

## Fact Sheet

# Coral handling safety tips for aquarium owners

In May 2017, the first likely case of Palytoxin poisoning was reported in South Australia when a family experienced adverse health effects after cleaning coral from their home marine (saltwater) aquarium.

Definitive confirmation of Palytoxin at the scene was not possible, however based on the type of symptoms and how quickly they occurred after scrubbing coral without protection, it is considered highly likely that the family was poisoned with Palytoxin. It is thought that this occurred after inhaling Palytoxin contained in airborne water droplets (aerosols), and when the toxin came into contact with skin during and after cleaning coral which had been removed from the aquarium.



## What is Palytoxin?

Zoanthid coral species popular with marine aquarium enthusiasts can contain Palytoxin which is dangerous to your health. Since the 1980s the popularity of keeping living corals in home aquariums has dramatically increased. Zoanthid corals are soft corals known as colonial (colony-forming) anemones. These decorative ornamental corals are commonly called 'button polyps', 'sun polyps' or 'zoas'.

Certain marine organisms<sup>1</sup>, including species of Zoanthid coral (e.g. *Palythoa* species and *Zoanthus* species) can contain a highly toxic, naturally-occurring, and potentially lethal substance known as Palytoxin. This is one of the most toxic non-proteinaceous natural compounds known today. Which organism actually produces the Palytoxin is still being debated by scientists<sup>2,3</sup>.

<sup>1</sup> e.g. dinoflagellates that are a source of nutrition for coral and cyanobacteria that are closely associated with coral

<sup>2</sup> observations of cultured corals suggest that stressed colonies may release mucoid secretions

This toxin disrupts the balance of ions such as sodium, potassium and calcium in cells causing nerve and muscle dysfunction and may end in cell death. As well as the neuromuscular system, Palytoxin targets the cardiac system and has the potential to cause irritation and inflammation of the skin and respiratory system.

Zoanthid corals are often recommended to new marine aquarium owners because they are considered to be relatively easy to keep. The risks associated with keeping soft corals in home aquariums are often unrecognised, or underestimated by aquarium enthusiasts and suppliers because there are limited documented cases to raise awareness. Also not all Zoanthid corals contain Palytoxin, but it is impossible to tell which ones do to be able to make an informed decision about keeping these corals. A further complication is that the identifying characteristics of Zoanthid corals are constantly being debated which means coral traders and buyers may not be certain that a coral is actually a Zoanthid.

While it is possible that you may not intend to buy Zoanthids – it is important to remember that other types of coral or any 'live rock' bought from aquarium suppliers may unintentionally contain Zoanthids. Marine aquarium owners should always presume Palytoxin is present and take appropriate precautions when handling corals.

### How could I be exposed to Palytoxin?

Palytoxin poisoning is relatively rare. Most reported cases occur after consuming contaminated seafood (particularly reef fish such as parrotfish and crabs)<sup>4</sup>. This oral exposure is the most harmful with fatalities reported after people have eaten Palytoxin in contaminated seafood.

Exposure to Palytoxin can also occur by direct contact with intact or damaged skin<sup>5</sup>, by direct contact with eyes, or by inhaling aerosols or steam vapours associated with aquariums<sup>6</sup> or the natural marine environment. One of the largest documented cases of inhalation exposure linked to Palytoxin was reported in 2006 with hundreds of people affected during a marine algal bloom in the Mediterranean<sup>7</sup>.

Inhalation of vapours or water droplets during cleaning or eradication of overgrowing corals from home marine aquariums as well as skin exposure during coral handling are the most common routes of exposure linked to corals.

### What are the health risks?

Marine aquarium enthusiasts have been handling corals for years and there are very few reported cases of human poisonings as a result of Zoanthid corals in home aquariums. Although poisonings are relatively rare it is important to be aware that Palytoxin poses a significant risk to human safety due to its extreme toxicity. Illness can occur and progress rapidly within minutes to hours after handling coral.

Multiple health effects have been reported to be associated with exposure to Zoanthid corals that potentially contain Palytoxin. Poisonings are rarely confirmed with conclusive identification of the coral and toxin – and in most cases a tentative diagnosis of Palytoxin poisoning is based on the type of symptoms with a history of handling corals outside of water.

It is difficult to confirm Palytoxin is the cause in presumed cases of poisoning because it is difficult to collect samples of aerosols after an exposure has occurred and there are no simple test kits and laboratories in Australia cannot routinely test for Palytoxin to diagnose poisoning cases.

---

<sup>3</sup> Pelin M., Brovedani V., Sosa S. and Tubaro A. 2016, 'Palytoxin-containing aquarium soft corals as an emerging sanitary problem', *Marine Drugs*, 14,33

<sup>4</sup> Over 100 reported ingestion cases attributed to Palytoxin

<sup>5</sup> First case reported in the early 1960s - less than 20 reported cases attributed to Palytoxin

<sup>6</sup> Less than 20 reported cases attributed to Palytoxin

<sup>7</sup> Since the 1970s algal blooms have become a recurring phenomenon in the Mediterranean

The type and severity of symptoms people experience usually depend on how long they have been exposed, the distance they were from the location where coral was being handled, and the route of exposure. For example, respiratory distress (shortness of breath, tight chest, wheezing, trouble breathing) occurs if Palytoxin is inhaled while gastrointestinal symptoms like nausea, diarrhoea and vomiting with subsequent involvement of the nervous system (convulsions, dizziness, numbness), skeletal muscle (weakness, cramps, myalgia) and cardiovascular system (increased or decreased heart rate) if it is ingested.

