



## Present status of chemicals used in galda farms of Khulna and Bagerhat areas

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### ABSTRACT

Studies were conducted on the antibiotic residues and their effects on the growth performance of galda. A survey was also conducted on the use of antibiotics especially nitrofurans, chloramphenicol and oxytetracycline drugs in bagda/galda farms and hatchery through questionnaires in Phultala upazila and Rampal upazila. Both commercially produced feeds such as Saudi-Bangla Feeds, Niribily Feeds, Quality Feeds, ACI Feeds, Balaka Feeds and those prepared locally were used in galda farms. Some farmers used pharmaceuticals such as Aquamarine, Oxycentril, whereas few of them use growth hormone in feed. Most of the farmers denied of using poultry dropping as fertilizer in the ghers of these two upazilas, whereas a few use poultry feed particularly in Phultala. Farmers of these two upazilas use urea, triple super phosphate (TSP), muriate of potash (MP), gypsum and as organic they use decomposed cow dung. Most the farmers use Sumithion, Sobicron, Nicovan, Hatap, Bitap, Basudin, Morter, Nitro, Diamond, Kiter, Sulfur and Zinc as pesticides/insecticides. Farmers also use chemicals such as lime, rotenone, TSP, Ziolite, 5-Star Aqua, Aqua sol., Mega-Zeo blue, Methylene blue, etc.

**Key words:** Chemicals, Galda., *M. rosenbergii*.

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### INTRODUCTION

The 1980's witness an unprecedented boom in the aquaculture of galda, (*Macrobrachium rosenbergii*) due to an expanded global demand for high quality seafood and attempts made by the government to liberalize and diversify the economy. Concurrent with such massive growth of galda farming and processing industries, the galda sector has been coping with various stringent quality requirement put forward by the international buyers, particularly EU countries.

Prawn culture is of central importance to the fisheries sector in Bangladesh particularly in the contest of export earning. Of all the exportable agro-based primary commodities, prawn is by far the most important which contributes more than 70% of the total export earning from all the agro-based products, including tea, raw jute, vegetables,

fruit, etc. It grew from the early 1970s and contributing about 11% of the total export earning in the mid-1990s (DoF, 1999). No other primary commodity enjoyed such spectacular growth in post-independence Bangladesh.

Back in 1995-97, food safety issues were mostly concerned to the microbiological contamination in post-harvest prawn due to improper harvesting, handling, transport, processing and preservations. But the new complaints are associated with the presence of nitrofurans (antibiotics) and some other health hazard chemicals in the prawn which found entrance from the environment or any source of contamination in the production chain. Antibiotics have been used in aquaculture in any Asian countries as feed additives to promote growth and added in water to prevent disease occurrence. Therapeutic doses are used to treat diseases. Long-term use and misuse of antibiotics

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may result to drug resistant bacterial strains and accumulation of unwanted residues in the cultured commodity upon slaughter and harvest. Some of the antibiotics that have been used in bagda hatcheries and grow-out ponds are tetracycline, rifampicin, chloramphenicol, nitrofurans, erythromycin, oxolinic acid and furazolidone. oxytetracycline, furanace, terramycin, ektecin, chloramphenicol and sulfa drugs have been used to treat fish bacterial infections (Tendencia and Lavilla-Pitogo, 2004). Considering the above fact the present study was undertaken with the aims to investigate present status of galda culture and collection of information on the use of harmful chemicals such as nitrofurans and their metabolites and chloramphenicol in galda farms.

## MATERIALS AND METHODS

### Inception of the research

Phultala upazila of Khulna district and Rampal upazila of Bagerhat were selected for conducting this field research to obtain detailed information about pharmaceuticals, growth promoter/hormone, poultry dropping/ waste and chemicals used in hatchery and farm, during handling and transportation of galda. These locations were chosen because of large farming areas, one for galda (*Macrobrachium rosenbergii*) in Phultala of Khulna and another one Rampal for Bagda (*Penaeus monodon*). Besides, these two upazilas were taken as pilot upazilas for testing of traceability system by the DoF under BQSP-Fisheries, UNIDO project. Altogether fifty galda farmers were interviewed in these locations. The farms were selected as randomly as possible within each area. The interviews from the farm and hatchery owners were taken in prescribe forms to assess the pathway and source of harmful antibiotics especially nitrofurazolidone, chloramphenicol and oxytetracycline found in galda body. The questionnaire forms developed for the interview targeting the fulfillment of aims of the present study.

