Appendix 1. Preparation of tunicates and recipes.

Figure S1. Prepared edible tunicates.

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Appendix 1.
Preparation of tunicates and recipes

There are many ways in which tunicates are prepared. A Korean dish utilizes small whole *Styela clava* with their tunic slashed to release the juices; chewing releases the nutrients and flavors and then the tunics are spit out (Figure A1 A, B). Cultured *Halocynthia aurantium* in northern Japan are also freeze-dried for food supplement tablets and vacuum-packed dried strips or whole bodies as a snack (Figure 2A). In countries around the Mediterranean, various species of *Microcosmus* are usually eaten raw (Figure A1 C). In northern Russia *H. aurantium* either fresh or frozen is removed from the tunic, chopped and added to pieces of whale and seal meat (caught by traditional methods by indigenous residents for personal use) and various seaweeds, and the whole mixture is eaten raw (Figure A1 E, F). In Japan dried *Halocynthia* can be added to hot sake to make ascidian sake or mixed with green tea and hot rice to make ascidian chazuke. In Korea some consumers fill fresh *H. roretzi* with whiskey, which is then poured into glasses through the excurrent siphon (Figure A1 D). Another Korean recipe: *Halocynthia aurantium* and *H. roretzi* are eaten raw by removing the tunic and dipping the body into a sweet and vinegary pepper sauce (KBSEntertain 2014) (in Korean). A new Japanese product by the Yamauchi Company utilizing cultured *H. roretzi* is “sea squirt ale”, also called “hoya ale” (McGee 2015). Pickled *Herdmania pallida* (Heller, 1878) removed from their tunic (while wearing gloves to protect against the tunic spines) can be prepared using salt brine or vinegar and spices (Tamilselvi et al. 2010). The pickling dissolves the tiny but sharp calcareous body spicules, thus making the animals edible while preserving them. In many recipes tunicates are combined with other seafoods, meats and vegetables to provide distinctive flavors; such dishes are a staple at many Korean restaurants. The classic Korean dish *mee-duh-duck chim* calls for steaming or braising a mixture of *S. clava* and/or *S. plicata* with broth made from dried anchovies and *kombu* kelp, soy sprouts, green onion, garlic, dried chili pepper flakes, soy sauce, salt, black pepper, sugar, sesame oil, glutinous rice flour, and watercress (adapted from the Korean website http://www.efmc.or.kr/public_html/common/life/life_1_sub4.asp, accessed 6 December 2015).

In Korea, pickled *Halocynthia roretzi* and *S. clava* are sold as value added products, at a retail rate of $32 US per 1 Kg and $15 US for 400 grams, respectively (http://www.xn-sh1b01lmmmdz44c.kr/product/?prdno=80, accessed 6 December 2015; FishSale 2015). *S. clava* powders are also used in Korea to enhance flavor in soup stocks (Gmarket 2015).
A Chilean recipe (La Cocina Chilena 2015) for stuffed piures (*Pyura chilensis* and probably now also using the introduced species *P. praeputialis* which is also harvested): (It could be easily adapted for any large solitary stolidobranch, with the limpets and abalone replaced by any other gastropod, fish or meat.) Ingredients (quantity depends on the number of people):

Piures (*Pyura chilensis*), locos (*Concholepas concholepas*, the Chilean abalone) or ground beef, lapas (*Fissurella*, the large local keyhole limpet), a large onion, 500g rice, cut lettuce, aji (paprika), cumin, chopped coriander, salt, and white sauce (Bechamel). Split the amount of piures into three parts that will be used in different processes of the recipe. To prepare this recipe one starts by doing a fried stuffing with the onion, paprika, cumin, coriander and one part of the piures. After that, another part of the piures should be washed, and the larger ones stuffed with the filling done on the previous step. The piures are then baked on a baking sheet at medium temperature, followed by brief broiling. The rice is prepared using the last part of piures, previously cut, and the locos or ground beef and lapas. To serve, each plate is covered with chopped lettuce, topped with the stuffed piures and a portion of the rice mixture. Some of the white sauce can be poured over the rice.

Numerous other recipes and photos of ascidians for sale in markets in various countries can be found at [https://www.jiscmail.ac.uk/cgi-bin/webadmin?A1=ind05&L=tunicata#21](https://www.jiscmail.ac.uk/cgi-bin/webadmin?A1=ind05&L=tunicata#21) (Accessed 6 December 2015). Scroll down to the section on edible ascidians.

**References**


KBSEntertain (2014) [https://www.youtube.com/watch?v=POlo12Q9lkU](https://www.youtube.com/watch?v=POlo12Q9lkU) (Accessed 6 December 2015)


Wild and cultured edible tunicates

**Figure S1. Prepared edible tunicates.**

A) Cleaned and prepared *Styela clava*; photo D. Blackwood
B) The finished dish ready to eat, prepared by W. Rhee; photo D. Blackwood
E, F) Raw *Halocynthia aurantium* body pieces added to whale and seal meat and seaweed; photos A. Khalkachan