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Survey and research for producing bacterial tablet to treat striped catfish pond environment at intensive scale

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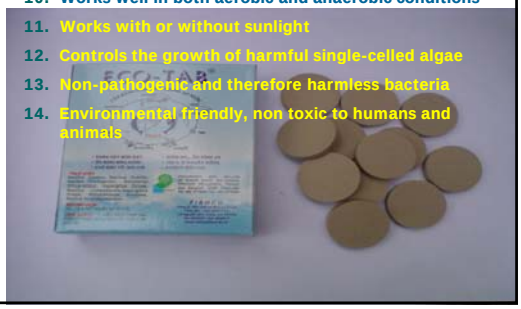
I. INTRODUCTION

- Striped catfish is one of the most important aquaculture species in Viet Nam.
- Problem of water environmental pollution in striped pond is a current affairs.
- In oder to treat the status of water pollution environment in tra catfish pond. Now there are many ways to do this problem such as:
- change water and use some inorganic substance like Zeolite, Dolomite to spread into the pond to absorb the organic and toxic gases in water pond.
- Use bioproducts for treatment is more popular using because of some advantages like cheap, environment friendly and efficiency.
- At the moment,on the market, a lot of bioproducts are using in different types:
  - powder.
  - liquid.
  - tablet.

Biotablets using for water treatment in aqua pond

1. Easy-to-use probiotics tablets
2. apply directly to pond
3. Create high water quality and balances pH and alkalinity
4. Very effective for ammonia and nitrite reduction
5. Eliminates Sludge and bad odors.
6. Removes organic waste in prawn and fish ponds
7. Turbo denitrification process
8. Effective treatment of luminescent water
9. Visible results within 4 days
10. Works well in both aerobic and anaerobic conditions
11. Works with or without sunlight
12. Controls the growth of harmful single-celled algae
13. Non-pathogenic and therefore harmless bacteria
14. Environmental friendly, non toxic to humans and animals



Striped catfish pond has some properties like:

- *Normally, the depth of pond normally range from 2.5 - 4m.*
- *A lot of sludge and suspense slugde.*

- *Powder and liquid type of bioproduct is rather difficult to sink to the bottom of the pond to treat .*

- The choice of biotablet type as the way to solve problem of striped aqua pond since some advantages:

Principle of microorganism

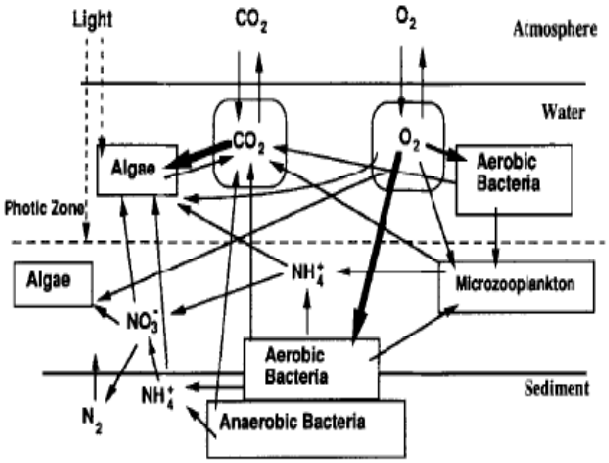


Fig. 1. Flows of oxygen, carbon dioxide and some nutrients between the principal microorganisms in a pond.

- Convenience, easy to use, easy packed and storage
- High microorganism concentration (≥ 10^9 CFU/g)
- Easy to approach to the bottom of the pond to treatment (>1,5m deep)
- Price: cheaper than imported products

General OBJECTIVE

Producing the biotablet use for treatment in striped catfish pond environment

II. CONTENT

1. ***Survey the biopoducts use for aqua pond treatment on market***
2. ***Establish a process to produce biomass from bacteria.***
3. ***Establish a process to produce biotablet***
4. ***Assessment of biotablet quality***
5. **Evaluation water treatment ability of biotablet in tank study (composite tanks), compare with commercial biotablet.**
6. **Assessment of water treatment of Tra catfish pond at intensive scale**

(8 items)

MATERIAL AND METHOD

❖ Material

- Bacillus strains (subtilis, lichenformic and megaterium)

- Carrier: cassava powder, soybean meal, rice powder, rice bran and others.

