PHOTOCHEMICAL STUDIES ON SPECIES OF EDIBLE SEAWEED *ULVA RIGIDA* AND *GRATELOUPIA TURUTURU*

SUMMARY

Edible seaweeds are rich in bioactive antioxidants, soluble dietary fibers, proteins, minerals, vitamins, phytochemicals and polyunsaturated fatty acids. Although seaweeds are used primarily as gelling and concentrating agents in the food or pharmaceutical industries, recent research has revealed their potential for complementary medicine. *Ulva rigida* is a green macroalgae called "Sea lettuce", belonging to the Ulvaceae family of the Ulvophyceae class. *Grateloupia turuturu* is a red macroalgae belonging to the Halymeniaceae family of the Florideophyceae class, commonly called "Devil's Tongue Grass", "Jinuari" (Korean) and "Ratanho" (Portuguese) originating from Asia.

In this thesis, the chemical constituents and biological activities of edible seaweeds *Ulva rigida* and *Grateloupia turuturu* species were investigated. Hexane, dichloromethane-methanol (1:1), methanol and water extracts of the related algae were prepared and their chemical constituents were determined by GC-MS and LC-MS analysis.

In addition, cytotoxic effects of all extracts on MCF-7 and MDA-MB231 human breast cancer cells and CCD-1079-Sk human fibroblast healthy skin cells, antimicrobial effects on *Staphylococcus aureus, Escherichia coli* bacterial species and *Candida albicans* fungi species, and enzyme inhibition effects were investigated against acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE) enzymes.

According to the results of cytotoxicity assays, the extract with the lowest toxicity on healthy cells was determined as the MeOH extract of *G. turuturu* (IC_{50}: 140.5 µg/mL). The DCM:MeOH (1:1) extract of *G. turuturu* was found as the highest toxicity on MCF-7 and MDA-MB-231 breast cancer cells (IC_{50}: 28.7 µg/mL)

The antimicrobial activities of the extracts on the corresponding bacterial and fungal species were determined as 125 µg/mL. While the hexane extracts inhibited AChE enzyme in both algae species, the other extracts did not show inhibitory properties against AChE and BuChE enzymes.

Keywords: *Ulva rigida, Grateloupia turuturu,* edible algae, cytotoxicity, anticholinesterase, antimicrobial, GC-MS, LC-MS.