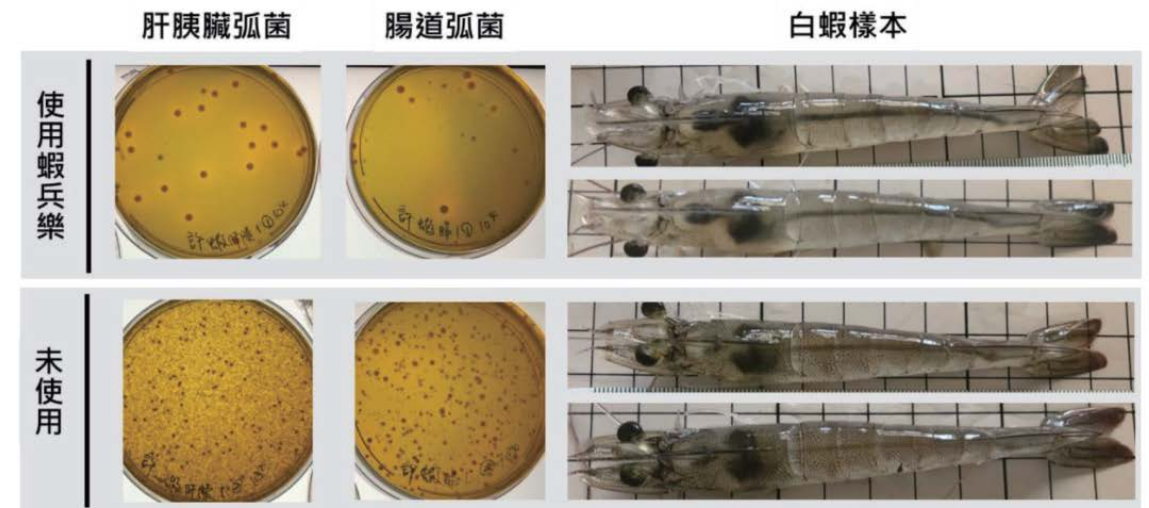
把實驗室 搬進養殖場

• 炬鉸行動健檢

- 及時監控疾病問題
- 顏式測定法：檢查蝦腸道中的弧菌量
- PCR疾病檢測系統：快速確認蝦隻是否感染特定病源



專業試驗人員現場採樣分析蝦隻樣品

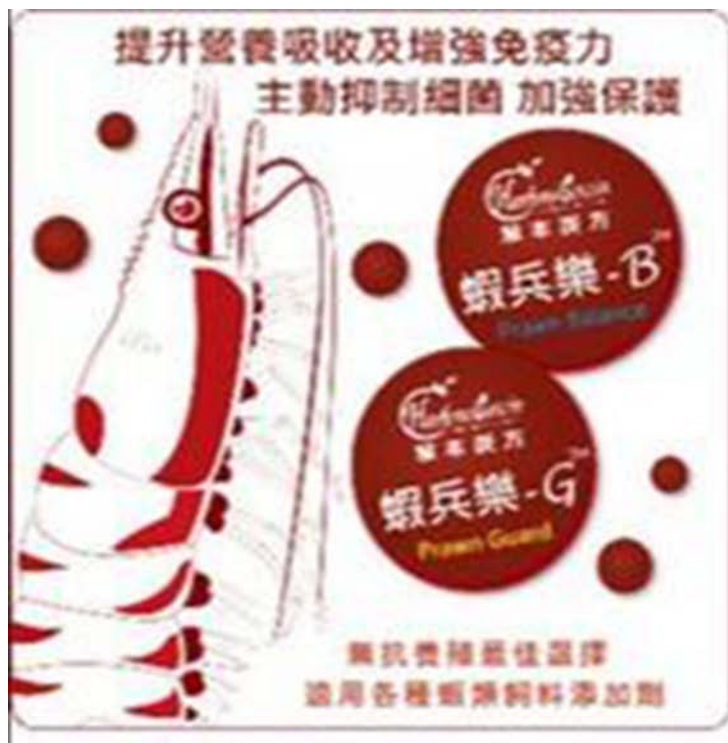


圖二 實際在養殖現場使用，餵食蝦兵樂的池中蝦隻腸道弧菌量明顯比起沒有餵食蝦兵樂的蝦來得少

客戶使用回饋

「蝦兵樂™」

「魚常健™」



「魚常健™」客戶使用回饋



屏東佳冬陳先生
午仔魚

3 分池 4.8 萬尾

使用期間二個月 存活率增加44.6%

總收穫量增加 87%



台南麻豆莊先生
吳郭魚

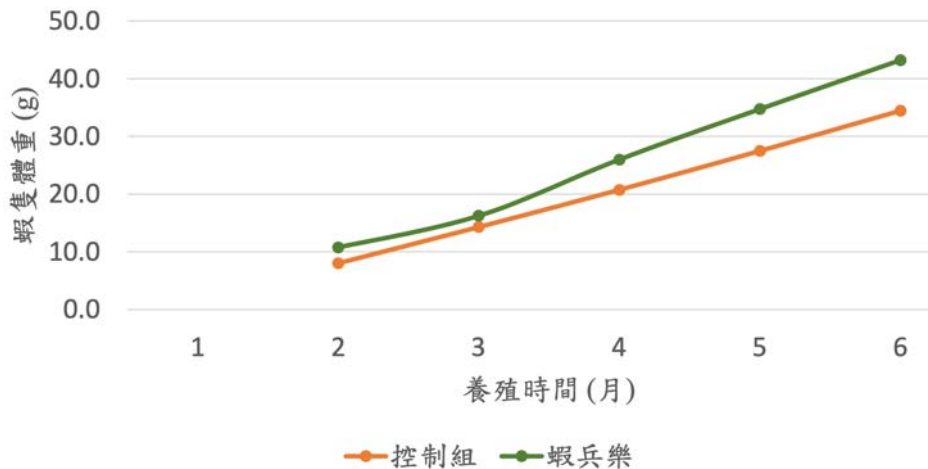
1.1 萬尾

使用期間三個月 均重增加 60%

「蝦兵樂™」純海水白蝦專養客戶使用回饋



- 台南七股 黃大姊
- 室外土池生態養殖
- 養殖密度：7 分地 18 萬尾
- 蝦苗來源：泰國 CP



體重增加 25%
可提早收成

飼養月份	0-1	1-2	2-3	3-4	4-5	5-6	6-7	平均
控制組	-	-	-	1.10	1.80	2.22		1.71
蝦兵樂	-	-	-	0.81	0.92	1.21		0.98

FCR 明顯改善
由1.71降到0.98

	累積收穫 (台斤)	存活率 (%)
蝦兵樂	2800	31
控制組	1800	21

收穫量增加1000斤
存活率增加10%

「蝦兵樂™」 室外生態養殖 客戶使用回饋

- 台南七股 王先生，白蝦養殖
- 首次以『蝦兵樂草蝦料』挑戰白蝦專養成功
- 室外養殖外來風險疫病問題大，病毒與弧菌感染的威脅隨時存在
- 蝦兵樂有效抑制病原菌讓蝦隻穩定生長
- 使用效益與心得：
 - 放苗18萬尾：間補收成 40尾斤~ 16尾斤
 - 飼料用量 5100公斤 收穫超過5300 台斤
- 2021下半年提升三倍放養量



「蝦兵樂™」連續兩期客戶使用回饋

- 屏東佳冬陳先生
- 白蝦專養 室外 三分 水泥池
- 蝦兵樂使用經驗：
 - 第一水 後期使用 3 個月：收穫 2500 台斤
 - 第二水 **全期**使用 5 個月：收穫 5000 台斤 **收穫增加一倍**
- 使用效益：
 - 費用增加不到 2 萬元，**收入增加 50 萬元**
- 心得：
 - 使用期間，蝦子成長穩定
