Effect of Methylene Blue and Sodium Chloride on the Bacterial Load of Nile Tilapia (*Oreochromis niloticus*) Fingerlings During Transport

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Introduction

- Tilapia as a source of protein
- Contribution of tilapia to Philippine aquaculture is 8.4%
- Fingerlings production is vital to the tilapia industry
- Survival of fingerlings during transport is critical

Significance of the Study

- **Use of methylene blue and sodium chloride in the reduction of bacterial load during fingerlings transport**

Statement of the Problem

- **Maintenance of healthy tilapia fingerlings for grow-out**
- **Effective disinfectants in fish transport must be identified**

Objectives of the Study

- To determine the effect of using two concentrations of Sodium chloride and Methylene blue on the bacterial load of the transport water of Nile tilapia fingerlings

- To compare which concentration of the two chemicals was more effective in the reduction of bacterial load of the transport water of Nile tilapia fingerlings

Bacterial Diseases of Fish

- Columnaris disease
- Edwardsiella septicemia or Edwardsiellosis
- Vibriosis
- Motile Aeromonad Septicemia
- Pseudomonad Septicemia or Red Spot disease
- Mycobacterios or Piscine Tuberculosis

Salt

- Considered as “aspirin” of aquaculture
- Commonly used to treat many external parasites of fishes
- Provides additional treatment in several cases of bacterial disease of fishes

Methylene blue

- It has inhibitory action on bacteria due to its binding effect with cytoplasmic structure within the cell
- Reduces water mold infection
- Effective for treating external parasites in fishes

Materials and Methods

Treatments

Treatment	Concentration
I	control
II	1 g/l of sodium chloride
III	2 g/l of sodium chloride
IV	3 mg/l methylene blue
V	1 mg/l of methylene blue

Chemicals used in the study

Test fish

- **Size of fingerlings:**
  size # 24 Nile tilapia

- **Source of fingerlings:**
  BFAR-NFFTC, CLSU

Transport Procedure

- Conditioning of fingerlings
- No feeding was done before transport
- Transport bags (20 x 30 x 0.003 in)
- Loading rate of 1,100 fingerlings/bag
- Duration of transport: 12 hours
- The bags were oxygenated

Collection of water samples

- 100 ml of transport water was collected in each bag
- Samples of transport water were placed in test tubes for bacterial load and water quality analyses

Bacterial counting

- Serial dilution up to 10^{-7} was done
- 0.01 ml from the bacterial suspension was placed in petri plates and incubated for 24 hours
- Number of Colony Forming Units per milligram (CFU/ml) were counted

