

**PRODUCTION OF AGAR EXTRACTS FROM RED SEAWEED *Gracilaria lemaneiformis* BY MEANS OF SIMPLIFIED EXTRACTION PROTOCOLS WITH PRESCREENING OF MICROPLASTICS**

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Red algae (Class Rhodophyceae) are seaweeds with a high economic trend in agar production. As Sri Lanka is equipped with a high diversity and endemism of *Gracilaria* species, we have a high potential for producing agar-based extracts in commercial scale reaching sustainability. Therefore, this work reports on the production of agar extracts from the seaweed *Gracilaria lemaneiformis* by means of selected simple protocols based on hot water extraction, with a future direction on developing a useful agar-based product with prescreening for plastic pollutants because macroalgae have a resilient capacity to trap both mesoplastics (5–10 mm) and microplastics (less than 5 mm). The collected plants from Trincomalee and Morawala, Negombo, Sri Lanka using random quadrat sampling method in September, 2023 were screened for debris prior storage. The agar production was performed in four different methods with and without pretreatment of 2% sodium hydroxide as per the literature using simplified water extraction protocols with slight modifications and prescreening for microplastics (MPs). According to the results, extraction efficiency increases with the use of dry powder form, rather than the direct extraction of thalli. A significantly higher percentage agar extraction had recorded when extracting using the dry powder form regardless of pretreatment with a percentage extraction of 19.46%. The selected species has been contaminated with microplastics (0.417±0.188 items/5 g), among which the majority are fibers of secondary MPs. It is highlighted that there is a significant difference among the concentration of microplastics in filtrates of the washing steps. It is evident that the mean MPs concentration present in the initial dried sample is decreasing with the number of washing steps (DW3-0 items/5 g) starting from the sodium hydroxide pretreated sample (NaOH—0.667±0.210 items/ 5 g) (p<0.05). Thus, more the washing steps would ensure the decreased contamination of MPs entrusting reduced MPs toxicity and enhancement of the good quality of the extracted product in commercial process. A conclusion can be made that *G. lemaneiformis* has been significantly contaminated with microplastics and the agar extraction protocol with pretreatment of sodium hydroxide followed by thorough water washing could be recommended for enhancing the quality of agar extracts. Further, this research should be developed to a better way of extracting agar with higher efficiency and producing a useful agar-based product.

**Keywords:** *Agar extracts, Gracilaria lemaneiformis, Microplastics, Red Seaweed*