



Ajay Koka
Director

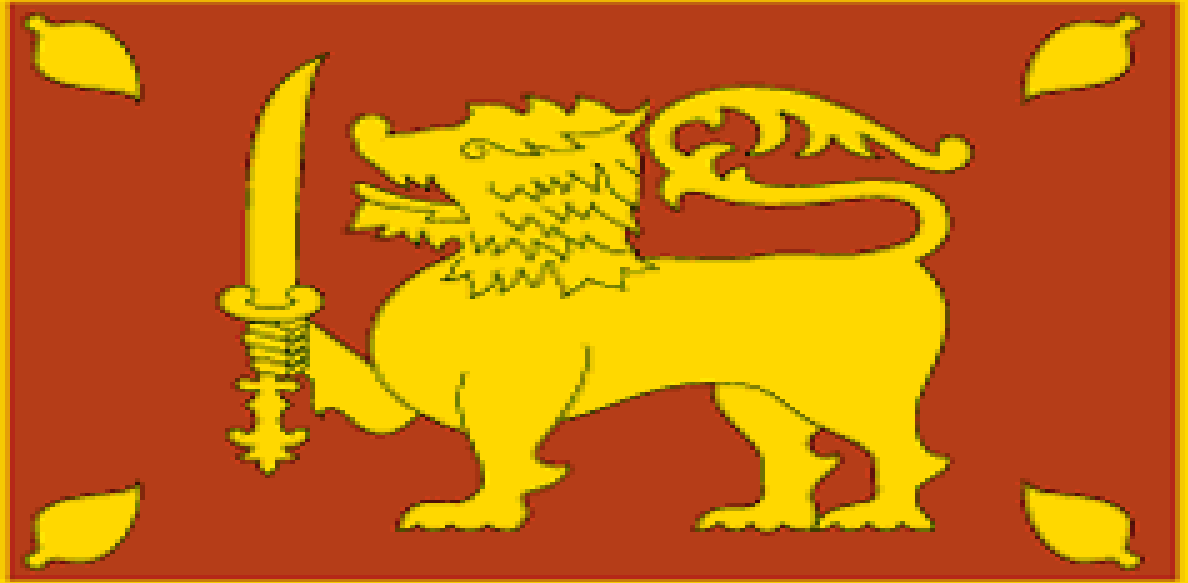
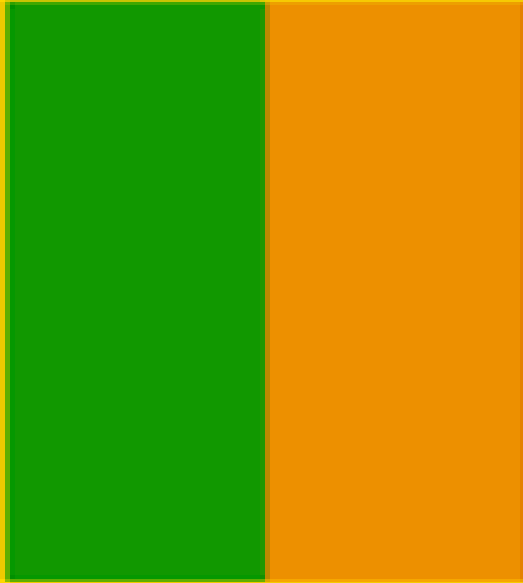
BOVIAN HEALTH CARE PVT. LTD.

