ABSTRACT

The aim of this research was to compare cultivated *Spirulina platensis* with *Moringa oleifera* as well as to test their synergistic effect in terms of antioxidant activity, phytochemicals and antibacterial activity. Cultivation was performed outdoor using self-made artificial seawater. The dried products were macerated and then fractionized. The DPPH antioxidant test gave significantly higher DPPH inhibitions in MSPcrude and MSPH compared to their singles. However, un-combined MM and MC fractions were significantly higher than their mixtures. MEA fraction was 3rd in DPPH inhibition. The lowest inhibitory concentration (IC_{50}) recorded was 182.57µg/mL from MSPcrude. Qualitative phytochemical identification revealed moderately high alkaloids (++) in SPcrude, not detected in Mcrude but present (+) in MSPcrude. Flavonoids and phenols were present in Spcrude, moderately high in Mcrude and MSPcrude while terpenoids were present in both crudes but moderately high in MSPcrude. Same treatments (crudes and fractions) were tested against *Aeromonas hydrophila*, *Vibrio alginolyticus*, *Bacillus cereus* and *Staphylococcus aureus* at 10, 20, 30, 40 and 50mg/mL using the agar well diffusion method. On *A. hydrophila*, the inhibition zone of MEA (22.10±0.87mm) was highest, MC had 19.94±2.90mm and the MSPC with 19.22±1.16mm, MM with 16.46±1.93mm and MSPM with 14.06±2.36mm did not differ significantly between their singles and mixtures, but both significantly differed from SPC and SPM. MSPH with 11.56±1.33mm significantly differed from MH and SPH at 50mg/mL while the rest were resisted (≤10mm). The inhibition zone on *V. alginolyticus* was 10.26±1.85mm for SPM and was significantly higher than MM and MSPM while the other 12 treatments were less than 10mm. SPcrude and Mcrude were significantly higher than MSPcrude on *B. cereus* and *V. alginilyticus* bacteria. MEA had 13.80±6.02mm, MSPC 11.58±4.10, MC 11.02±12.86, SPcrude 10.32±2.82mm with the rest less than 10mm on *B. cereus* at 50 mg/mL. SPH had 11.08±1.21mm, was higher than MSPH and MH on *S. aureus* but statistically indifferent. MC with 10.52±1.85mm was not significantly higher than SPC or MSPC. The MSPcrude was statistically higher than Mcrude but not Spcrude on *S. aureus*, this and the rest treatments were less than 10mm against *S. aureus*. In conclusion, *S. platensis* and *M. oleifera* demonstrated antioxidant and antibacterial activity, and synergism in this study. The observed synergy is a new finding *in vitro* with *S. platensis* and *M. oleifera* which can be useful in the development of antioxidants, and combinational antibiotics in aquaculture, however additional studies are recommended.

Keywords: Antioxidant, Antibacterial, *Spirulina platensis*, *Moringa oleifera*, Synergism