

Nitrofurans: Pull the Trigger to Safeguard the National Interest

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About 100 shipments of frozen prawn products from Bangladesh were rejected by the European Union from 2005 to 2009 and as a result more than \$ 500 million foreign currency earning deployed by Bangladesh. Livelihoods of about 5 million peoples who have complete dependency on prawn industry always face uncertainty of their life. Bangladesh fell short of frozen food export targets by 20.83 percent in FY 2008-09, with exports totalling \$454.43 million. Export Promotion Bureau statistics show that frozen food worth US\$454.53 million was exported during FY 2008-09 against US\$534.07 million export in FY 2007-08. It's shipment also dropped by 49.63 per cent in July of FY 2009-10 compared to July of FY 2008-09. Price of frozen food from Bangladesh also fell down by 55 percent during the time. As demand fell drastically country forced to sell goods at low price in international market. The entire crisis happened in exported prawn product of Bangladesh due to the presence and availability of "Nitrofurans".

Table 1 : Alert Notification of exported shrimp prawn products from Bangladesh

| S.L. No | Year | Total export to EU (MT) | Total No of Alerts | Causes of Alerts |
|---------|------|---------------------------|--------------------|-------------------------------------|
| 1 | 2005 | 17,790.52 04 (2004-05) | 04 | Nitrofurans |
| 2 | 2006 | 18,211.52 (2005-06) | 22 | Nitrofurans |
| 3 | 2007 | 23,776.37 (2006-07) | 03 | CAP, Nitrofurans & Decomposition |
| 4 | 2008 | (34,560.00 (2007-08) | 15 | Nitrofurans |
| 5 | 2009 | (29,760.00) (2008-09) | 54 | Nitrofurans |

Source : Bangladesh Frozen Foods Exporters Association (BFFEA)

Nitrofurans are a class of drugs typically used as antibiotics or antimicrobials. It has been prohibited from use in food-producing animals in most countries due to public health and safety concerns, particularly in relation to the carcinogenic potential of either the parent compounds or their metabolites. The defining structural component is a furan ring with a nitro group and consist of 4 main

Members of this class of drugs include: nitrofuran chemicals referred to in the scientific literature namely furazolidone, furaltadone, nitrofurantoin and nitrofurazone

| Name | Types of nature | Bound Residue | Banned |
|----------------|-----------------|----------------------------------|--------|
| Furazolidone | Antibacterial | AOZ (3-amino-2-oxazolidinone) | 1995 |
| Nitrofurantoin | Antibacterial | AHD | 1993 |
| Nitrofurazone | Antibacterial | SEM (Semicarbazide) | 1995 |
| Furaltadone | Antibacterial | AMOZ | 1993 |

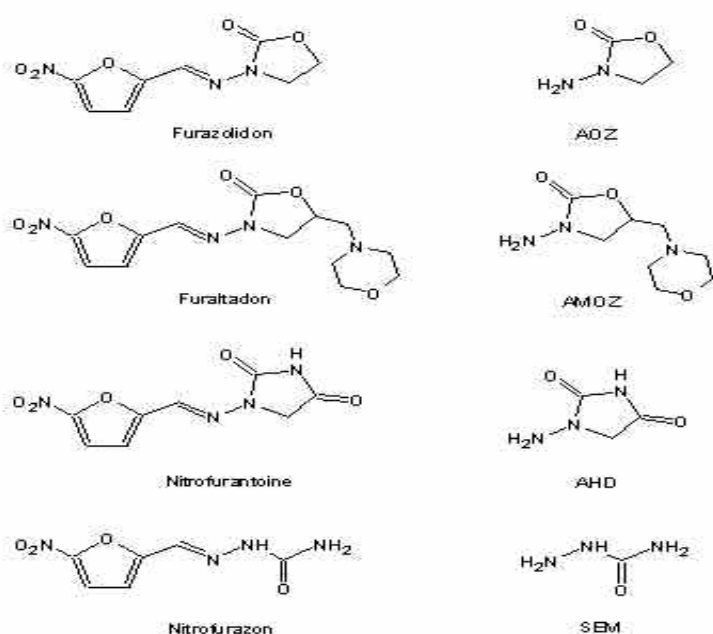


Figure 1: Chemical structures of 4 nitrofurans and their correspond metabolites

Global Nitrofuran “crisis” came to light in 2002–03 when nitrofuran metabolites were reported in poultry and aquaculture products from Thailand, Vietnam, India and Brazil, in Portuguese poultry meat, and in pork meat purchased in Italy, Portugal and Greece. Nitrofurans are synthetic broad-spectrum antimicrobial agents and veterinary drugs used in some countries in human and veterinary medicine like poultry, aquaculture and pig production. Since 1993 and 1995, the use of Nitrofuran drugs was banned in EU for food animal production (Council regulation (EEC) No 2901/93, 1993; Commission regulation (EC) No 1442/ 95, 1995). The use of these in food production is already banned in the United States, Australia, Canada, Japan, Singapore, Bangladesh, and the European Union because of a possible increased cancer-risk through long-term consumption. But due to cheap, effective and continued to be manufactured and used for companion animals, aquarium fish and human medicine in many countries still now although it was banned. In March 2003, a definite MRPL

