

# SEA CUCUMBER PROCESSING FOR OPTIMIZED PRODUCT VALUE



This document relates to the processing activities of the *Cucumaria Frondosa* sea cucumber species. Sea cucumbers are found all around the globe as different species which differs in sizes, shapes and anatomical features. Some of the information described in this document might not apply to other species.

## SPECIES INFORMATION

The *Cucumaria Frondosa* sea cucumber is the only species with commercial value that can be harvested along the East Coast of North America. It is found in most habitats in the Estuary and the Gulf of St. Lawrence, Canada. In the south, its range extends to Cape Cod, USA. This particular sea cucumber species has been reported almost all around the globe in the northern hemisphere.

Sea cucumbers have a tube-shaped elongated body with a mouth at one end and an anus at the opposite end. The mouth is surrounded by tentacles. For feeding, the sea cucumber will extend its tentacles into the water. It has a green to brown leathery skin. The body is very flexible, tightens when it is stressed, and can expel its internal body organs, which can be regenerated. Sea cucumber has very low mobility and gather in groups known as "beds".

## HANDLING

To reduce losses and maximize the product's market value, handling and holding procedures on the fishing vessel during transport and prior to processing are important. After capture, to prevent quality problems, sea cucumber should be eviscerated and immediately placed in seawater. The holding bins should have smooth walls, be clean (free of dirt and sand particles), and include drainage holes. During transport to processing facilities and storage, the sea cucumbers should be kept in seawater which needs to be changed every 8 to 12 hours.



## PROCESSING AND MARKET

The main market for sea cucumbers is processed products. A limited amount of raw sea cucumber is eaten worldwide.

In Asian markets, wild sea cucumbers are preferred over those produced from aquaculture, and sea cucumbers harvested from cold and arctic waters have a higher value over those from tropical and warm waters.

The processing of sea cucumbers depends on the market demand for the final product. Sea cucumbers are rich in protein and are used in traditional Chinese medicine. They are also a highly sought after food item. The most common product produced from sea cucumber is dried body walls, which is a traditional part of Chinese cuisine. The process consists on eviscerating and gutting the cucumber, then cleaning and cooking it in boiling water, and then drying it.

The longitudinal muscles (referred as meat) are also extracted from the sea cucumber and prepared for niche markets.

The sea cucumber's head alone, also called *flower*, can also be dried as a lower end product.

The quality and value of sea cucumbers depend on the thickness of the body wall, skin coloration and texture. Higher value products are composed of sea cucumbers presented in their undamaged, elongated and tube shape, also known as *Cocoon Cut*.

The most commonly processed sea cucumber products are:

- Cocoon cut, skin with meat, dry or frozen.
- Butterfly cut, skin with meat, dry or frozen.
- Butterfly cut, skin without meat, dry or frozen.
- Sliced skin, frozen.
- Raw meat, frozen.

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## *COCOON CUT* versus *BUTTERFLY CUT*: PROCESS DESCRIPTION

The following compares the two most popular sea cucumber processing methods, Cocoon Cut and Butterfly Cut.

### **Butterfly Cut**

The butterfly cut process consists on first cutting the sea cucumber along its body to gain access to the internal organs. Once that cut has been produced, the sea cucumber is “unrolled” which gives it a butterfly like shape. To “unroll” the cucumber, it is required to entirely or partially cut the head off and to partially cut of the anus off. Cutting or not the head entirely off is determined by the end product needed to be prepared (with or without head on). Once the sea cucumber has been flatten out, the internal organs are manually removed (gutting), most often with a scraping tool. This particular processing method also allows the possibility to detach the meat from the skin, to prepare the frozen raw meat and skin without meat products. The meat is detached manually with a scraping tool. Once the sea cucumber has been gutted, it can go through the remaining processing stages, cleaning, cooking, drying and freezing, all depending on the required end product to be prepared. It must be noted that some equipment available on the market have automated the cutting and gutting stages of the butterfly cut process.

### **Cocoon Cut**

The cocoon cut is a much simpler process than the butterfly cut. It consist on cutting the head off to create an opening in which an especially designed cleaning tool is inserted to remove all the sea cucumber internal organs (gutting). The longitudinal cut - along the body - is not required. Cutting or not the head off is determined by the end product needed to be prepared (with or without head on). Once the sea cucumber has been gutted, it can go through the remaining processing stages, cleaning, cooking, drying and freezing, all depending on the required end product to be prepared. Oceatec's cleaning line system is specially designed to produce the Cocoon Cut.



Cocoon Cut, dried, skin with meat head on

## COCOON CUT versus BUTTERFLY CUT: COMPARATIVE ADVANTAGES

### Advantages

#### Cocoon Cut

- Dry skin with meat product keeps its higher valued elongated and undamaged tubular shape. No longitudinal cut.
- Fewer processing steps for a cheaper processing cost and a faster process.

#### Butterfly Cut

- Possibility to produce the sea cucumber meat and skin without meat products.

### Disadvantages

#### Cocoon Cut

- Entirely manual process is not possible, special cleaning tool is required.
- Detaching the meat from the skin is not possible while keeping intact the tubular shape.

#### Butterfly Cut

- The meat on skin product is damaged and does not retain the higher valued tubular shape.
- When fully manual, needs many required processing steps for a more expensive and elaborate process.



Butterfly Cut, skin without meat before cooking and drying

## CONCLUSION

Due to the large variety of products that can be processed from the sea cucumber, setting up the right processing line can be confusing to processors. They simply must be aware and focus on the highest valued product that they can provide to their buyers on the long term.

They should also carefully analyse short term orders that might provide interesting commercial opportunities comparing to long term market trends that are pointing towards more added valued products, such as the Cocoon Cut sea cucumber.

This process selection also offers a tremendous opportunity to increase productivity and revenues while keeping the same number of workers and the same raw product supply. This is a strategic choice in these times of workers scarcity.

	COCOON CUT	BUTTERFLY CUT
Tube shape	✓	✗
Meat and skin without meat products	✗	✓
Quick and simple process	✓	✗
Added value	✓	✗

Contact us for additional information.



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