

Nutrient enriched sustainable foods for the next generation!

Have you ever experienced that eating right makes you feel right? To understand this phenomenon better, an early-stage lab scale study was performed to assess the potential of improving gut health by using probiotics as leverage. With the earth's population growing at an alarming trend, alternate and easily cultivatable food has become a necessity for a sustainable future. Seaweeds due to their high productivity and high yields have proven to be a promising alternate source of food going forward. They are not only rich in vitamins, minerals, and salts, they are also rich in simple sugars such as glucose and mannitol! This glucose and mannitol are what bacteria with probiotic potential can utilize and grow to bring about fermentation.



Fermentation has been used by humans from time immemorial as a method to preserve and increase the shelf-life of foods. In this study, two different type of bacteria were employed to try and bring about the fermentation of brown seaweed. Since seaweeds comprise majorly of water, it makes their preservation and utilization as a food product very difficult. Bacteria which boost the health of human gut which are commonly known as probiotic bacteria, were selected and introduced into the medium containing brown seaweed (*Alaria esculenta*). As the bacteria grew, they fermented the seaweed by reducing the pH of the solution containing seaweed. The two novel probiotic bacteria which were employed for this study showcased their ability to help in the fermentation of the brown seaweed by using glucose and mannitol for their growth. Not only did the two new bacteria prevent spoilage, but they also prevented the growth of potentially harmful microbes like fungus and other undesired bacteria.

The ability of the novel probiotics to aid in the process of fermentation was assessed in a stepwise manner. First, the bacteria were given pure nutrition source which can be easily used for their growth. Once they showed that they can grow well with the pure nutritional source, they were given seaweed where the nutritional source exists in a more complex manner. This would invariably affect the growth of bacteria as they would need to work more to access this source and consume it. Nonetheless, the bacteria grew! They grew so well and facilitated the fermentation of the kelps, thereby proving their potential ability to help increase the shelf-life of brown seaweed.

Using pressure and heat to cook food kills the unwanted microbes in the food and makes them safe to eat. To check if pressure-cooked seaweeds were better for consumption in comparison to frozen seaweed, the seaweeds were pressure-cooked at 121°C for 20 minutes. When the novel bacteria with probiotic properties were injected into the vessels containing the seaweeds, they irrespectively brought about efficient fermentation of the seaweeds in both the cases. However, the final acidic content of the pressure-cooked seaweed was found to be more suitable for human consumption in comparison to frozen seaweed.

In addition to being able to utilize glucose and mannitol for their growth, one particular strain of bacteria was surprisingly found to be able to synthesize a valuable sugar-alcohol compound alongside the consumption of nutrients! Utilization of probiotics along with brown seaweeds not only shows promise towards a nutrient enriched food product, but it also paves way for sustainably obtained raw material in addition to revolutionizing the mindset towards green foods!