### Collection of primary information

The interviews were based on an extensive questionnaire regarding management practices and

the use of chemicals on the farm. Interviews were conducted openly, with follow-up discussions if necessary. Collected data were compiled, tabulated and transformed into reports through logical analysis.

### Collection of secondary information

Relevant information about health hazard antibiotics in frozen food items were collected from print and electronic domain, from books, journals, periodicals, reports and newspapers, from internet browsing, from different organizations such as DoF, BFRI, BAU, BCSIR, BSTI, DAE, DLS, Ministry of Health, Environment etc. and reviewed the background information regarding health hazard chemicals, antibiotics, growth hormones and biological contaminations in frozen food items and previous research findings through survey.

## RESULTS AND DISCUSSION

Table 1 showed farm size, farm preparation, farm operating season, stocking and feeding of galda in Phultala upazila of Khulna and Rampal upazila of Bagerhat district of Bangladesh.

Average farm size of all the galda farms surveyed in the two upazilas; Phultala of Khulna and Rampal of Bagerhat districts was over 50 decimals. Almost all the farms used to dry their pond/gher, repair dike and remove predatory fishes before culture. Most of the farms in all the two regions remove aquatic weed or scum from gher before starting of gher operation. Most of the galda farmers use lime and fertilizer in their gher.

In the coastal belt of Bangladesh galda culture can be classified into: Galda and bagda culture, Galda and finfish culture, Paddy-cum-galda culture and Monoculture of galda. On the basis of the farm management, however, for example stocking rate, feed supply etc. galda culture practice in Bangladesh can be divided into three categories: traditional, improved traditional and semi-intensive system.

In traditional galda culture of Khulna and Bagerhat area, monoculture of galda starts from April and continued up to December.

Sources and stocking of post larvae (PL) in galda farms of two upazilas of Bagerhat and Khulna were presented in Table 1. The source of the PL is mostly from natural sources; whereas some farmers used hatchery produced PL. Stocking density varies from place to place. The galda fry are stocked at the rate of 50-200 fry/decimal. The fry were released 7-25 days after entering water from March to May in Phultala and January to February in Rampal. In all galda farms, the fry were released after conditioning in nursery either in the gher itself or in a separate place. Both commercially produced feeds such as Saudi-Bangla Feeds, Niribily Feeds, Quality Feeds, ACI Feeds, Balaka Feeds, etc. and those prepared locally were used in galda farms in Phultala. However, in Rampal, the farmers do not use any commercial feed; they mainly use locally prepared feed, composed of rice bran, rice flakes, boiled rice, maize, wheat bran, boiled pulse, mustard oil cake (MOC), molasses, bason and snail meat. Farmers apply feeds 1-2 times in a day in Phultala, whereas in Rampal, farmers apply feeds 2-3 times in a month. In both Phultala and Rampal, some of the farmers use Pharmaceuticals such as Aquamarine, Oxycentril, etc., whereas few of them use growth hormone in feeds. Most of the farmers denied use of poultry dropping as fertilizer in the gher of these two upazilas, whereas a few farmers admitted to use poultry feed in Phultala. Farmers apply feeds 12-15 hours prior to harvesting in Phultala, whereas in Rampal harvesting is done within 2 to 4 hours after feeding.

It was found that viral and appendages cutoff were the major diseases of these two upazilas (Table 2). In Phultala, there is also incidence of unknown disease possibly related to low dissolve oxygen in the water where galda dies immediately after coming to the edges of the pond and it is mostly happened in early in the morning. In Phultala, these diseases occur in April to June when the environment temperature is high and in Rampal it occurs from December to June.