501, SSR Corporate Park, 13/6, Mathura Road, NH-2,

Faridabad-121003 | **Mobile** : +91 70423 90 323 --- | **Office** : 0129 4290700 Ext-701

✉ ajay@bovianhealthcare.com | www.bovianhealthcare.com

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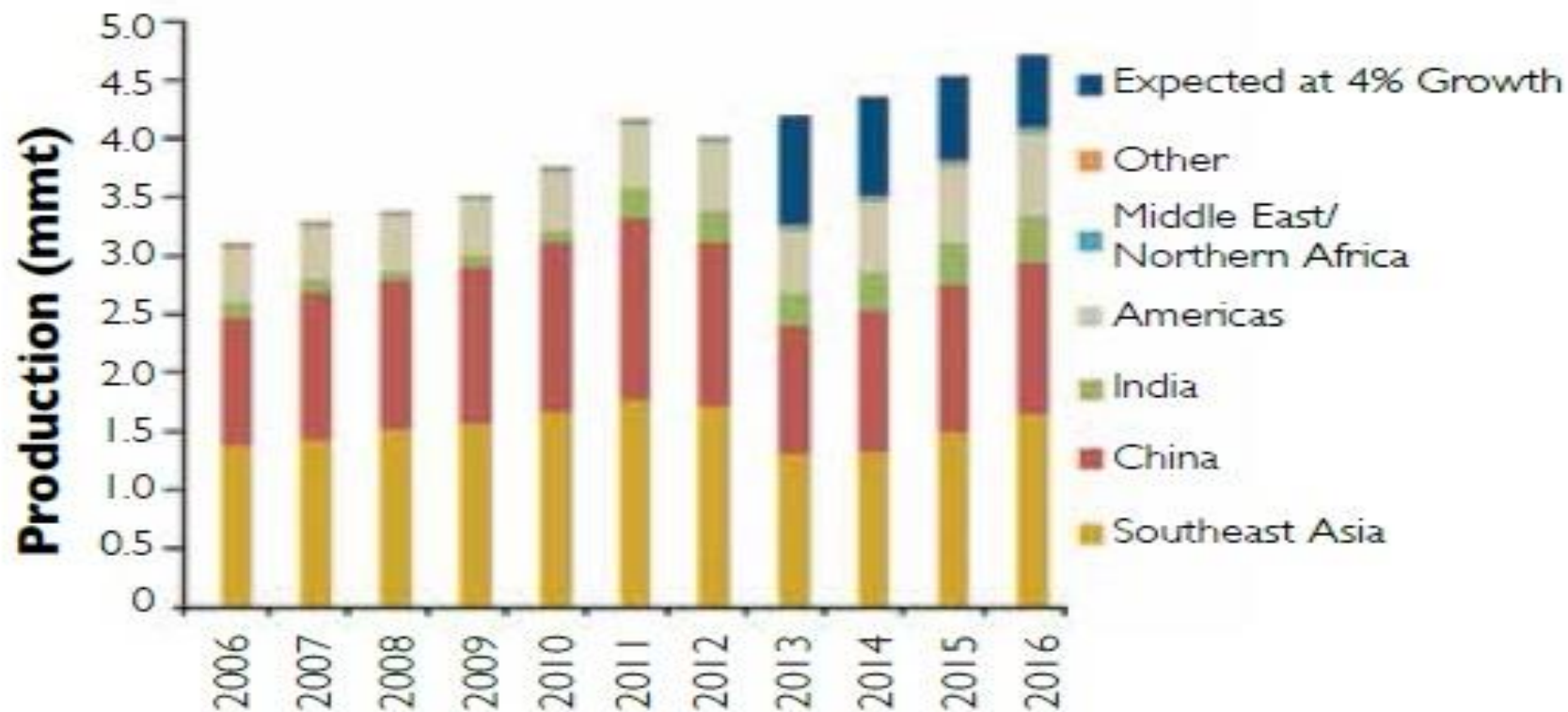
FLOW OF CONTENT

- ✓ Introduction
- ✓ Shrimp production by region
- ✓ Global shrimp culture
- ✓ Challenges associated with closed and semi closed shrimp farming
- ✓ **Zeolites** and **Probiotics** – The Natural Choice

