

Alternative product forms, consumer packaging and extracted derivatives of tropical sea cucumbers

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Abstract

Sea cucumbers have been traded in their dried form, called beche-de-mer or trepang, for centuries. Beche-de-mer is relatively non-perishable and can be transported without refrigeration for long durations, and stockpiled for a year or more. With improved shipping and air freight possibilities, new product forms have appeared in the Asian marketplace. In addition, modern packaging of dried and semi-processed sea cucumbers to attract specialty and household consumers is now commonplace. We provide an exposé of a range of modern product forms and packaging of tropical Indo-Pacific sea cucumbers from various markets. The trade in dried products is still expansive although more non-dried, ready-to-cook sea cucumber products are now widely accepted, with packaging tailored for sale to household Asian consumers in supermarkets and stores. Sea cucumbers, especially those in the genus *Stichopus*, are also used to create a wide range of tonics that are favoured by Malay-speaking countries. For most products, important features are attractive packaging and clever marketing that boasts health, beauty, food safety and authenticity of the sea cucumber products. Most modern product forms will not be options for small-scale fishers but could improve profits for organised export companies. In certain cases, mariculture programmes for tropical sea cucumbers will need to seize these new market opportunities to achieve profitability.

Introduction

Sea cucumbers have long been fished and exported as dried, non-perishable products. The dried form of sea cucumbers is called beche-de-mer in the Pacific and Indian Ocean, trepang in Indonesia and northern Australia, and balat in parts of Malaysia and the Philippines (Akamine 2013). In recent times, several factors have opened opportunities for the trade of new product forms and ways to market sea cucumbers: 1) better shipping of frozen products; 2) affluence of middle and upper-class Chinese who can now afford sea cucumbers more regularly; and 3) a shift in consumer culture in China and other Asian societies towards supermarkets that have the facility to import and sell perishable forms of seafood.

Beche-de-mer in bulk (sacks containing about 40 kg of product) still dominates trade volumes (To and Shea 2012). It appears that a significant proportion of that volume is eventually bought by restaurants, which would not especially be attracted by consumer-friendly packaging and household quantities. While the trade of dried sea cucumbers

in bulk will remain dominant for some time to come, the surge in the demand for small-volume packages of consumer-friendly product presents opportunities worth consideration.

Sea cucumbers have been eaten for centuries by Chinese people for their supposed health benefits (Fabinyi 2012). Recent scientific studies have confirmed that a range of sea cucumber species do have both dietary components (e.g. protein and essential amino acids) and bioactive compounds (see Bordbar et al. 2011 for a review). In recent years, research into the medicinal values of such compounds from sea cucumbers has proliferated in the scientific literature, much more so than biological and ecological studies. Hence, health products from sea cucumbers may be gaining credibility and the trade of such products could offer important options for value-adding of sea cucumbers fished from tropical countries.

In this article, we expose a range of “new” product forms for tropical sea cucumbers from a variety of localities. We finish with a discussion of these

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trade opportunities and whether any of them can be realised by artisanal fishers, processors or aquaculture programs in developing countries and island states in the Indo-Pacific.

Gift boxes



Dried *Stichopus naso* (apparently) in gift boxes of 350 g in a store in Chinatown, Sydney, Australia. Retail price is AUD 88 (USD 80) per box. (Photo: S.W. Purcell)



Dried, medium-sized sandfish, *Holothuria scabra*, in 1 kg gift boxes in a store in Haymarket, Sydney. Retail price is AUD 450 (USD 410) per box. (Photo: S.W. Purcell)

Frozen products



Frozen, gutted sea cucumbers unpackaged in a supermarket in Guangzhou (Canton), China. Customers scoop as many as they want into bags and pay by weight. (Photo: S.W. Purcell)



Frozen, gutted *Parastichopus californicus* unpackaged in a seafood market in Beijing, China. Customers scoop as many as they want into bags and pay by weight. (Photo: M. Fabinyi)



Medium-small frozen *Holothuria scabra* in bags in a store in Chinatown, Sydney, Australia. These sandfish most likely come from one of the fisheries in Australia. The sea cucumbers were probably gutted and cooked once, then vacuum-packed in bags. The product is vacuum packed in plain bags with a simple label. Retail price is AUD 25 (USD 23) per 500 g bag. (Photo: S.W. Purcell)



Frozen *Actinopyga spinea* in bags in the frozen seafood section of a supermarket in Guangzhou (Canton), China. The sea cucumbers were probably gutted and cooked once, then vacuum-packed in bags. Retail price is 188 Chinese Yuan (USD 31) for a 400 g bag.



