

# Oyster Depuration: One Answer to Polluted Estuaries

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Several countries have outright bans on the importation of Philippine oysters due to their consistently high levels of fecal coliforms, *Salmonella* and other pathogenic bacteria. Notably, Singapore has instituted a strict system of monitoring bacterial levels in all shipments of oysters originating from the Philippines, rejecting entire shipments when samples fail to meet rigid requirements.

Most of the oysters commercially produced in the Philippines come from the largest island, Luzon, raised near Cavite in Manila Bay or Dagupan City in Pangasinan. In both sites, the oysters are grown in estuaries in close proximity to sewage outfalls of major urban centers.

Traditionally, marketing has been the responsibility of the wives of oyster farmers. Often, oysters are sold in-shell. Otherwise, they are shucked by the wives who have little knowledge of sanitation. To survive, the last remaining oyster exporter in the Philippines, Value Trading Co. of Dagupan City, in cooperation with government and international agencies, recently put into operation the first oyster depuration facility and sanitary packing operation in the Philippines.

In theory, depuration is carried out by placing oysters in water known to be free of pathogenic or enteric bacteria, long enough for water to be pumped through the mantle cavity of the filter-feeding oysters and, thus, eliminate bacteria present in the oysters, including within the

digestive tract. Depuration schemes range from the relatively simple placement of oysters into estuarine waters to rather complex facilities with microfiltration systems. The facility at Value Trading is a seawater recirculation scheme in which water is prefiltered through a macro-particulate filter, similar to those used for swimming pools. After the prefiltration, the water is pumped through a 0.9 micron mesh microfiltration unit and then through a high-intensity ultraviolet radiation source to eliminate water-borne bacteria. The water then flows into the tanks with the oysters placed inside plastic laundry baskets. The water is then periodically pumped into large holding tanks and filtered through a sand/gravel unit before passing through the macro- and microfiltration units again. Depletion of the oxygen being a problem of closed-system depuration facilities, the water in the tanks is constantly aerated by a small compressor. Usually, each batch of oysters stays in the tank for 48 hours: shorter time periods have proven insufficient. Part of the water is changed after each depuration run, and the tanks are sanitized with a chlorine bleach.

The shucking and packing rooms are disinfected daily and all work surfaces and basins are of stainless steel. Workers are required to undergo periodic public

health examinations, and strict personal cleanliness is mandated. They are required to use hair nets, surgical gloves and plastic aprons. Prior to entry into the packing room, all personnel are required to use rubber boots and step into a dilute solution of chlorine bleach in order to prevent tracking in of outside bacteria. Shucked oysters are passed on to the packing room through a small portal. Within the air-conditioned packing room, the oysters are washed with chlorinated water, packed in sterilized brine, and quick-frozen. Bacterial levels at various points, from the farm through to depuration, shucking and packing, are monitored using a small quality control laboratory on the premises.

Although the depuration/packing facility is actually a prototype for Southeast Asia, several small but successful shipments of oysters have been sent to the Singaporean market.



Holding tanks with sand/gravel filtering (*above*); looking down on raceways containing baskets of oysters (*below*) at Value Trading's depuration plant.

