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✓ Introduction

✓ Shrimp production by region

✓ Global shrimp culture

✓ Challenges associated with closed and semi closed shrimp farming

✓ **Zeolites** and **Probiotics** – The Natural Choice
INTRODUCTION

- Aquaculture is the fastest growing food sector
- World aquaculture production – 64 million tons
- Growth rate in aquaculture is about 6.3%
- Disease and feed – Major concern in aquaculture
- Feed accounts for 60% of the cost of aquaculture
- Disease causes great economic loss e.g. Vibriosis etc.
SHRIMP PRODUCTION BY REGION

![Graph showing shrimp production by region from 2006 to 2016. The production is measured in million metric tons (mmt). The regions include Expected at 4% Growth, Other, Middle East/Northern Africa, Americas, India, China, and Southeast Asia. The graph indicates an upward trend in production over the years.]
GLOBAL SHRIMP CULTURE 2013

Million MT

Percentages indicate the share of *P. vannamei*.

2010-2013 data: GOAL estimates.

 SHRIMP CULTURE

✓ Growing population of the world
✓ Search for new protein sources
✓ Demand for low fat food
CHALLENGES ASSOCIATED WITH CLOSED AND SEMI CLOSED SHRIMP FARMING

- Diseases
- Poor Growth
- Toxic gases accumulation
- Poor nutrition
- Formation of sludge & slow biodegradation
- Fragile Ecosystem
Very fragile eco system of Ponds

Food crises: Dietary imbalance

Over crowding: Leads to Stress and hamper Growth

Unstable water quality: Low Dissolve Oxygen, More Toxic gases

Slow biodegradation: Formation of Sludge

More prone to Disease outbreaks

Exhausted minerals, Nutrients in the pond
LOW DISSOLVED OXYGEN AND TOXIC GASES

Figure 8 Mass mortality in the check tray due to dissolved oxygen depletion
Figure 1 Black gill disease

Figure 4 White muscle disease in bigger size *L. vannamei*
ANTIBIOTICS AND CHEMICALS

✓ Effects all body functions and metabolisms

✓ Effect liver and kidneys

✓ Very specific and limited action

✓ All synthetic preparations, so comparatively less accepted by body

✓ Chances of drug resistance

✓ Drug side effects

✓ Hazard of residues in shrimp
ZEOLITES AND PROBIOTICS – THE NATURAL CHOICE

Probiotics

Maintain ecosystem

No residue

Natural

Happy Shrimp

No side effect

Zeolites
Zeolite is an oxide structure having well-defined pores commonly used as commercial adsorbents and catalysts.
**BENEFITS OF ZEOLITES**

- Provides a vast surface area for adsorption of toxic gases to make the habitat clean and healthy
- Purifies the water and improves the dissolved oxygen content
- Exchanges ammonia and other poisonous gases in water
- Acts as a acid base buffer and maintains pH of water
- **Cao** in Ziolite is known as quick lime and thus act as a strong disinfectant and correct pond pH.
- Improves soil and water quality, and finally helps to prevent the occurrence of disease
- Enables to promote growth and survivability and higher profits
“Probiotic is a cultured product or live microbial feed supplement, which beneficially affects the host by improving its intestinal (microbial) balance.

The probiotic should provide actual benefit to the host, be able to survive in the digestive tract, be capable of commercialisation, i.e. grown on an industrial scale, and should be stable and viable for prolonged storage conditions, and in the field”. (Fuller, 1987)
MODE OF ACTION OF PROBIOTICS

1. Secrete bacteriocins / defensins
2. Competitive inhibition
3. Inhibit bacterial adhesion / translocation
4. Reduce luminal pH
5. Increase mucus layer

- Lumen
- Mucosal layer
- Lamina propria
- Mesenteric lymph nodes
- Peyer’s patch
- M cell
- Enhance Barrier functions

Probiotics
MODE OF ACTION OF PROBIOTICS

✓ Adhere to cells
✓ Exclude or reduce pathogenic adherence
✓ Compete for essential nutrients
✓ Stimulate the immunity of the host
✓ Persist and multiply
✓ Produce acids, hydrogen peroxide, and bacteriocins
✓ Antagonistic to pathogen growth
✓ Coaggreagate and form a normal, balanced flora.
BENEFITS OF PROBIOTICS

- Reduction in mortalities
- Lead to reduction in the levels of antimicrobial compounds
- Lead to improved appetite and/or growth performance
- Improves immunity: S. boulardii
- Improves gut health
BENEFITS OF PROBIOTICS

✓ Play crucial part to eliminate ammonia and Nitrogen from the pond water eg: Nitrobacter and Nitrosomonas

✓ Remove H2S and improve Dissolve Oxygen in pond water eg; Rhodococcus and Rhodobacter

✓ Improve zooplankton and Phytoplankton: eg Lactobacillus sps

✓ Degradation of organic matter in the pond: B. licheniformis etc
Oxygen consumption: These are anaerobic bacteria so create more favorable for beneficial microbes inside the gut.

Enhance production of lactobacillus and in turn produces Lactic acid that help to control pathogenic bacteria.

Enzyme production: Produces Proteases and many other enzymes.

Enhance immune response.
HOW TO CHOOSE THE RIGHT PROBIOTIC

✓ Strain

✓ Manufacturing process

✓ Choosing the strain with the highest activity

✓ Choosing the right stabilizer

✓ Packing
THANK YOU