Backside of package of frozen *Actinopyga spinea*, providing information about the product and several suggested ways of cooking the sea cucumbers, written in Chinese at the left and English at the right. (Photos: S.W. Purcell)



Frozen *Stichopus horrens* in a bag in the frozen food section of a supermarket in South Korea. The product was probably boiled once then placed in bags and frozen. It was marketed as “hwangoksam” (yellow jade sea cucumber). Koreans are avid consumers of *S. horrens* and apparently prefer those exported from the Philippines. The bag had 13 sea cucumbers for a weight of 1.6 kg and retailed for KRW 20,000 (approx. USD 19). (Photo: J. Akamine)

Vacuum-packed products



Left: Vacuum-packed *Stichopus hermanni* in a retail store in Hong Kong. The product was semi-processed (cooked once) and not refrigerated.

Right: backside of package with Chinese text referring to product origin (Australia), details of how to prepare the sea cucumber for cooking, and examples of cooking methods and recipes. (Photo: S.W. Purcell)



Isostichopus fuscus in a transparent plastic box in the frozen seafood section of a supermarket in Beijing. Each specimen is individually vacuum-packed, and has been cooked once so they only require reheating. The product sold for CNY 288 (USD 48) for 300 g. They are marketed as “non additive” and “chemical free” to assure consumers that no additives have been used to artificially increase the reconstitution ratio of the product. (Photo: M. Fabinyi)



Frozen and vacuum-packed *Isostichopus badionotus* on sale in a store in Beijing. The packet reads in Japanese, “South American sea cucumber”. Price is CNY 120 (approx. USD 20) for 500 g. They only require reheating, so they are likely to have been cooked once before packaging. (Photo: M. Fabinyi)

Extracted products of sea cucumbers



Gamat water. Believed to heal wounds, reduce swelling, increase appetite, enhance blood circulation and maintain good health. Made at Langkawi and produced by simmering whole *Stichopus* sp. sea cucumbers in water for three days. When preparing gamat water from fresh whole sea cucumbers, the sea cucumbers are allowed to simmer over a low flame for three days without adding water. This pure liquid is then diluted with water and marketed as gamat water. The tonic is supposed to be consumed twice a day, 30 mL each time. Price USD 4 for 200 mL. (Photos: P.S. Choo)

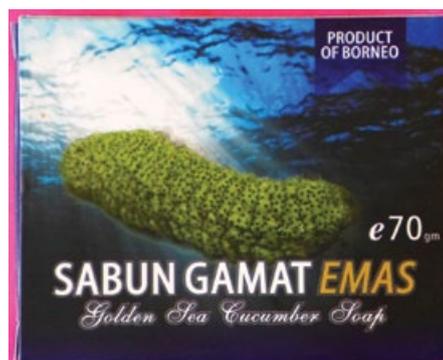
Gamat jelly. Believed to improve general health. About 10 mL of the jelly is mixed with fruit juices, cold or warm water, and taken twice a day; 10 mL of jelly contains 3.48 g of *Stichopus herrmanni*. Price USD 18 for 350 mL. (Photo: P.S. Choo)



Essence of fish and sea cucumber. Believed to help maintain health and energy. Extracted from fresh fish and sea cucumber. Adults and children over 12 years of age drink one bottle (75 mL) a day and children 12 years and under drink ½ bottle (35 mL) a day. Price USD 12.50 for 75 mL. (Photo: P.S. Choo)



Sea cucumber emulsion. Ingredients: sea cucumber (*Stichopus* sp.) extract, honey, omega 3 fatty acid, L-arginine, D-alpha-tocopherol, L-glutamine, chlorella, vitamin B6, vitamin B1, beta-carotene, collagen. Believed to help in wound healing (including gastric wounds), treat haemorrhoids, asthma and diabetes, lower blood pressure, increase blood circulation, nourish the skin, reduce joint and bone pains, and increase libido. Consumed as a tonic; 1–2 tablespoons for adults before breakfast and dinner. Price USD 33 for 500 mL. (Photo: P.S. Choo)



Sea cucumber (gamat) soap. Pictured like an aquatic super hero, the sea cucumber *Stichopus herrmanni* is used to make this fine soap. It costs MYR 15 (USD 4.5) for a 70 g bar. (Photo: J. Akamine)



Two bars of sea cucumber soap sold in a shop in Kota Kinabalu, Sabah, East Malaysia. Each bar is about 70 g and sells for USD 4. They claim they are made from extracts of *Stichopus horrens*. (Photo: J. Akamine)

Discussion

Product forms for whole sea cucumbers

The market for sea cucumbers in China and other Southeast Asian countries has become open to a wider range of sea cucumber product forms. Frozen sea cucumbers are now commonplace in supermarkets in China and other countries such as Korea and Việt Nam. It appears that the sea cucumbers are already cooked once before packaging and the consumer needs only to reheat them and serve in a dish. Low-value species may be exported and sold frozen in bulk and consumers choose quantities and pay by weight. In contrast, moderate-value and high-value species are packaged in convenient quantities for consumers and the packaging may be important to sales.