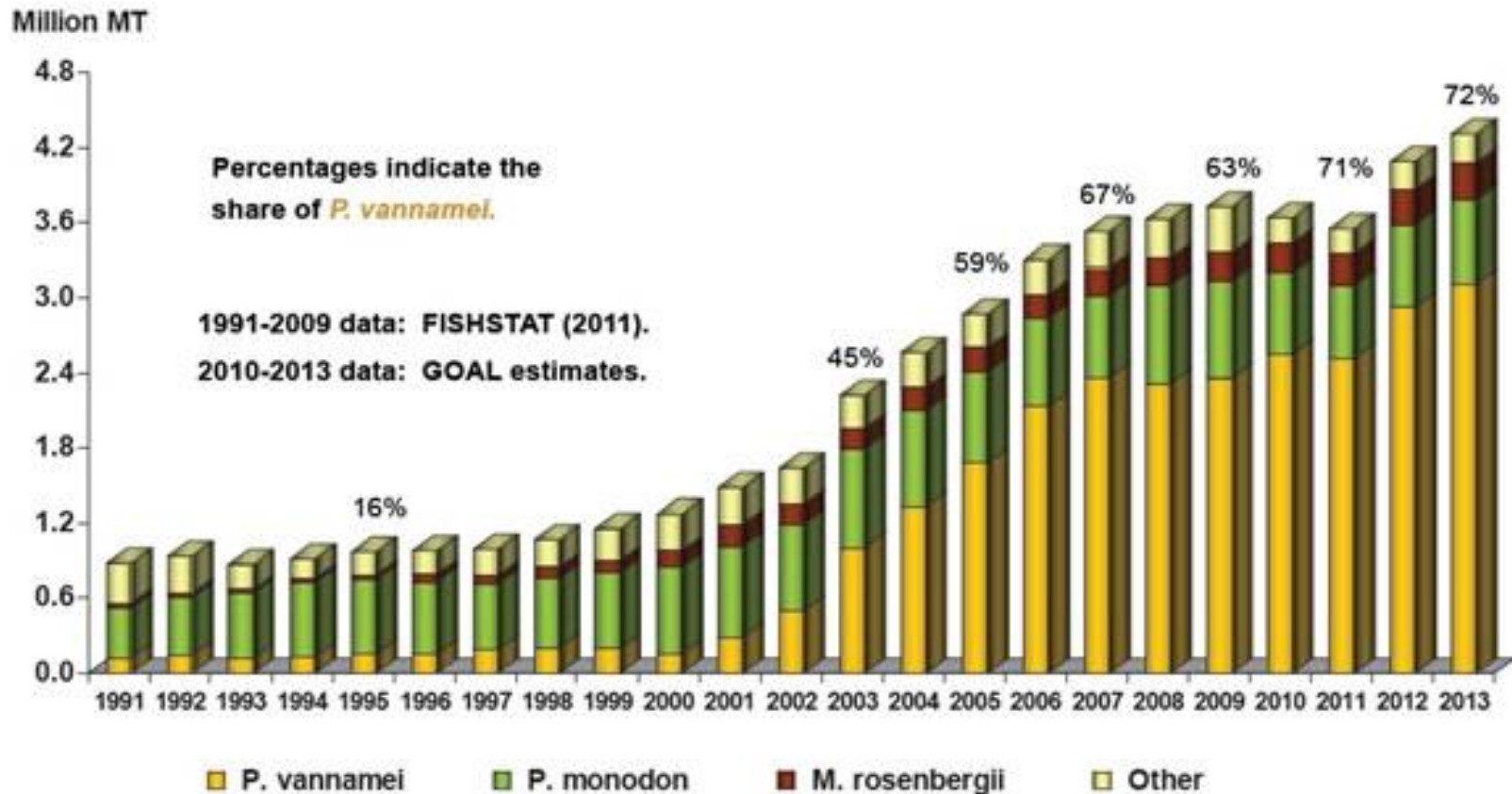
INTRODUCTION

- ❖ Aquaculture is 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 account 60% cost of aquaculture
- ❖ Disease causes great economic loss e.g. Vibriosis etc.

