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Probiotic use in *Litopenaeus vannamei* farming in Andhra Pradesh

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Prophylactic health products (probiotics) are used in shrimp aquaculture to improve pond water quality, pond soil condition and/or enhance the shrimp health leading to better weight gain of shrimp. Questionnaire based survey was conducted in 182 *Litopenaeus vannamei* shrimp farms located in north coastal (n=50), central coastal (n=82) and south coastal (n=50) regions of Andhra Pradesh, in order to understand the usage pattern of probiotics. A total of 45 different probiotics brands supplied by 31 manufacturers were being used in *L. vannamei* farming. However, three probiotic brands were being prominently used by 54% of the shrimp farmers. A single probiotic (different brands) was being applied by 50% of the shrimp farmers while 35% and 15% of famers were employing two and three probiotics, respectively during shrimp culture. Water probiotics (bioremediators) were being commonly used (67%) compared to soil probiotics (3%) and gut probiotics (4%). Other probiotics used, were meant for dual applications namely water & soil (16%) and water & gut (7%). The bacterial species composition of the different probiotics comprised of *Bacillus* species (*Bacillus subtilis*, *B. licheniformis*, *B. megaterium*, *B. mesentericus*, *B. pumilis*, *B. polymyxa*, *B. amyloliquefaciens*) *Pediococcus acidilactici*, *Lactobacillus* (*L. acidophilus*, *L. casei*), *Thiobacillus*, *Streptococcus faecium*,

Clostridium butyricum, *Cellulomonas cartae*, *Pseudomonas* (*P. putida*, *P. denitrificans*). The product labels claim that probiotics help to maintain water quality by digesting organic matter, reduce H₂S, NH₃, turbidity, hardness, improve DO, regulate pH, reduce sludge, maintain stable and health phytoplankton bloom, assist in free moulting of shrimp, improve feed conversion and probiotic microorganisms compete with harmful *Vibrio* sp. and bring down vibrio population in shrimp rearing environment. The price of different probiotics ranged between Rs. 145 kg⁻¹ and Rs. 7000 kg⁻¹ (mean price Rs. 1937±1432 kg⁻¹). The cost per application dose of probiotic per hectare pond ranged between Rs. 363 and Rs. 7875 with a mean cost of Rs. 2405 ±1527 dose⁻¹ hectare⁻¹ pond area.

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Present status of fish diseases and economic loss in Indian aquaculture

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In India, fisheries has been a very important economic activity. The vibrancy of the sector can be visualized by the 11-fold increase that India achieved in fish production in just six decades, i.e. from 0.75 million tonnes in 1950-51 to 9.6 million tonnes during 2012–13. This resulted in an unparalleled average annual growth rate of over 4.5 percent over the years which had placed the country on the forefront of global fish production. While, Asia contributes more than 90% to the world's aquaculture production, India now takes the second position with regard to annual fisheries and