

# **Making Use of Sargassum in Barbados**

by  
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*Figure 1. Collecting Sargassum at Silver Sands beach.*

## **Introduction**

Sargassum seaweed is a relatively recent problem on the island of Barbados. Over the past 4 years, the seaweed has been washing up on the coastlines in increasing volumes and is becoming a large threat to Barbados' tourism industry (Fig. 1). The National Conservation Commission (NCC) has been working to clear beaches of the Sargassum and recently stated, "This year, the volume has increased to such an extent that it is challenging for all the agencies combined to deal with it. We all need more resources" (Williams, 2015). Evidently, there is an increased need for research to better understand and utilize this naturally occurring potential resource and protect the beaches and tourism industry from its effects. Mentored by James Sealy at the

NCC, three undergraduate student participants in the McGill/UWI Barbados Interdisciplinary Tropical Studies (BITS) summer program took on the challenge of finding ways to help Barbados to harness the positive aspects of Sargassum seaweed.

## **What is Sargassum?**

Sargassum consists of "many leafy appendages, branches, and round, berry-like structures that make up the plant" (National Oceanic, 2015). The berry-like structures are called pneumatocysts and are filled with oxygen. Pneumatocysts are buoyant due to this oxygen causing the Sargassum to float along the surface of the ocean. When the Sargassum eventually sinks, it "provides energy in the form of carbon to fishes and invertebrates in the deep

sea” (National Oceanic, 2015). In extreme cases, Sargassum can float in bunches that “can stretch for miles across the ocean.” These ‘rafts’ of Sargassum provide habitats for various species including fish, shrimp, crabs, marine birds and sea turtles (National Oceanic, 2015). This phenomenon becomes an issue as the Sargassum travels across the ocean to foreign areas such as Barbados, where these displaced animals are introduced as potentially invasive species. The origin of Sargassum was thought to be Africa, however recent satellite images suggest its origin to be “north of the mouth of the Amazon” (Jim Gower, 2013).

### **The Issue**

As stated by the NCC, “In some cases, marine litter may become entangled in the seaweed, fish may become trapped, both of which contribute to the odours and appearance of the seaweed while it decomposes. However, this process is not toxic and poses no threat to humans” (BGIS, 2015). This smell of decomposing algae with its load of trapped organisms is a threat to the prominent beach tourism of Barbados. Many of the beautiful and popular beaches around the island are no longer top attractions due to the build-up of Sargassum and the resulting smell. Resorts and villas located along the beaches invaded by Sargassum are likely to see further declines in guests in upcoming years unless something can be done.

### **Solutions**



*Figure 2. Our three completed compost piles.*

### **Composting Trial**

Our group worked to test the use of Sargassum in composting. Our intention was to investigate the potential for Sargassum composting with used animal bedding. The source of straw was from the Ministry of Agriculture’s Greenland Farm. The soiled straw is usually burned, but composting could repurpose this material in a positive way. Trials were conducted at the NCC and involved mixing straw from Greenland with varying amounts of Sargassum from the beach at Silver Sands (Fig. 2). This preliminary trial will give an idea of the optimal ratios between these two components that can be further investigated in the future. Compost added to agricultural soil has been proven to directly increase water retention in soil, feed bacteria that help with plant growth, and bind soil particles (Washington State, 2015).

### **Seed Germination Assays**

Our group also set up seed germination trials to test the use of raw Sargassum with or without other potting

mixture components. Lettuce seeds were used to evaluate growing media containing Sargassum. Results of these trials showed promising growth of the lettuce. Sargassum alone yielded positive germination results. We would suggest that further trials be conducted that include both germination and early seedling growth.

### ***Alginate Extractions***

Under the guidance and supervision of Dr. Srinivasa Popuri from the Department of Biological and Chemical Sciences at UWI, we were able to extract alginate (alginic acid) from dried Sargassum (Figs. 3 and 4).



*Figure 3. Fresh Sargassum pre-extraction.*

Alginate is a natural polysaccharide with dietary fibre properties (KIMICA, 2009). Alginate is found in the gel bodies of seaweed cells and can be used in a variety of applications including cosmetics and textiles applications, food additives and pharmaceuticals. Commercial production of alginate could greatly benefit the Barbados economy if the extraction procedure can be commercialized and suitable markets found.

In conclusion, it was observed that Sargassum can be readily composted

using soiled animal bedding, with the best ratio being 1:2:1 of Sargassum: straw: manure). It can also be used fresh as a component of potting mixtures, where our trials suggested pure Sargassum provided a substrate for germination. However, further trials will need to be conducted. We were able to extract alginate from Sargassum that has commercial utility and potential as an export product. We hope that these preliminary findings will assist others to purpose the Sargassum that is likely to arrive on the island in increasing volumes.



*Figure 4. Adding seaweed to the first solution.*

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## References

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