The presence of cuts or abrasions impacts on the severity and variety of symptoms of skin exposure to Palytoxin which range from local inflammation (skin redness, swelling, and dermatitis) to cardiac and neuromuscular symptoms because the toxin can easily pass through the skin wound to enter the bloodstream and reach many organs.

## What are the symptoms of Palytoxin exposure?

The most common presenting signs reported to be associated with handling marine corals are flu-like symptoms such as coughing, fever, chills, sore throat, headache, muscle aches or cramps, chest pain and respiratory distress.

Other reported symptoms include:

- > skin symptoms: rash (hives, redness, oedema), skin itching, numbness and dermatitis
- > respiratory symptoms: rhinorrhoea (runny nose)
- > ocular symptoms: teary eyes (lacrimation), conjunctivitis, keratoconjunctivitis, eye irritation, eye pain, swollen eyelids, photophobia, blurred vision, corneal erosions leading to ulceration and 'corneal melt' causing blindness
- > neurological symptoms: fatigue, dizziness, speech disturbance, bitter metallic taste, weakness, ataxia, tremors, tingling or numbness of extremities
- > gastrointestinal symptoms: abdominal cramps, nausea, vomiting, diarrhoea
- > muscle symptoms; muscle pain, muscle weakness, muscle cramps, muscle spasms.

More severe cases report haemolysis, cardiac effects such as slow, fast or irregular heart rate, myocardial damage, low or high blood pressures, severe respiratory reactions with bronchoconstriction, pulmonary oedema (fluid on the lungs), muscle breakdown (rhabdomyolysis) leading to kidney failure, coma and death from cardiac or respiratory failure.

Palytoxin exposure should be considered as a possible cause of respiratory, muscular and cardiac complaints for patients who own or work with marine aquariums. There is no specific treatment or antidote for Palytoxin poisoning with medical treatment limited generally to supportive care.

## Who should I call for help?

In an emergency, always call triple zero (000). For first aid advice phone the Poisons Information Centre on 13 11 26.

## How can I avoid being exposed to Palytoxin?

Zoanthids readily proliferate, overgrow and colonise other corals; forming large, tightly attached colonies that are difficult to thin out or remove. This characteristic increases the potential for marine aquarium enthusiasts to be exposed to Palytoxin. Most aquarium-related cases occur as a result of skin exposure after prolonged handling through cuts on hands or inhalation of coral dust, steam vapours or aerosols while cleaning, separating, growing/propagating, collecting, transporting, mechanically removing, or destroying coral by pouring boiling water on the live rock as well as cleaning tanks that contain coral.

You can experience health effects even if you are only in the vicinity (even in adjacent rooms or floor levels) of someone undertaking these activities. Be aware that there is no distinctive or unusual smell or colour associated with Palytoxin aerosols to alert you to the danger of exposure.

### Recommended precautions when handling coral:

- > Keep general handling of corals to a minimum.
- > Do not handle coral with your bare hands.  
*Barrier protection e.g. protective eyewear and gloves should always be worn when coral is handled. Latex gloves break easily when handling sharp rocks so it is recommended that you use thick industrial type gloves: particularly long robust rubber gloves that protect the forearms.*
- > Always handle coral under water.  
*The safest way to eradicate unwanted coral colonies is complete removal of the live rock from the aquarium by bagging the live rock plus water at a distance from aquarium lights (the warming effect in shallow water can trigger Palytoxin release), while you are wearing protective equipment and sealing the bag before removing from the aquarium.*
- > Monitor aquarium water levels closely to keep coral completely submerged at all times.  
*Water levels should not be allowed to drop to expose coral surface – particularly with evaporation under aquarium lights.*
- > Avoid placing coral under powerful halide lights when out of water.  
*Halide lamps that emit light wavelengths used to help grow and raise new coral colonies or coralline algae in ‘culture’ aquariums or filter sumps can cause intense heat stress in corals that are out of the water causing rapid release of Palytoxin.*
- > Avoid activities that can potentially produce aerosols.  
*These activities include cleaning or transporting coral breaking up or cutting coral for propagation, or attempting to eliminate, kill, separate, destroy or otherwise remove colonies from live rock by pouring hot or boiling water or using chemicals, scrubbing, brushing or scraping.*
- > Dispose of marine aquarium water carefully.  
*Wear protective equipment and prevent splashing and contaminating nearby surfaces when changing marine aquarium water — tank water can contain Palytoxin.*
- > Be aware that Palytoxin is heat stable.  
*Heating does not remove the toxin but it can be deactivated using bleach.*
- > Remember that Palytoxin can travel some distance in aerosols.

---

## For more information

**Scientific Services Branch  
Public Health Services**

**Telephone: 8226 7100**

**Email: [Health.ScientificServices@sa.gov.au](mailto:Health.ScientificServices@sa.gov.au)**

**[www.sahealth.sa.gov.au](http://www.sahealth.sa.gov.au)**

Public -11-A1