Table 3. Showed information about agricultural activities practice in galda farm in Phultala and Rampal upazila. In Phultala upazila most of the farms have a nearby agricultural land whereas approximately 50% of the farms have agricultural

land near the farms in Rampal upazila. It was observed that all the farms had a piece of agricultural land either in the middle or alone one side in the farm. In Phultala almost all the farms have agricultural land in the middle position. Area of these lands is mostly less than one acre in Phultala and 1-2 acres in Rampal. Farmers of these two upazilas use both organic and inorganic fertilizers. As inorganic fertilizers they use urea, triple super phosphate (TSP), muriate of potash (MP) and gypsum and as organic they use decomposed cow dung. For good production of agricultural crop, most the farmers of Phultala use Sumithion, Sobicron, Nicovan, Hatap, Bitap and Basudin as pesticides/ insecticides in their land. On the other hand the farmers of Rampal use Morter, Nitro, Diamond, Kiter, Sulfur and Zinc as pesticides / insecticides.

All the farmers of Phultala upazila culture galda in their ponds due to freshwater whereas in Rampal upazila the farmers' culture galda with bagda (*P. monodon*) due to saline water which ranged from 2-12 ppt in their gher (Table 4). Therefore farmers of Phultala upazila sell only galda whereas farmers of Rampal sell both galda and bagda. Most the farms are located in such remote areas where there is no ice factories established nearby farms. The farmers manage ice from distant places to preserve and transport the harvested galda and bagdas to the depots. During transportation of ice the farmers use gunny bags around the ice as an insulating material so as to reduce melting of ice. The practice of using ice is extensive in Rampal upazila than Phultala because of longer distance from ice plants to farms. In Rampal area, depots are located far distance from farm areas, where as in Phultala, the depots are very close to the farm areas. So all the farmers of Rampal upazila use ice to maintain good quality of their galda and bagda, where as in Phultala area, the farmers carry live bagda to depots without using ice. During transportation, farmers of both upazilas use plastic drum for carrying galda and bagda to depot.

Table 1

Farm size, Farm operating season, Stocking period of PL and Stocking density in Phultala and Rampal upazila in the Khulna and Bagerhat district.

Major aspects	Khulna	Bagerhat
	Phultala	Rampal
<b>A. Farm size</b>		
Average farm size	33% over 50 decimals	100% over 50 decimals
<b>B. Farm preparation</b>		
Water source	Rain and river	Tide
Culture type	Improved traditional	Traditional, improved traditional and semi-intensive
Liming in farm	100% Yes	100% Yes
Fertilization in farm	50% Yes 50% No	100% Yes
<b>C. Farm operating season</b>		
Months	3-12 months	6-12 months
<b>D. Stocking</b>		
Source of PL	31% Private hatchery 69% natural	100% Natural
Length of PL	½-2 inch	½-1 inch
Stocking density	50-200 fry/ decimal	150-300 fry/ decimal
Stocking period of PL	March-may	January-February
<b>E. Feeding</b>		
Feed used	Locally made feed and Brand feed (Saudi Bangla, Niribily, Quality, ACI, Balaka)	Locally made feed.
Locally used feed ingredients	Rice Bran, Boiled rice, Maize, Wheat, Bran, Mustard Oil Cake (MOC), Molasses	Rice Bran, Boiled rice, Maize, Snail, Wheat Bran, Boiled Pulse, Mustard Oil Cake (MOC), Chira, Molasses, Bason
Feed formulation type	13% Semi Solid 87% Solid	Mainly solid
Feeding Rate (Kg)	5-10	2-8
Feeding frequency	1-2 times/ per day	2-3 times/ month
Use of Pharmaceuticals in Feed	13% use (Aquamarine) 87% do not use	16% use (Oxycentril) 84% do not use
Use of growth promoter/hormone in Feed	Only use 4% (Urea)	Only use 8% (Noverties Hormone, Urea)
Use of Poultry dropping/ waste in feed	No	No
Use of Poultry feed	Only use 4%	No

Table 2  
Disease related information in Phultala and Rampal upazila.

