CONDUCTIVE HYDRO DRYING OF RED AND BROWN SEAWEED SOURCES FROM SOUTHERN COASTAL ZONE

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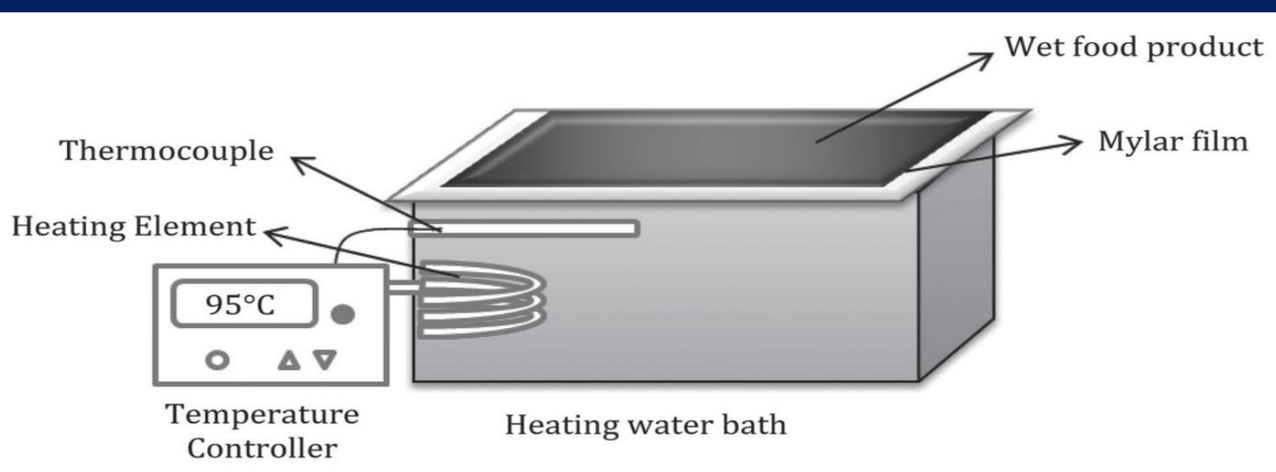
Abstract: Conductive hydro drying (CHD), also known as refractance window drying (RWD), is a low-temperature non-thermal drying method. This study examines the drying of *Kappaphycus alvarezii* and *Turbinaria conoides* using CHD. Initially, their moisture content is about 80%, but it is reduced to around 10.50 % for *Kappaphycus alvarezii* and 12% for *Turbinaria conoides* after the process effectively preserves nutritional and bioactive components, with water activity levels of 0.34 a_W and 0.42 a_W, respectively. The dried products also show minimal color change, making CHD a superior alternative to traditional drying methods while maintaining quality and nutrition.

Methodology

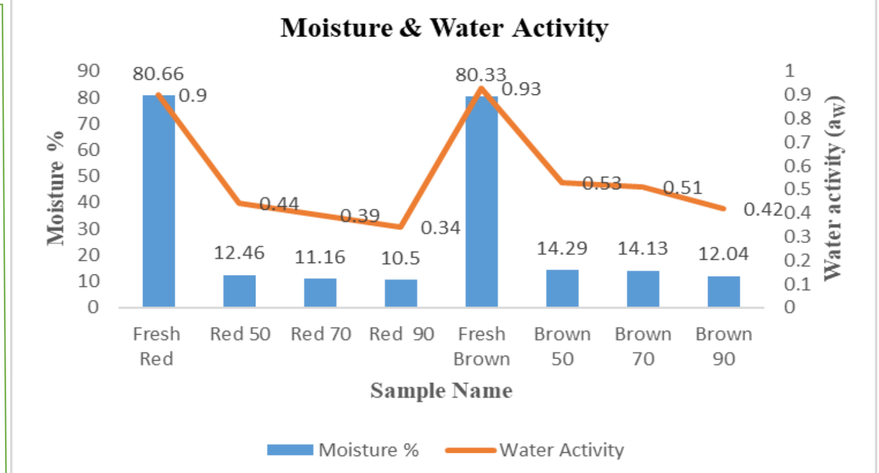



Kappaphycus alvarezii


Turbinaria Conoides

Results

The highest moisture reduction occurred at 90°C, achieving 10.50% for red seaweed and 12% for brown seaweed. In this study, the drying temperature was directly proportional to color changes; higher temperatures resulted in greater ΔE values, while lower temperatures produced smaller values. CHD effectively preserves pigments like phycoerythrin and fucoxanthin, maintaining color integrity. A linear relationship was observed between moisture content and water activity; as moisture decreases, water activity also declines. The lowest water activity for red and brown seaweed was noted at 90°C, measuring 0.34 a_W and 0.42 a_W, respectively. The process of convective heat transfer involves all three modes of heat transfer, but conduction is the dominant mode



Color Value

Sample	L	a	b	ΔE
Fresh Red	10.70 ± 0.19	0.30 ± 0.04	0.44 ± 0.01	-
Red CHD 50	11.24 ± 0.11	0.50 ± 0.02	0.55 ± 0.08	0.59 ± 0.02
Red CHD 70	11.36 ± 0.13	0.56 ± 0.01	0.72 ± 0.02	0.76 ± 0.01
Red CHD 90	11.53 ± 0.12	1.14 ± 0.02	1.39 ± 0.05	1.52 ± 0.02
Fresh Brown	11.67 ± 0.03[a]	0.84 ± 0.02	1.41 ± 0.04	-
Brown CHD 50	20.40 ± 0.14	1.65 ± 0.01	4.53 ± 0.01	09.30 ± 0.13
Brown CHD 70	21.38 ±0.10	1.66 ± 0.01	4.70 ± 0.01	10.28 ± 0.01
Brown CHD 90	22.13 ± 0.01	1.88 ± 0.01	5.18 ± 0.02	11.16 ± 0.01

Sample variant	CHD 50	CHD 70	CHD 90
Kappaphycus alvarezii			
Turbinaria conoides			

Conclusion

- Recent research emphasizes the effectiveness of CHD in achieving low moisture content, reducing water activity, and maintaining excellent color retention in both dried red and brown seaweed.
- Compared to traditional drying methods, CHD shows superior preservation of quality.
- The CHD preserves both quality and nutritional content.
- Future studies could investigate the scalability and economic feasibility of using CHD for industrial-scale seaweed drying.

References

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