- Equipment: Rotary tablet press Machine

Method

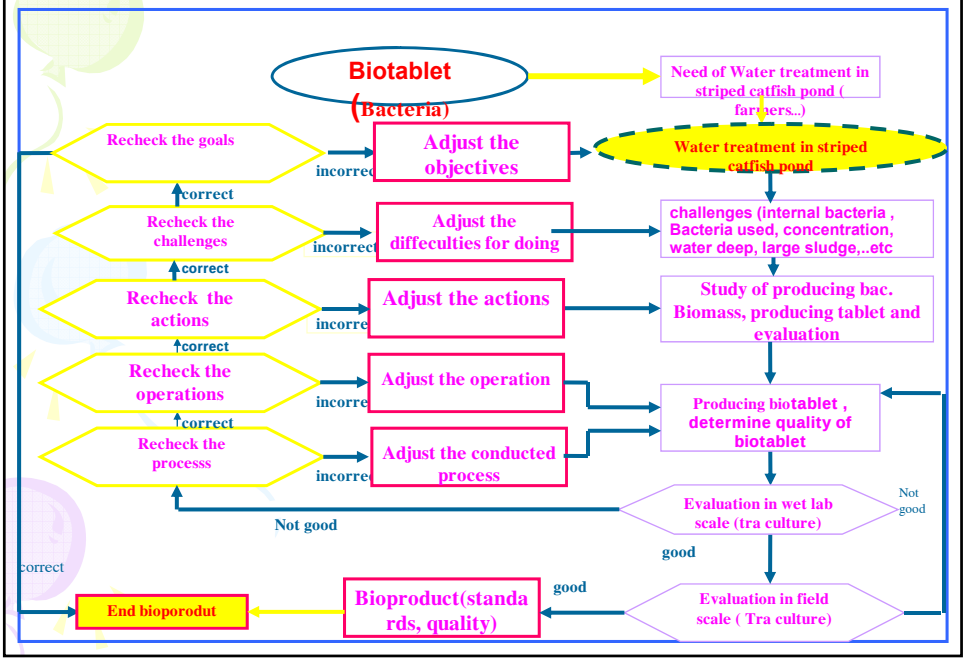
- Enumeration of bacteria

- Solubility by measuring the time of intact biotablet in water

- Sensory (texture, color and flavor).

- Biochemical method (determine of crude protein, lipid, carbohydrate and moisture)

System approaches diagram



III. RESULTS & DISSCUSION

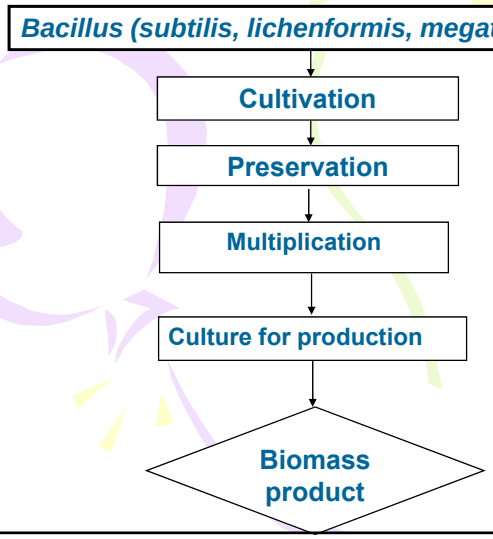
1. Survey some bioproducts using for water treatment in tra catfish pond at Kien giang and Dong Thap province