(Minimum Requirement Performance Limit) was set at 1 µg/ kg in EU for these drugs in poultry and aquaculture products (Commission decision 2003/181/EC, 2003)

On May, 2009 more than 50 fresh water prawn consignments from Bangladesh were rejected from different European countries, mostly from Belgium, due to the detection of toxic antibiotic, nitrofurantoin, in them. After the rejection of product Bangladesh Govt. had decided to stop export shrimp and prawn product for the 6 months suspension period till November 20, 2009. **Abul Basher, Chief Executive Officer of Bangladesh Frozen Foods Exporters Association expressed his deep concern on impact of EU ban on exported prawn due to Nitrofurantoin. He said 'If we had not stopped shipments, the European authorities might have imposed a total ban on all types of shrimps from Bangladesh, which could be a catastrophe to the recession-hit industry.**

Due to the presence of nitrofurantoin in exported prawn on last May, 2009 as a result, thousands of workers of shrimp processing plants have been rendered unemployed since last one month as licenses of three shrimp processing factories have been cancelled in Khulna region recently by EU rejected Bangladesh's \$350 million seafood sector in (April 20, 2009). Cancelled three shrimp and prawn processing plants of Bangladesh had been exporting frozen shrimps worth about Tk 3.5 billion per year. They invested about 2.5 billion in this sector including in the infrastructure development. Those factories are now closed and workers are jobless.

A severe cyclone AILA happened on May 25, 2009 which destroyed the south-west coastal region of Bangladesh and washed away 75 to 80 per cent coastal aquaculture farm before harvesting. Vice president of the Bangladesh Frozen Food Exporters' Association (BFFEA) Abdul Bakir told, "We've estimated nearly 10 billion taka (about 142.9 million U.S. dollars) loss where around 70 percent farms were washed away due to the cyclone." This was great loss for prawn sector of Bangladesh because the BFFEA last week decided to suspend export of fresh water prawn to European Union (EU) for six months from next month for the availability of nitrofurantoin in the consignment of exported prawn of Bangladesh. But not maintained all the necessary steps for prawn exports in EU, government again deShekh Shafee Ahmed, convener of Galda Chingri Hatchery Association of Bangladesh (GHAB) said that hatchery of galda chingri can't able to marketing 90% of their product for the farmers and approximate economic loss in 2009 was 100-120 crore for all the govt. and non. govt. *macrobrachium* hatcheries of Bangladesh

Driven by 6 months banned time of prawn export and a severe cyclone Aila (May 25, 2009) destroyed the country's frozen food export fell by 14.89 per cent during the last fiscal year (2008-09) compared to the corresponding previous year. As demand fell drastically exporters of Bangladesh forced to sell goods at low price. Recently, names of 15 factories have been included in the list of Sick Industries Association, an official said. In the first nine months of the fiscal year 2008-09, prawn shipments slid 13 percent to 356 million dollars. The exporters have asked the government to bail

them out, saying the livelihoods of many of the country's 1.5 million farmers are at stake. Kazi Shahnewaz, President of Bangladesh Frozen Food Exporters Association said the AFP that 50,000 farmers in the impoverished nation of 144 million people would be affected by the export ban.

Renowned Belgian laboratory of Aquaculture and Artemia Reference Centre (ARC) at Ghent University detected semicarbazide (SEM), a metabolite of nitrofurazone, from all rejected 50 prawn consignments of Bangladesh as they are now taking whole part, instead of flesh parts, of the prawn for analysis in the new procedure. ARC director Prof Dr Patrick Sorgeloos said that SEM is indeed a metabolite of nitrofurazone but it cannot be formed as a product of various chemical reactions that involve natural compounds in absolute absence of nitrofurazone or other nitrofurans. He said, "The exoskeleton of *Macrobrachium* contains SEM but the tail of the same prawn tests negative for SEM. Very likely thus that the SEM detected in the exoskeleton of *Macrobrachium* is not of nitrofurazone origin but formed as the result of a chemical reaction with bioactive compounds in the exoskeleton".

