Chapter 1
Understanding the Macroalgal Value Chain: From Production to Post-Harvest Processing

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ABSTRACT

The macroalgae value chain is similar to other plant-based production chains in that they go through the same chain of production, grow-out, harvesting, processing, utilization, and ultimately disposal. Extraction is a process specific only to the end product and can include the extraction of polysaccharides including hydrocolloids. The extraction process also contains other high-value specialty chemicals for use as additives in food and cosmetic products. This chapter explores the macroalgal value chain.

DOI: 10.4018/978-1-5225-5577-3.ch001
INTRODUCTION

In broad terms, the macroalgal value chain is comparable to many other plant-based production systems comprising production through grow-out, harvesting, processing, utilisation and ultimately disposal (Figure 1). Globally, the vast bulk (96%) of seaweed that is utilized is produced via aquaculture while only 4% comes from wild harvests. There is then substantial diversity in the downstream processing and utilization which can be summarised as follows:

1. Around 85% by value is used either fresh or variously simply processed (e.g. dried, salted or pickled) into sea-vegetables.
2. Around 10% by value is processed to extract hydrocolloids (primarily alginates, carageenans and agars) for use across a range of industries including food, cosmetics, pharmaceuticals and industrial applications.
3. The balance is used in a range of processes for the extraction of other generally high-value compounds.

There is a smaller but growing application for the use of dried and ground algal materials in cosmetics (e.g. facial scrubs) but these applications are currently limited to a very small proportion of the existing production.

The macroalgae industry is also part of a larger business ecosystem as shown in Figure 2. From Figure 2 it is clear that commercialisation success of macroalgae derived products require access to sufficiently mature and large markets. For most derived products the Australian market will be too small (with the possible exception of food ingredients) and hence the involvement of international companies in the value chain becomes critical, and the higher the value added (which frequently correlates with a lower global volume) the more important this international firm involvement becomes (e.g. for cosmeceuticals and pharmaceuticals). To maximise the value, it is important to commence the industry structure planning with the highest value-added products and ensure international market access and involvement of international firms to enhance the probability of success since the lower the value added the more local the value chain becomes and hence the implementation risk reduces since these value chains can more easily be connected into existing value chains with a sufficient local market.
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