



Scent Fishing

Through various actions, the fishmeal and fish oil processing industry seeks to mitigate these emissions.

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The Municipality of Coronel even has a WhatsApp number for residents to report foul odors, primarily emanating from the town's fish processing plants. These complaints led to six facilities in the sector being subjected to a health investigation in early May. This situation has been recurring frequently in recent decades in this area and other parts of the country.

Aware of the problem, the company Camanchaca Pesca Sur developed an app with a georeferencer for reporting unpleasant odors. This app is for use by the residents of Coronel, regardless of the source, to transform these complaints into a collaborative and responsive system.

As a more structural measure, the Odor Management Strategy in Chile, updated by the Ministry of the Environment (MMA) in 2017, includes among its key pillars the strengthening of odor regulations in five priority sectors, one of which is the fishing industry.

Has there been any progress regarding this sector? Yes, because by September 30, 2021, at the latest, the Ministry of the Environment (MMA) must have ready the draft of the "Standard for the Emission of Pollutants in Aquaculture Centers and Processing Plants of Hydrobiological Resources that, due to their odors, generate discomfort and constitute a risk to the quality of life of the population."

The Ministry justifies the measure by highlighting, for example, that the Coronel Environmental and Social Recovery Program (PRAS) establishes, among the solutions for the odor component, "proposing new regulations for the Seafood Processing Plant sector, as a national challenge to reduce and eliminate the emission of unpleasant odors."

The Ministry of the Environment (MMA) adds that odor regulation in different sectors includes establishing odor limits and prioritizing the use of best available techniques (BAT), "primarily to prevent and reduce odor generation at the source through integrated process strategies, such as good practices, the implementation of an Odor Management Plan (OMP), and the application of treatment technologies," it explains.

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Protocols and Technologies

While awaiting regulations, and to advance odor control and mitigation, companies affiliated with two of the sector's main trade associations—the Northern Fishing Vessel Owners and Industrialists Association (Asipnor) and the Fishing Industry Association (Asipes)—have implemented "best practice protocols for odor management" in recent years. These documents include seven sections related to the entire fishmeal production chain: (1) unloading and transport of raw materials, (2) ensuring the freshness of raw materials entering the production process, (3) ensuring process airtightness, (4) thorough plant cleaning, (5) managing wastewater and sludge, (6) performing regular maintenance, and (7) training operators throughout the production chain.

Asipes technical publications specifically state that the main sources of odor in the fishing industry are fishmeal production processes. In response, they argue that "the fresher the raw material, the less protein degradation occurs, which significantly reduces emissions of amines and hydrogen sulfide associated with decomposition—compounds responsible for the unpleasant odorous gases generated by these processes."

At the same time, the group highlights four mitigation measures currently implemented by its members:

- Recalculating the capacity of existing vapor scrubbers and adapting them to current requirements.
- Incorporating best practices, including staff training and regular well cleaning.
- Improving the airtightness of vapor equipment and ducts.
- Establishing maximum limits for accumulation in wells.

As part of the technical background for developing the standard that will regulate odor emissions in the fishing sector, the consulting firm Envirometrika also indicates, in a 2020 study, that fishmeal and fish oil processing plants, including those producing fish feed with fresh raw materials, are the ones that cause the greatest odor impact in the industry. This is corroborated by the number of complaints received by the Environmental Superintendency against these facilities: 53 in 2019, significantly higher than the 21 complaints against net repair shops.

To control odors, the analysis indicates that fish processing plants in Chile use 7 of the 10 MTD (Medium Technical Data Sheet) methods available worldwide: chemical scrubbers, biological scrubbers, combined scrubbers, wet scrubbers, biofilters, regenerative thermal oxidation, and UV with ozone. They do not use activated carbon filters, catalytic activated carbon filters, or thermal oxidation.

