

Nutritional Evaluation of Sea Buckthorn “*Hippophae rhamnoides*” Berries and the Pharmaceutical Potential of the Fermented Juice

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Abstract : Sea buckthorn is a temperate bush plant native to Asian and European countries, explored across the world in traditional medicine to treat various diseases due to the presence of an exceptionally high content of phenolics, flavonoids and antioxidants. In addition to the evaluation of nutrients and active compounds, the focus of the present work was to assess the optimal levels for *L. plantarum* RM1 growth by applying response surface methodology (RSM), and to determine the impact of juice fermentation on antioxidant, anti-hypertension and anticancer activity, as well as on organoleptic properties. Sea buckthorn berries were shown to contain good fiber content (6.55%, 25 DV%), high quality of protein (3.12%, 6.24 DV%) containing: histidine, valine, threonine, leucine and lysine (with AAS 24.32, 23.66, 23.09, 23.05 and 21.71%, respectively), and 4.45% sugar that provides only 79 calories. Potassium was shown to be the abundant mineral content (793.43%, 22.66 DV), followed by copper and phosphorus (21.81 and 11.07 DV%, respectively). Sea buckthorn juice exhibited a rich phenolic, flavonoid and carotenoid content (283.58, 118.42 and 6.5 mg/g, respectively), in addition to a high content of vitamin C (322.33 mg/g). The HPLC profile indicated that benzoic acid is the dominant phenolic compound in sea buckthorn berries (3825.90 mg/kg). Antioxidant potentials (DPPH and ABTS) of sea buckthorn showed higher inhibition than ascorbic acid. Antimicrobial potentials were most pronounced against *Escherichia coli* BA12296 (17.46 mm). The probiotic growth was 8.5 log cfu/mL, with juice concentration, inoculum size and temperature as the main contributors to probiotic growth with a 95% confidence level. Fermentation of sea buckthorn juice with *L. plantarum* RM1 enhanced the functional phenolic and flavonoid content, as well as antioxidant and antimicrobial activities. The fermentation with *L. plantarum* RM1 enhanced the anti-hypertension and anticancer properties of the sea buckthorn juice and gained consumers' sensorial overall acceptance.

Keywords : sea buckthorn juice, *L. plantarum* RM1, fermentation, antioxidant, antimicrobial, angiotensin converting enzyme inhibition

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