Tablet 1:different kinks of bioproduct use for water treatment in Cayfish pond

item	Description	Original	Type	Content	
				microbiology	biochemical
1	ECO MARINE	USA	tablet	- Bacillus *subtilis* - B.*licheniformis* - B.*pumilus*	
2	ECO TAB	ThaiLand	tablet		- Amylase - Xylanase - Cellulos
3	GRANUBAC	ThaiLand	tablet		- Amylase - Xylanase - Cellulos - Beta Gluatanase
4	SUPER BIO-TAB	ThaiLand	tablet	- *Bacillus subtilis* - B.*linchenifomis* - B.*amyloliquefaciens* - B.*thuringensis* - B.*cereus* - *Nitrosomonas Eropea* - *Aspergillus Orizae* - *Nitrobacter Winogradshyi*	
5	DEOCARE A	Vietnam	powder	- *Bacillus subtillis* -- B.*licheniformis*	- Extracted from Yucca Sichidigera 27%
6	ECO-TAB	ThaiLand	tablet	- *Bacillus subtillis* - B.*licheniformis* - B.*cereus* - B.*thuringenis* - B.*Amylosliquefaci-ens* - *Nitrobacter Winogradskyi* - *Aspergillus Orizae* - *Aspergillus Orizae* - *Nitrosomonas Europea*	
7	VIMESUBTYL	Vietnam	powder	- *Bacillus subtilis*	
8	Fish MEN	Vietnam	powder	- *Bacillus subtilis* - *Lactobacillus* - *S.cerevisiae* - *S.boulardii* - *Aspergillus oryzae* - *Aspergillus niger* - *Aspergillus- awamori* - *Streptococus lactic*	- Protease - Celllulase - Glucanase - Amylase Innergredient 100g
9	SUPER CHARGE	ThaiLand	powder	- *Bacillus subtilis* - *Lactobacillus plantarum* - *Saccharomyces cerevisionciea*	
10	TURBO SPEED	ThaiLand	powder	- *Bacillus pumilus* - *B.subtillis* - *Lactobacillus plantarum*	-Protease -Innergredient 1000(g)

III. Result (cont.)

2. Bacterial strains selection and establish the scheme of producing biomass from bacteria



-Media (carbon, nitrogen,..etc)

(TCS, rice powder, KNO3, soybean)

-Culture conditions (pH, t°c, time, moisture...etc).

(pH 6-7, 30-37, 48h, 0-5%)

-Factors effect to bacterial concentration during fermentation and storage time.

Select baterial strains base on some system approach:
- Documents related to Bacteria used for water treatment in aqua. pond.
- Analysis biological specifications of registered commercial bioproducts.
- Experts: Isolate and Select the bacterial strains: *Bacillus subtilis, Bacillus lichenformis, Bacillus megaterium.*

III. Result (cont.)

3. Research on producing biotablet

3.1. Mixing ratio of ingredients in carrier

Tablet 2:determine composition of carrier

Description	rate (%)																					
	For. 1			For. 2			For. 3			For. 4			For. 5			For.6			For. 7			
Rice powder	10	10	10	20	20	20	30	30	30	40	40	40	50	50	50	60	60	60	70	70	*70*	80
Casava powder	60	70	80	50	60	70	40	50	60	30	40	50	20	30	40	10	20	30	0	10	*20*	10
Soybean meal	30	20	10	30	20	10	30	20	10	30	20	10	30	20	10	30	20	10	30	20	*10*	10
Result	-			-			+			+			+			+			+ +			

(-) Untabletability (powder) , (+) tabletability (tablet) (++): good tabletability

3.2. Effect of moisture and drying time to physical properties

Table 3: Factors effect ot tabletability, texture of the tablet

Moisture of mix (%)	30	35	40	45	50
Drying time (h)	6	6	7	8	10
Tabletability	+	+	+	+	+
Texture of tablet	Soft and easy broken			Hardness, smooth surface	soft, rough surface

3.3. Study of ratio of additive in tablet

3.3.1. Effect of additive to solubility of tablet

Table 4: effect of additive sustance to solubility time of biotablet

Ratio of additive (%) (water absorbant substance)	Without additive sustance (control sample)	1	2	3	4
Solubility (min)	13	65	60	54	50

