

Formalin and Fish Trade in Bangladesh - Human and Environmental Risks

An increasing trend in Bangladeshi markets show imported fish represents a significant source of fish supply within the fish trade business (see Figure 1). A good percentage of the fresh fish supply within Bangladesh is imported from neighbouring countries, for example, about 80,000 kg of fish products enter Bangladeshi markets everyday through the Teknaf border from Burma. Recently, several media reports indicated that fish imported from neighbouring countries are contaminated with formalin. It is suspected that these fish may be sprayed with formalin to extend its shelf life, to make them stiff and appear fresher for longer periods of time and to prevent decomposition. Formalin is also used in imported fish because of the amount of time needed to transport the fish to various domestic markets in Bangladesh. The traders may dip the whole fish or inject formalin in the fish body cavity or spread formalin mixed water on the fish surface while the fish are displayed for purchase. It is not known whether some local fish are also sprayed with formalin to prevent their decomposition

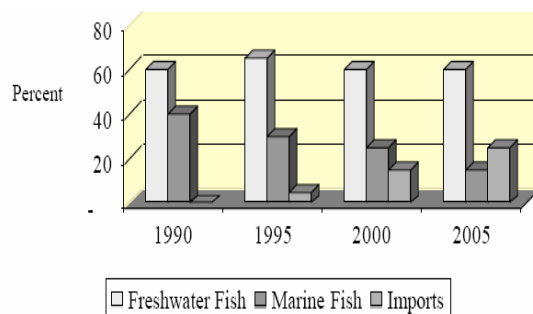


Fig 1 : Fish supply according to Dhaka Traders

Formalin is a solution of about 37% by weight of formaldehyde (HCHO) gas in water (37g of formaldehyde in 100 ml of solution). It has an odour that is pungent and suffocating. It is well known as a preservative in medical laboratories, as an embalm fluid and as a steriliser. Formalin (heavily diluted form) is used as an aquatic chemo-therapeutant (i.e treatment against fish diseases caused by protozoa, fungi). The US Food and Drug Administration approved three commercial formalin products for use in US food fish aquaculture as parasiticides and fungicides. It is however not approved for usage in aquaculture in Australia, Europe and Japan because of its association with oncogenesis (tumour development)

The international agency for research on cancer classified formalin as carcinogenic to humans when exposed at elevated concentrations (see Table 1 for exposure routes). Formalin has been linked to nasal and lung cancer, with possible links to brain cancer and leukaemia. Short term formalin exposure could be fatal. Long term exposure to low levels of formalin may cause respiratory difficulty, eczema and sensitization. Humans could be exposed to this hazardous chemical from eating of formalin contaminated fish, or via inhalation, skin and eye contact (see Table 1). Human food safety data from North American and European fish showed that formalin does not accumulate in the edible tissues of aquatic species as a result of exposure in fish or formalin treatment in juvenile or adult fish against parasites at experimental or approved concentrations.

Table 1 : Formalin exposure routes and possible effects on humans

Exposure routes	Effects on humans
Ingestion (swallowing)	Ingestion of pure formalin (10-40% formalin) could cause severe irritation and inflammation of the mouth, throat, and stomach, severe stomach pain will follow and possible loss of consciousness and death; Ingestion of dilute formalin will cause discomfort in the stomach and mouth
Inhalation (breathing)	Concentration of 0.5-2.0 mg/L may irritate the eyes, nose and throat. Concentrations of 3-5 mg/L may cause tearing of the eyes. Concentrations of 10-20 mg/L could cause difficulty in breathing, burning of the nose and throat, cough. Concentrations of 25-30 mg/L may cause severe respiratory tract injury. . Concentrations of 100 mg/L is dangerous to life and health
Skin (dermal)	Prolonged and repeated contact with formalin could cause numbness (lack of feeling) and a hardening or tanning of the skin
Eye contact	Formalin solution splashed in the eye can cause injuries from transient discomfort to severe such as loss of vision
Carcinogenicity	Formalin has the potential to cause cancer, repeated and prolonged exposure increases the risk of cancers of the lung, nasopharynx, oropharynx and nasal passage

Formalin discharged as effluent into natural environment could significantly reduce the amount of dissolved oxygen. High concentration of discharged of formalin (without any dilution) could cause mass mortality of aquatic species including benthic invertebrates and phytoplankton. Please note that phytoplankton is one of the major sources of oxygen supply in an aquatic environment vital for species survival and abundance.

References :

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The article is based on various sources and was compiled by Golam Kibria, Ph.D in May 2007 for <http://www.sydneybashi-bangla.com/>. (8) Views expressed in this article are those of the author and are not to be taken to be the views of any others including third parties. The author disclaims any liability for any error, loss or other consequences which may arise from relying on any information in this article. Dr Golam Kibria is a Senior Environmental Scientist with the Australia's largest Rural Water Authority and an Adjunct Professor. He is from Melbourne, Victoria, Australia