SHRIMP PRODUCTION BY REGION



GLOBAL SHRIMP CULTURE 2013



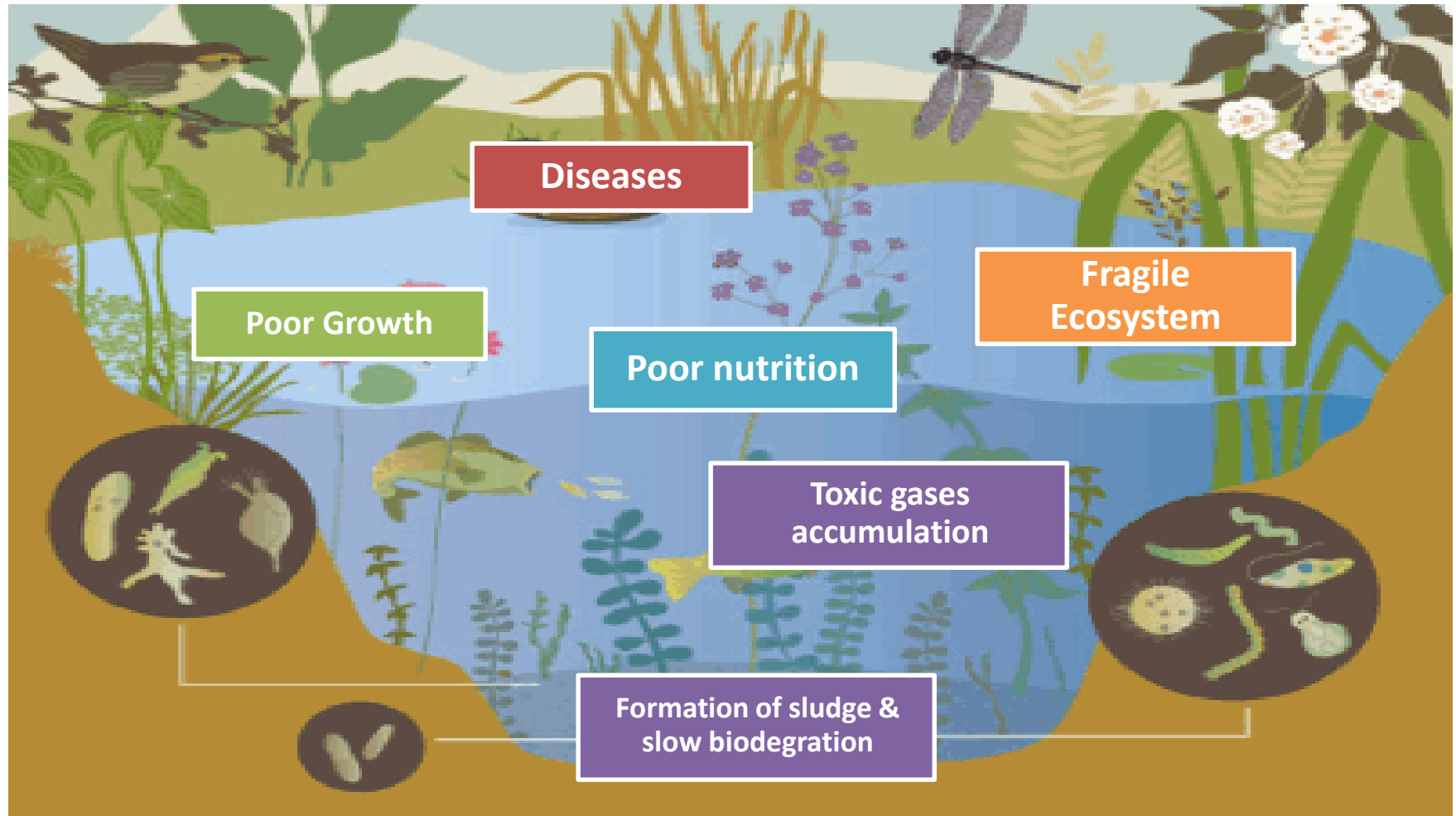
Sources: FAO (2011) & GOAL (2011).