3.3.2. Effect of binder to physical properties

Tablet 5 : effect of binder to physical properties of biotablet

Diets	1	2	3	4
Binder (%)	2.5	5	7.5	10
Properties	A lot small partical on tablet	Soft and small particals on surface of tablet	No small particals, smooth surface	Viscous and rough surface

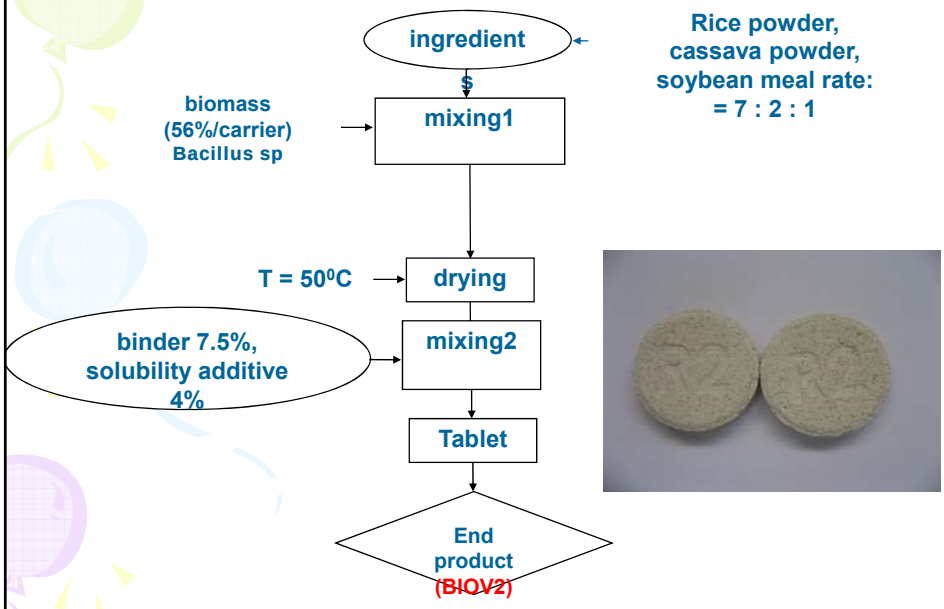
3.4. Assessment of the shelf life of bioproduct

Tablet 6: Effect of storage time to bacterial concentration (at room temperature)

Week	1st	2sd	3th	4th
Microbiological concentration x10^9(CFU/g)	1.5	1.1	1	0.9

-Quantity of microorgamisms decrease slightly after 01 moth in room temperature and without packed

3.5. scheme of producing biotablet



4. Assessment of Quality

Table 7:properties of biotablets

Bio-tablet product	Sensory	Physical properties				Chemical						Microbiology
	colour	shape	size (mm)	mass (gram)	solubility (min)	moisture (%)	Crude protein (%)	Crude Lipid (%)	ash (%)	fibre(%)	Cabonhydrate (%)	Total Bacillus spp. (CFU/g)
BIOV2	Slight yelow-white	round	38	3,4	50	9.75	11.47	1.94	4.07	1,13	71.64	$1.5x10^9$
ECO-MARINE	White	Round	25	1,95	> 60	3.34	2.28	0,60	3,37	3,53	86.88	$6.7x10^9$
ECO TAB	Slight brown	round	25	2,1	45	5.04	1.59	0,80	67.94	0,42	24.21	$1.0x10^7$

V.CONCLUSION

- The result of survey showed that biotablet has been accepted on market used for water treatment in striped catfish pond.
- Ratio of ingredients in carrier is rice powder: cassava: soybean meal correspondent with 70:20:10.
- Moisture of the mixture (carrier+ biomass) 45% and drying time of 8h are suitable for producing biotablet.
- Ratio of absorbant substance 4% and binder 7.5% are suitable for solubility of biotablet.
- Micobiological concentration of BIOV2 decrease slighly after 01 moth storage ($0.9.10^9$ CFU/g) in room temperature.
- Properies of BIOV2 is different with ECOMARIN and ECO TAB.


Thank you