 - 即使豪雨高溫也沒有疾病爆發
 - 使用過最好的產品



「蝦兵樂™」神農獎與環境教育獎 客戶使用回饋

- 嘉義義竹 邱家兄弟，養殖方式：白蝦、魚類混養
- 室外生態養殖不用藥的堅持，病原菌感染的威脅隨時存在
- 以蝦兵樂搭配自有魚蝦混養飼料配方
- 白蝦收成量從**2.7萬斤**提升到**4萬多斤**
- 有效抑制病原菌讓魚蝦穩定生長
- 使用蝦兵樂的魚蝦 風味更為鮮甜



「蝦兵樂™」東海岸室外高密度養殖 連續4期 客戶使用回饋

- 台東太麻里 許先生，白蝦養殖
- 連續4水以『蝦兵樂草蝦料』高密度白蝦專養 穩定收成
- 多年養殖經驗在水質優良的台東海岸 也存在病原菌感染問題
- 平時以蝦兵樂B壓制蝦隻腸道病原菌爆發
- 管理失誤或水況劇烈變化時，以蝦兵樂B+G 有效控制蝦隻疾病



新型態蝦類養殖- 半生物絮團**連續三期** 客戶使用回饋

- 屏東林邊/佳冬 劉家兄弟 白蝦養殖
- 最適合漁電共生養殖白蝦、草蝦的模式
- 以250噸水養出2500斤以上白蝦，室內、外平均存活率> 80%
- **連續3次 一噸水養出10台斤以上的穩定成績**
- 平均上市規格30尾斤/20尾斤



「蝦兵樂™」室內設施養殖客戶使用回饋

- 屏東枋寮 賴先生，草蝦、白蝦養殖
- 首次以『蝦兵樂草蝦料』挑戰高密度草蝦室內專養成功
- 室內養殖的模式只要做好蝦苗檢疫與進水消毒，WSSV不是太大的問題，反而是弧菌感染的威脅比較大
- 使用效益與心得：
 - 過程中穩定控制蝦隻腸道健康
 - 4個月：均重超過60公克，
 - 存活率大於80%
 - 1500噸水體 收穫超過4000台斤



使用海洋大學林翰佳教授研發的草本炭方飼料添加劑，確實對腸道的弧菌控制帶來明確的效果。左起林翰佳教授、廖一久博士、林翰佑教授、賴珽光。

「蝦兵樂™」東海岸室外草蝦養殖 客戶使用回饋

- 台東大武 林先生，草蝦養殖
- 以『蝦兵樂草蝦料』搭配『達文西草蝦料』挑戰室外草蝦專養
- 平時以蝦兵樂草蝦料預防蝦隻腸道病原菌爆發
- 定期以達文西草蝦料加強控制蝦隻疾病

2/26放苗

四個月達到平均25尾斤

七個月達到平均 9尾斤

9/18清池還有**2500斤的9尾斤**巨大健康草蝦

合計收成 **10928台斤**

飼料用量 11483公斤



感謝

天然、安全、高效能
無抗養殖



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