Gift boxes of sea cucumbers are most common for high-value species but medium-value species can also be packaged this way. Product shape, colour and form are paramount in gift boxes. An especially important time for gift giving is at Chinese New Year or Spring Festival. Red is frequently used as a colour in the packaging of gifts.

Products from sea cucumber derivatives

The processing of sea cucumbers as a medicinal product has come a long way. Among the Malay-speaking countries, only the *Stichopus* species are traditionally used for medicinal purposes and, strictly speaking, gamat refers to species in the genus *Stichopus*. Whereas processed gamat used to be bottled in recycled sauce bottles and marketed as “gamat water” or “gamat oil”, these products are now sold in attractive packaging of many forms. Liquid sea cucumber extracts are sold in Malaysia as an essence or in the form of jelly. In Malaysia, the products are also added into coffee powder, or processed into a product together with the snakehead fish (*Channa striatus*). Many of these products are also marketed on the Internet.

Gamat products are regarded as cures for a wide variety of ailments in Malay-speaking countries, including Malaysia, Indonesia and Brunei. Claims of medicinal benefits are mainly anecdotal (although there are an increasing number of scientific studies supporting these claims — see Bordbar et al. 2011), and include healing of wounds, promoting healing after child birth, cures for epilepsy, herpes, tuberculosis and lowering of blood triglycerides and cholesterol.

Gamat soap has gained popularity abroad, such as in Japan and South Korea, as a souvenir from Malaysia. Gamat soap is produced in both West Malaysia (especially Langkawi Island) and East Malaysia (Kota Kinabalu). The packages claim they use *Stichopus* sp. but other species are sometimes used. In Japan, sea cucumber soap using *S. chloronotus* and *Holothuria atra* from Okinawa has gained popularity among health and nature-conscious consumers, and a 90 g bar can cost about USD 35. The market appears to be open to a variety of value-added products from sea cucumbers, where “beauty” and “health” are keywords.

Producing new product forms in the Indo-Pacific

While the new product forms present opportunities for trade, we doubt that any of these can be produced directly by artisanal fishers. Freezing and vacuum packaging require equipment that is unaffordable to small-scale fishers, and the labelling and marketing of such products requires considerable investment and market contacts. Some of these opportunities will be taken up by large processing and exporting companies, who may or may not pass on improved profits to fishers.

New product forms and marketing might sway buyers in some countries to ask fishers to collect certain sized sea cucumbers or certain species. Demand may increase for certain *Stichopus* species

in artisanal fishers such as those in the Indo-Pacific region if traditional tonics or other products begin to be produced. Such changes in fisheries would need to be monitored and watchfully managed by resource managers.

Our article has two important implications for aquaculture. First, aquaculture programmes should seriously look at processing and selling their sea cucumbers for consumer packs (e.g. bags of frozen sea cucumbers or gift boxes) to improve profitability. This is especially true in places such as New Caledonia, where high operating costs make aquaculture profitability marginal (Purcell et al. 2012). Indeed, this is where aquaculture farms should have an advantage because the animals can be harvested at optimal sizes for consumer packs and in a controlled manner to attain a high product quality. Second, aquaculture may move towards certain species that are favoured by Chinese household consumers or for medicinal derivatives. For example, experimental trials have started in Malaysia to develop aquaculture technology for producing *Stichopus horrens* for making gamat tonic, jelly and emulsions.

Perhaps eco-labelling of cultured sea cucumbers could improve sales but we question whether the Chinese and other Asian consumers presently buy into such marketing strategies. Consumer interest in the ecological sustainability of seafood is low in large parts of China, and is unlikely at present to be an important factor that influences purchasing decisions (Fabinyi and Liu 2014). In contrast, however, consumer interest in food safety is very high. In part due to a range of food safety scandals in China, including in the seafood sector. There is a strong suspicion about issues, including the use of antibiotics and other chemicals in the production process, and the use of materials to produce “fake” products (including shark fin and sea cucumbers) (Fabinyi and Liu 2014). Labelling strategies that stress freshness, safety and authenticity are, therefore, becoming more common in China’s seafood sector, and may be one strategy for producers and traders of tropical sea cucumbers to adopt.

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