SHRIMP CULTURE

- ✓ Growing population of the world
- ✓ Search for new protein sources
- ✓ Demand for low fat food



CHALANGES ASSOCIATED WITH CLOSED AND SEMI CLOSED SHRIMP FARMING



CHALANGES ASSOCIATED WITH CLOSED AND SEMI CLOSED SHRIMP FARMING

- ✓ 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



DISEASES



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



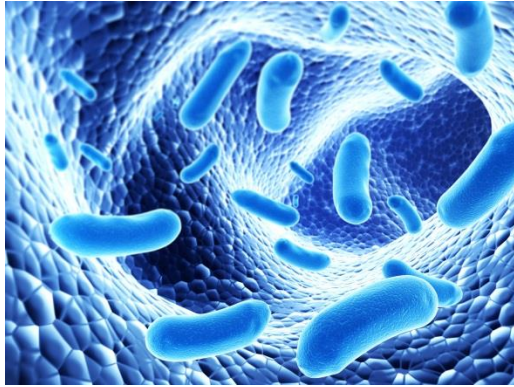
Figure 1 Black gill disease

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



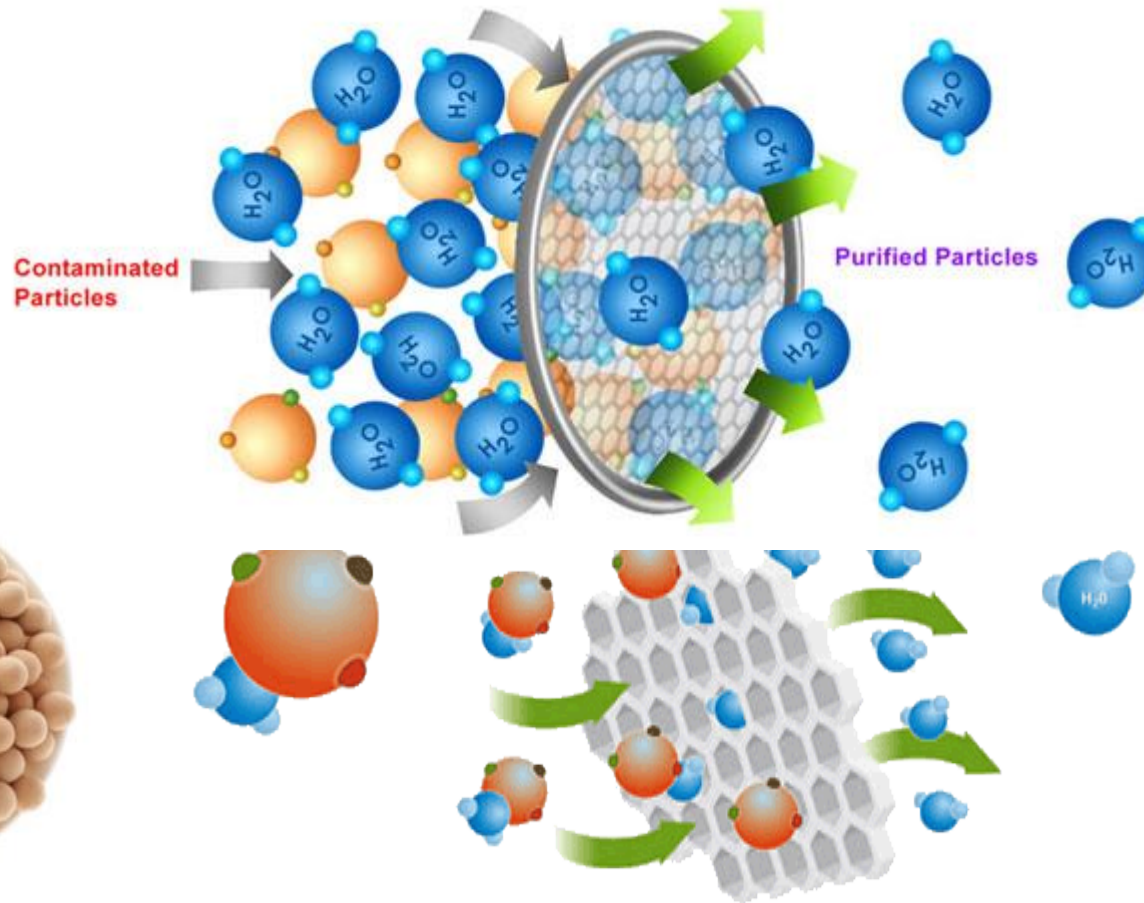
Probiotics



Zeolites

ZEOLITE

