

## Executive Summary

The aquaculture sector in Bangladesh is growing rapidly concerning both the quantity and species diversity. Among commercially important aquaculture fishes in Bangladesh, pangasius and tilapia are two popular aquaculture fish species for decades among fish farmers and consumers due to their high growth rates, comparatively more disease resistant, survival capacity in adverse environmental conditions and economic viability of farming. In export earnings of Bangladesh, fisheries and aquaculture sectors have emerged as the second most important. To bring the possibility of exporting pangasius and tilapia into reality the microbial and chemical water quality in fish farms producing pangasius and tilapia were focused in the research within this project. In addition, factors affecting flesh colour of pangasius, and flavour of fish flesh in pangasius and tilapia were examined. The research data were obtained by field work in fish farms in five commercially important fish producing areas (Mymensingh, Bogura, Cumilla, Jashore, and Khulna) and by experimental studies at Patuakhali Science and Technology University (PSTU) and Bangladesh Agricultural University (BAU). Analysis of collected samples were performed at either PSTU, BAU or University of Copenhagen (UCPH). Comparatively better water quality was found in less commercialized areas i.e., Jashore and Khulna. Higher coliforms bacteria were found in the Mymensingh and Bogura regions, while farms in the Jashore appear to have a better, but still unacceptable water quality according to WHO recommendations. The difference of coliform bacteria between the northern (Mymensingh and Bogura) and southern region (Khulna) of Bangladesh is possibly due to relatively higher salinity in the ponds of Khulna district. The results also showed that microorganisms producing the earthy compound geosmin were found in more than 80% of the water samples, whereas organisms producing the musty compound 2-MIB were present in about 20% of the analyzed samples. Pangasius and tilapia cultured in four regions (Mymensingh, Bogura, Cumilla, and Jashore) of Bangladesh were found to be low-risk for consumption and do not surface any possible threat to the health of consumers.

Pigments in the feed were found to be the main source for colouring of flesh in pangasius. The reduced concentration of carotenoids in the feed caused lower pigment content in the flesh, which led to a reduced yellow colour of the flesh and to produce desired white coloured fish. It was also observed that a frequent water exchange in the ponds also reduced the pigment concentrations. Results showed that the common off-flavour compound in fish, geosmin, only was detected at low amounts in the fish, while several other aroma compounds (various terpenes, some with fruity or woody flavours) occurred in the fish, but were also found in feeds and feed ingredients. Phytoplankton in the water (ingested by some fish species) had a low contribution to the fish flavour, indicating that feeds probably are the most abundant off-flavour source in the fish. Chemicals that accidentally are discharged into the pond water may also contribute taste to the fish, but more studies must be done to substantiate this.

Finally, if the identified quality issues from this project are addressed and applied in pangasius and tilapia fish farms, farmers in Bangladesh will be able to produce better quality

fish with no yellow coloration and off-flavor, which will contribute to the increase of consumer acceptance in Bangladesh's local market and also facilitate to eliminate the export barrier.