Data gathered

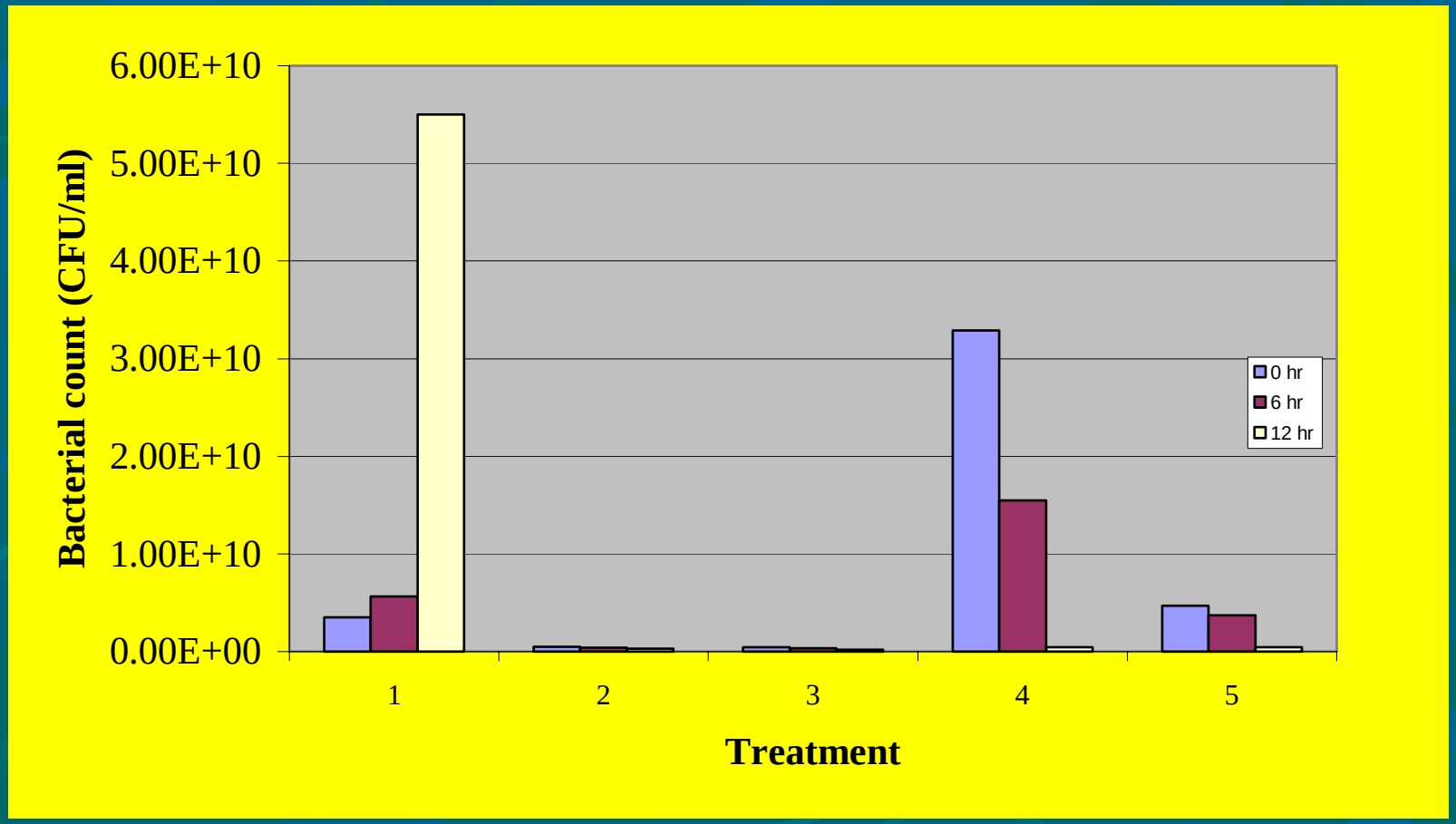
- Bacterial count (CFU/ml)
- Mortality (%)
- Water quality parameters
  - pH
  - Temperature (ºC)
  - D.O. (mg/L)

Results

Bacterial count in the transport water at 0, 6 and 12 hours of transport of Nile tilapia fingerlings

Treatment	Bacterial count (CFU/ml)		
	0-hr	6-hr	12-hr
I	3.5×10^{9} a	5.6×10^{9} a	5.5×10^{10} a
II	5.1×10^{8} b	3.8×10^{8} b	2.8×10^{8} b
III	4.5×10^{8} b	3.5×10^{8} b	2.1×10^{8} b
IV	3.3×10^{10} c	1.6×10^{10} c	4.3×10^{8} c
V	4.7×10^{9} c	3.7×10^{9} c	4.6×10^{8} c

Changes in bacterial count in the five treatments at every 6-hour intervals



Water quality parameters at 0, 6 and 12 hours of transport

Parameter	Duration of transport (hour)	Treatment				
		1	2	3	4	5
pH	0	8.0	7.6	7.7	8.2	8.1
	6	7.7	7.3	7.5	7.7	7.5
	12	7.7	7.8	7.7	7.7	7.6
Temperature (^oC)	0	25.2	25.4	25.5	25.8	25.3
	6	29.4	29.3	29.5	29.1	29.1
	12	30.4	30.2	30.3	30.3	30.7
Dissolved oxygen (mg/l)	0	18.6	18.2	18.5	18.6	18.2
	6	14.7	14.4	14.9	14.7	14.1
	12	15.0	14.5	14.3	15.4	15.4

Mortality (number and percent) and percent survival of size # 24 Nile tilapia fingerlings after 12 hours of transport

Treatment	Mortality (%)
1	0.8
2	0.6
3	0.7
4	0.7
5	0.4

Discussion

- Bacterial count in Treatment 1 was highest among all treatments at 0 to 12 hour of transport
- Bacterial count using methylene blue showed highest decrease in bacterial count compare to sodium chloride

Conclusion

- **Methylene blue and sodium chloride were both effective in reducing the bacterial load in the transport water compared with the control**

Maraming Salamat Po!