Zeolite is an oxide structure having well-defined pores commonly used as commercial adsorbents and catalysts.



BENEFITS OF ZEOLITES

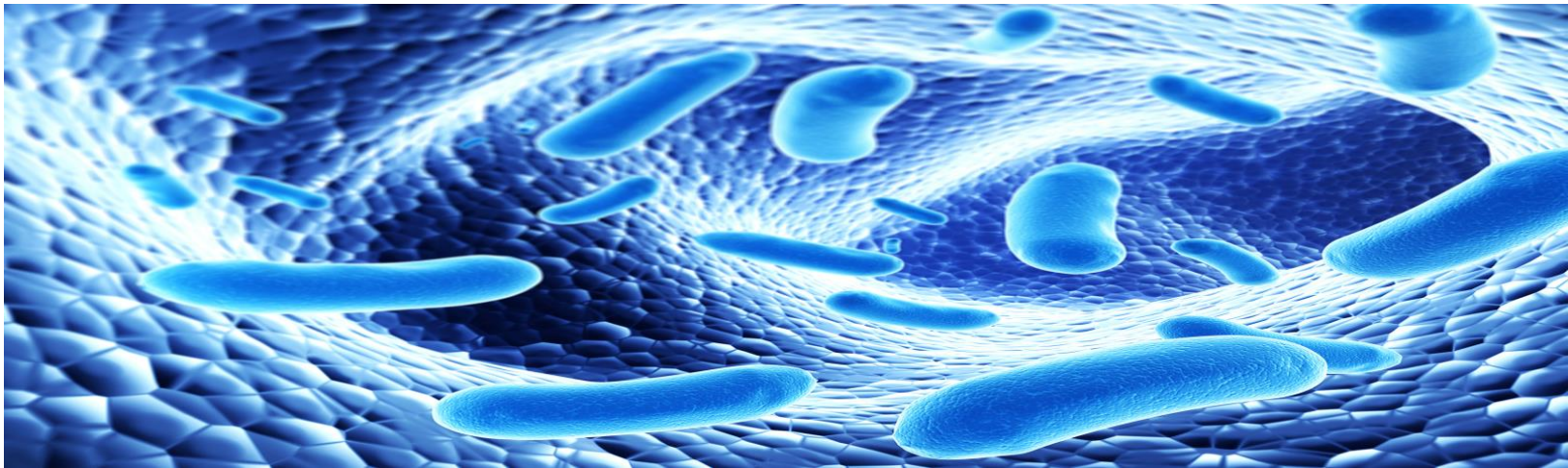
- ✓ Provides a vast surface area for adsorption of toxic gases to make the habitat clean and healthy
- ✓ Purifies the water and improves the dissolved oxygen content
- ✓ Exchanges ammonia and other poisonous gases in water
- ✓ Acts as an acid base buffer and maintains pH of water
- ✓ **CaO** in Zeolite is known as quick lime and thus acts as a strong disinfectant and corrects 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