The lack of monitoring over shrimp and prawn feed quality has thwarted the progress of the industry, said Vice-President of Bangladesh Frozen Food Exporters Association (BFFEA) Maksudur Rahman. Syed Mahmudul Huq, chairman of **Bangladesh Shrimp and Fish Foundation** (BFSS) said "We brought foreign experts who tried to trace how the toxic antibiotic entered shrimp rearing and export-processing areas in Bangladesh. After investigating potential sources of the contaminant and the way it spread, we suspect the contamination originates from feed. It may also come from medicines used in the industry".

Sheikh Safee Ahmed, convener of said Aquanet 'GHAB doesn't permit any of its members to use nitrofurans or any other banned chemical/antibiotic during PL production and it will enforce strict vigilance to stop its use during the production season in 2010 onward'. Nesar Ahmed, Professor of the Department of the Fisheries Management at the Bangladesh Agricultural University, said "fish meal is a major reason behind the infection of germ in prawn. He also stated that sources of fries also responsible for the contamination of nitrofurans in shrimp". **A consultant at the Bangladesh Shrimp Foundation- a multilateral facility to support industry- told that it was widely believed nitrofurans came to prawns from the feed, which are sourced from markets. 'It is the duty of the industry and the government to ensure cautious supervision on feed supply chain and eliminate nitrofurans from prawns so sustain in the global market,' he said. The consultant feared that if prevention of nitrofurans was not ensured within short time frame, Bangladesh would lose its share in global market. Md. Kamal Hossain, Market Extension officer of Quality Feed Limited said "No shrimp and prawn feed mill industry never responsible for nitrofurans contamination. Meat and bone meal widely used as feed ingredients for prawn feed formulation which imported from abroad. We have doubt that nitrofurans probably available in this ingredients but there are no facility in Bangladesh for the detection of this banned chemical in the feed ingredients like meat and bone meal".**

For prawn there are more and more indications that the origin of residues is treatment of prawn in a very early stage of the life cycle. In prawn fry from treated tanks the corresponding nitrofurantoin tissue-bound residues were detected. Similarly, in model experiments using cold-water shrimp, tissue-bound residues were detected in exposed prawn. M. Shah Nawaz Chowdhury, Chief Consultant of Rainbow Hatchery Limited said “the diseases have been prophylactically and therapeutically treated with antibiotics in few hatcheries, but underlying causes have not been addressed and resulting emergence of antibiotic resistant strain. To maintain healthy ecosystem in hatchery tanks bioremediation is one of the best technological processes where we use *Bacillus* strains as probiotics in larval rearing of fresh water prawn to avoid the uses of antibiotics”.

Stakeholders said the health hazardous element comes from feeds, although the use of nitrofurantoin is prohibited in Bangladesh, with some suspecting that the element is coming through illegal channel of trade. Steps should take to examine the water and soil of the prawn farming areas. Besides feeds, prawns themselves may be the indirect source of nitrofurantoin infection. These prawns change their shells several times from their fry stage until being full grown for harvest. Their shells contain different chemicals and minerals. Growers repeatedly transfer the shrimps in the cultivation stage from one pond to another and the latter is dried up before transferring the prawns in it on removing the viscous clay that gathers at its bottom due, perhaps, to amalgamation of waste feeds and chemicals or minerals, released from the rotten shells. If this clay is not fully removed or removed to a safe distance when no part of it can be washed back to the pond wherein shrimps are grown, it is suspected that the wet clay itself might become the incubator of nitrofurantoin to eventually be the source of the contamination (<http://www.growfish.com.au/content.asp?contentid=7622>).

The government has decided to formulated a national working committee to address the problems in the prawn industry has been formed with relevant government and non-government organizations, international development agencies and export-related people and agencies as its members. The committee has drawn a national action plan to hold a number of meetings, seminars and workshops, the implementation of which is underway. Under the action plan, while importing feeds for animals, shrimps and prawn, provision for providing certificate guaranteeing the prawn and animal feeds to be nitrofurantoin-free has been made mandatory.

