Fungal and Algal Extracts Enrich Myoblast and Mammary Cell Growth in Serum-Free Culture Medium

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Fungal and microalgae extracts represent a sustainable strategy to enrich cell culture media in the context of cellular agriculture. They provide a variety of bioactive molecules that may support cell adhesion, differentiation, and 3D-matrix development, depending on species and extraction method. This study evaluated aqueous extracts from *Pleurotus ostreatus* (PL), *Mucor* spp. (M), *Saccharomyces cerevisiae* (Y), *Euglena gracilis* (EG) and whey (W, included as control) for their effect on murine myoblasts (C2C12) and bovine mammary epithelial cells (MTEC). Standard culture medium, without fetal bovine serum (FBS), was supplemented with extracts at concentrations ranging from 3.13 to 0.02 mg/mL. Each sample was chemically characterized (dry matter, ash, crude protein, crude fiber, ether extract). Cell viability was assessed using Alamar Blue assay after 48 hours (C2C12) and 72 hours (MTEC). The three most effective concentrations for each extract were then used to qualitatively evaluate morphology and proliferation via inverted light microscopy and to monitor dynamic cell proliferation using xCELLigence system. In parallel, RT-qPCR was performed to analyze genes involved in proliferation (in both cell line) and differentiation (in C2C12). Protein contents were 16.54±0.70% for PL, 42.22±0.48% for M, 46.59±0.43% for Y, 29.47±0.12% for EG, 78.80±0.18% for W. PL extract promoted C2C12 proliferation at 0.78 mg/ml and showed the highest MTEC viability at 1.56 mg/mL, although other concentrations also supported cell viability. These findings suggest that fungi and microalgae extracts, rich in bioactive compounds, could enhance C2C12 and MTEC growth.

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