Tecnologías para reducir olores en plantas de harina y aceite de pescado

MTD	Características	Reducción	
		Gas	Olor
Scrubber químico	Bueno para reducir gas amoníaco	97-100% para H ₂ S y TMA	Altamente eficiente
Scrubber biológico	Mejor performance en reducción odorante	80%-95% (H ₂ S y NH ₃)	70%-90%
Scrubber combinado	Scrubber químico más biológico	—	80%-90%
Scrubber húmedo	Con agua o químicos (operación cara)	—	Altamente eficiente
Filtro de carbón activado	Su desempeño varía con el tiempo	—	80%
Filtro de carbón activado catalítico	Mayor eficiencia de adsorción y mayor vida útil	99,5% para H ₂ S	Altamente eficiente
Biofiltro	Varios tipos de biofiltro	—	90%
Oxidación térmica	Reducción de COVs y olores	99,5% COVs-99% H ₂ S	99,50%
Oxidación térmica recuperativa	Reducción de COVs y olores	99,5% COVs	99,50%
UV con ozono	Equipo oxidación fotolítica	—	80%-98%

Fuente: Estudio "Generación de antecedentes técnicos para la elaboración de la norma de emisión de olores para centros de cultivos y plantas procesadoras de recursos hidrobiológicos" (2021).

It also highlights seven best practices with the same objective: cleaning raw materials in trucks and unloading ducts, monitoring raw material freshness, ensuring equipment airtightness, cleaning fishmeal plants, managing wastewater and sludge, designing equipment and new facilities to control odors, and training operators throughout the production chain on the implemented best practices.

In January 2021, the same consulting firm presented another analysis that specifies the odor reduction levels in fishmeal and fish oil processing plants, based on the aforementioned 10 MTD (see table).

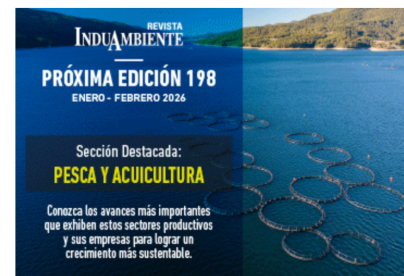
RTO Equipment:

At the odor workshop "Good Practices and Best Techniques in the Fishmeal and Fish Oil Industry," a representative from Asipnor explained that companies in the sector—in the Arica, Tarapacá, and Antofagasta regions—prioritize airtightness in process lines, gas scrubbing and condensation in scrubbing towers, incineration in boiler combustion chambers, and oxidation and combustion in RTO (regenerative thermal oxidizer) equipment.

The association highlighted, in particular, this last solution "because it destroys volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) created through chemical processes and industrial exhaust vapors, converting them into CO₂ and water vapor."

RTOs operate as follows:

- Process gas laden with VOCs and HAPs is introduced through a fan into the RTO's inlet manifold.
- Flow control directs this gas to the energy recovery chambers where it is preheated. The process gas and contaminants are progressively heated in the ceramic beds as they proceed to the combustion chamber. In the combustion chamber—using supplemental fuel such as natural gas, propane, diesel, or biofuel—the VOCs and PAHs are oxidized.
- Once purified, the hot air leaving the combustion chamber releases thermal energy as it passes through the ceramic bed in the direction of the outlet flow.
- The outlet ceramic bed is heated, and the gas is cooled so that the outlet gas temperature is only slightly higher than the process inlet temperature.



than the process inlet temperature.

Outlet valves alternate the direction of airflow to the ceramic beds to maximize energy recovery within the RTO.

The high energy recovery within the thermal oxidizers reduces the auxiliary fuel requirement and saves on operating costs.

Among the advantages of RTO systems are: they can be adapted to low, medium, and high airflow rates; they destroy a wide variety of VOCs; their operating and maintenance costs are reasonable; they achieve high thermal efficiency; they generate no waste; and they are simple, as they have few moving parts.

Conversely, their disadvantages are the high investment cost and fuel consumption.

RTO equipment is used, for example, at Corpesca's eastern plant in Iquique.

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FACT:

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fishmeal and fish oil plants operate in Chile. They are mostly located in the Biobío (25), Los Lagos (18), Metropolitan (6), Arica (5), and Coquimbo (5) regions.

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