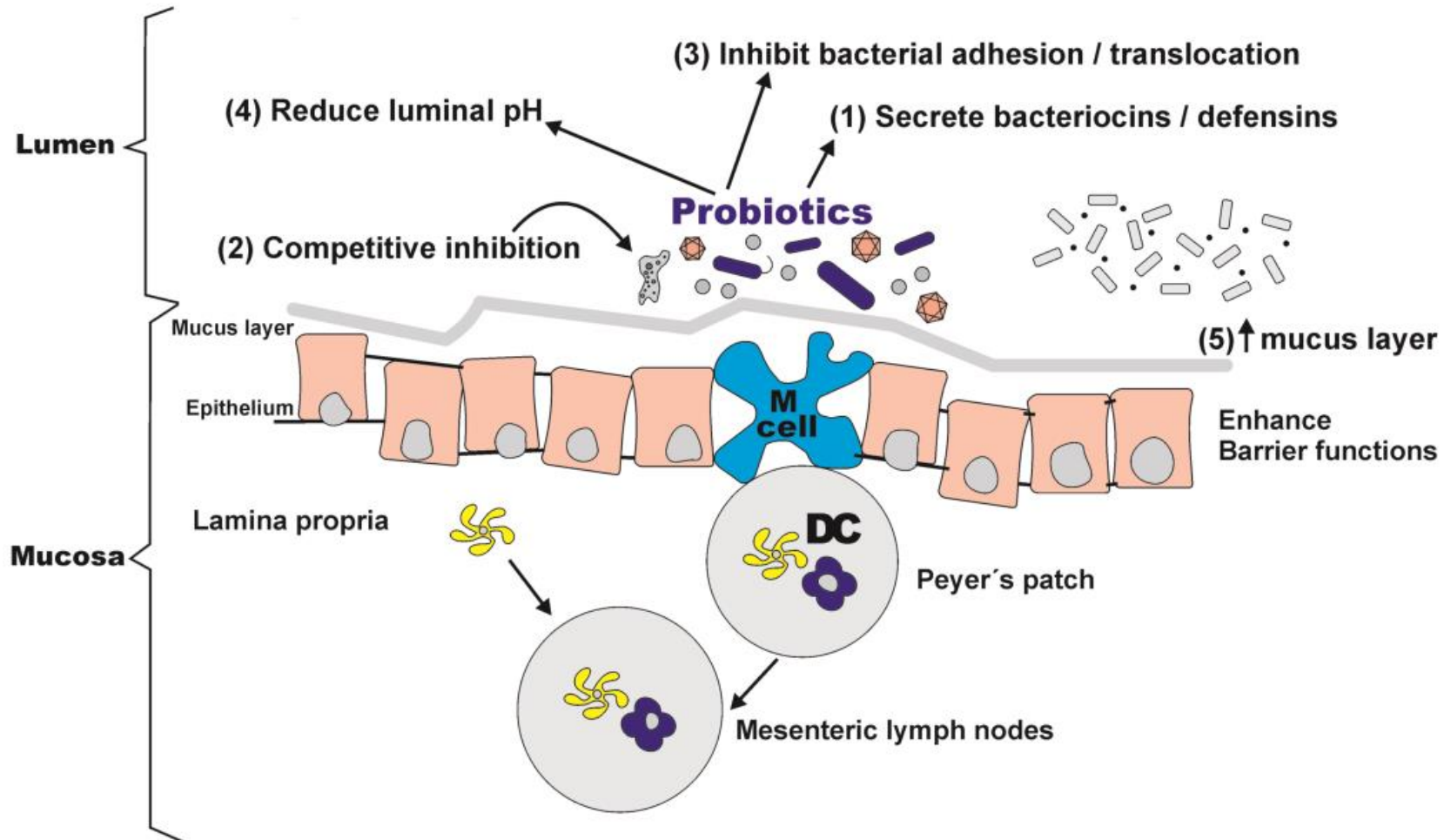
PROBIOTICS

“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



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
- ✓ coaggregates 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



BENEFITS OF PROBIOTICS

- ✓ 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



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THANK YOU