On 03-04th October two days seminar on "Shrimp Export from Bangladeshi Potentials and Challenges" together with Fishery Products Business Promotion Council (FPBPC), Bangladesh Frozen Foods Exporters Association (BFEEA), Bangladesh Shrimp and Fish Foundation (BSFF) and in collaboration with the Ministry of Commerce and the Ministry and Department of Fisheries held at Dhaka Sheraton Hotel making recommendation for branding Bangladeshi shrimps and forming a shrimp development alliance with all the stakeholders to raise foreign exchange earnings from the sector. The seminar was organized against the backdrop of local frozen food processors' voluntary imposition of a six-month ban on Bangladeshi shrimp exports after some consignments sent to the European Union were put under a rapid alert notice for antibiotic nitrofurantoin contamination. Minister for

Fisheries and Livestock Md Abdul Latif Biswas graced the concluding session as the chief guest. He said a law on controlling standard of feed is awaiting passage in Parliament and hoped it would check local manufacturing and import of contaminated fish feed. Mentioning that the government is trying to combat contamination of harmful antibiotic nitrofurans in Bangladeshi shrimps and prawns, the minister said measures would be taken to control the illegal entry prawn fries from foreign countries, which is blamed by many for the contamination. He said an aquaculture food safety centre is being established to maintain the quality of shrimps and hoped the sector would be able to attain the 1-billion-dollar-export target by 2015.

The government of Bangladesh has been warned several years back by the buyers and foreign regularity authorities about the presence of this harmful chemical in the frozen foods, but there was not much improvement made on this matter yet. The Government need to take initiative and involve all concerned stakeholders including technical and non-technical personnel, private sector and the representatives of support industries like hatchery, feed mill, animal health and all related stakeholders in a brainstorming process to resolve this vital national crisis. The potential contamination sources which were stated below;

Feed source

Prawns are fed with feed which requires high protein (min 30 per cent) for growth. One of the main sources of protein is meat and bone meal (MBM) -- an indigenous, highly volatile "No Quality" commodity which is mainly coming through legal import. This commodity is not truly made to be used in animal feed rather it is for the application of fireplace as incinerator and in soil as organic fertiliser. This commodity is not only contaminated with nitrofurans but also contains pork by-product which is banned in our import policy due to religious compliance. Unfortunately this highly contaminated and "immoral" raw material is also being used indiscriminately in poultry and all other prawn feeds.

Local sun-dried fish

Farmers and feed mills are collecting and using local sun dried fish as protein source in prawn feed which is also a potential source of nitrofurans, because this chemical is also used for protecting prawn from bacterial contamination. They also use toxic pesticides to control infestation of insects. This type of raw material is very harmful for both humans and animals. According to the interview with concern stakeholders including scientist, farmers and expertise, 70% percent respondents said that the possible source of nitrofurans is locally available low cost prawn feed where the ingredients used for this formulated feed is not good enough and very low in quality. Most of the farmers want to use low cost feed in their farms for profit that make the situation worse.

Organic fertilizer

Cow dung and poultry manure which are seldom used as organic fertilizer in prawn pond for plankton growth. These are also potential sources of nitrofurans, because these animals are treated with drugs

containing Nitrofurans and get excreted through manure, which is finally transferred to the aquaculture pond as organic fertilizer

Hatchery source

Some hatcheries are using nitrofurans self-destructively for treatment purpose of brood stocks as well as prawn larvae. This later sustains as residue in the seeds and travels to culture pond.

It is now urgent needed to take action for the Nitrofurans free exportable prawn product of Bangladesh for the lifelong. Otherwise EU commission banned Bangladeshi exported product for ever. Nitrofurans detection technique should be available in shrimp and prawn farming of Bangladesh.

So, following steps should be taken by Government for the nitrofurans free white gold product of Bangladesh:

- Create a massive awareness amongst the hatcheries, farmers, feed millers, organic fertiliser suppliers, the government's extension departments, local fish meal suppliers and the frozen food exporters about the significance of this issue.
- Establish lab facility for detection of Nitrofurans in all possible sources and also develop a rapid test kit which can be used by all stakeholders concerned to get a primary indication.
- The government must set up a monitoring cell and a surveillance team to ensure control of all possible sources of contamination.
- Ban import of Meat and Bone meal for safety of our citizen as well as the shrimp industry which are currently being used indiscriminately.
- Evaluate the necessity of the above-mentioned drugs under Nitrofurans group and ban all manufacturing and import of such chemicals immediately.
- Let the Fishery extension department work with the fish farmers to improve the quality of fishmeal used in animal feed. Refrain farmers from using harmful chemical and offer safer alternatives.

It is not so difficult to solve this problem unless the government is biased by some interest groups who may be temporarily affected such as **pharmaceutical industries**, feed mills and commodity trading companies. There is no reason why the government will wait to resolve this issue where the solution is already known. For the purpose, the government needs to have the correct mindset to "pull the trigger to safeguard the national interest".