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Advancement of Green Process Through Microwave-Assisted Extraction of Bioactive Metabolites from *Arthrospira Platensis* and Bioactivity Evaluation

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Abstract:

Bioactivity and functional properties of cyanobacterial extract mostly depends on process of extraction, temperature and solvent used (polar or non-polar). To evaluate these parameters a design of experiment (DOE; using a 2^k design) was performed with *Arthrospira platensis*. Extraction process was optimized through microwave-assisted extraction considering solvent ratio, temperature and time of extraction with polar (PS) and non-polar (NPS). Maximum extract yield obtained was $4.32 \pm 0.25\%$ and $5.26 \pm 0.11\%$ (w/w) respectively for PS and NPS. Maximum content of bioactive metabolites in PS extracts were thiamine ($846.57 \pm 14.12\mu\text{g/g}$), riboflavin ($101.09 \pm 1.63\mu\text{g/g}$), C-phycocyanin ($2.28 \pm 0.10\mu\text{g/g}$) and A-phycocyanin ($4.11 \pm 0.03\mu\text{g/g}$), while for NPS extracts were α -tocopherol ($37.86 \pm 0.78\mu\text{g/g}$), β -carotene ($123.64 \pm 1.45\mu\text{g/g}$) and $19.44 \pm 0.21\text{mg/g}$ of fatty acids. *A. platensis* PS extracts showed high antimicrobial activity and PS extracts had antioxidant activity of $0.79 \pm 0.12 \mu\text{molTE/g}$ for FRAP assay, while for NPS extracts $1.03 \pm 0.08 \mu\text{mol } \alpha\text{-TE/g}$ for FRAP assay.

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