Major aspects	Khulna Phultala	Bagerhat Rampal
<b>A. Major diseases occur</b>		
Viral	12%	18%
Appendages Cutoff	44%	61%
Unknown	16%	Nil
None	28%	31%
<b>B. Seasons of occurring diseases</b>		
December	Nil	23%
April	21%	46%
May	79%	8%
<b>C. Repeated occurring of any disease</b>		
	33% Yes 67% No	16% Yes 84% No

Table 3  
Agriculture related information in Phultala and Rampal upazila.

Major aspects	Khulna Phultala	Bagerhat Rampal
<b>A. Nearby Agricultural land</b>	93% Yes 7% No	54% Yes 46% No
<b>B. Position of the land</b>	9% Beside 91% Middle	36% Beside 54% Middle
<b>C. Area of the land</b>	68% Less than 1 acre 18% 1-2 acre 14% More than 2 acre	29% Less than 1 acre 57% 1-2 acre 14% More than 2 acre
<b>F. Types of fertilizer used</b>		
Organic	Nil	Nil
Inorganic	86% (Urea, TSP, Potash, Gypsum)	79% (Urea, TSP, Potash, Gypsum)
Both	14%	21%
<b>G. Use of pesticides/insecticides</b>	58% Yes (Sumithion, Sobicron, Nicovan, Hatap, Bitap, Basudin) 42% No	60% Yes (Morter, Nitro, Diamond, Kiter, Sulfur, Zinc) 40% No
<b>H. Weed control chemicals</b>	100% No	100% No

Table 4  
Selling information in Phultala and Rampal upazila.

Major aspects	Khulna Phultala	Bagerhat Rampal
<b>A. Species</b>	100% <i>M. rosenbergii</i>	50% <i>M. rosenbergii</i> 50% <i>P. monodon</i>
<b>B. Ice used</b>	50% Yes 50% No	100% Yes
<b>H. Transportation</b>		
Distance of depot to which galda/ bagda is being transported	1-2 km	1-4 km
Transportation time	30 min-1hour	1-2 hours
Transport in (container)	Plastic drum	Plastic drum

Table 5  
Chemicals use in Phultala and Rampal upazila.

Major aspects	Khulna Phultala	Bagerhat Rampal
A. Chemicals used during pond preparation	21% Yes (Lime, Rotenon, Phosphate) 79% No	35% Yes (Lime, Triple super phosphate) 65% No
B. Chemicals used for water purification	50% Yes (Lime, Potas, Aqua jet, Metro sol) 50% No	100% No
C. Chemicals used for preventing disease	31% Yes (Ziolite, 5 Star Aqua, Aqua sol., Mega-Zeo blue, Methylene blue) 69% No	7% Yes (5 Star Aqua, Methylene blue) 93% No
D. Chemical used during transportation	100% No	100% No

Table 5 shows information about chemicals use in different stages of galda farming in Phultala and Rampal upazilas. Farmers of both upazilas use lime, rotenone, TSP, etc. during pond preparation but the percentage of uses of lime, rotenone, TSP is higher in Rampal upazila. For maintaining water quality farmers normally use lime, MP and aqua jet. The farmers use variety of chemicals such as Ziolute, 5-Star Aqua, Aqua sol., Mega-Zeo blue, Methylene blue, etc to prevent diseases. But the uses of different chemicals in farms is high in Phultala upazila compared that of Rampal.

## CONCLUSION

It is observed that different types of commercial feeds were used in galda farms in Phultala and Rampal Upazila. The farmers used various

chemicals and antibiotics in galda farms for prevention of disease. The generic names of those chemicals are now known. They also used various insecticides when the same ponds are used for paddy culture. All the antibiotics used in this present studies were found growth promoters. Bacterial loads reduced considerably in ponds where antibiotic medicated feeds were used. The withdrawal period of nitrofurans metabolites were 10 days for AOZ and AMOZ and 20 days for SEM. The withdrawal period of chloramphenicol was 20-25 days whereas tetracycline was 5-7 days.

## RECOMMENDATIONS

More research support is needed to improve the cultural and management practices of galda culture. All the chemicals used in galda and bagda

farms should be investigated to know their generic names. The competent authority should have control over the use of chemicals and antibiotics on legal basis. All the feeds used for galda, bagda and poultry should be analyzed for antibiotics in metabolites and parent forms.

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