



Scopus-ISI Journal, Impact Factor: **0.483** **J. Pure Applied Microbiology, 16 (2022)**

البحث رقم (8) : فردي تخصص
وغير مستخلص من رسالة

Manal Khider, Mahmoud Zaki El-Readi, Salah Abdalrahim, Abdel Naser Zohri, Ibrahim M.
Functional low-fat set yogurt enhanced with microbial exo-polysaccharides -mediated anticancer activity. J. Pure Appl. Microbiol., 16 (2022).

Abstract

Exopolysaccharides (EPSs) are novel functional additives for low-fat yogurt. Pharmaceutical, medical, and food industries are using more LAB-based EPSs. In this study, *Leuconostoc spp.* was used to produce ninth bacterial EPSs in a modified molasses medium. Production of EPSs was concentration-dependent on all stains and the highest yield was obtained from the S3 strain (55.23 g/l), followed by S6 (49.95 g/l), S8 (45.68 g/l), and S744.23 , respectively. HPLC and FTIR analysis showed that all purified EPSs from *Leuconostoc citreum* (S3) and *Leuconostoc holzaapfelii* (S8) were related to exopolysaccharide glucan. Anticancer activity of all EPSs samples (EPSs1-9) against Caco-2 cells and normal MCR-5 cells were investigated using MTT assay evaluated. The results revealed that Caco-2 cells were more sensitive than the normal MCR-5 cells. The highest anticancer activity against Caco-2 cancer cells was recorded for EPS8 ($IC_{50} = 22.94 \mu\text{g/ml}$, $SI=3.73$), followed by EPS3 ($IC_{50} = 36.15 \mu\text{g/ml}$, $SI=8.72$), EPS1 ($IC_{50} = 50.01 \mu\text{g/ml}$, $SI=3.73$), and EPS4 ($IC_{50} = 94.90 \mu\text{g/ml}$, $SI=3.26$), respectively. The lowest cytotoxicity was recorded for EPS5 ($IC_{50} = 130.5 \mu\text{g/ml}$). The most active EPSs (EPS3 and EPS8) were used as fat replacements and stabilizers in low-fat set yogurt at non-toxic concentrations (0.4, 0.8, and 1.2%). EPS3 and EPS8 improved the low-fat yogurt's organoleptic and rheological properties. EPS8 had the highest water holding capacity (77.26%), viscosity (3660 CP), and lowest syneresis (22.95%) and whey off (0.6 ml). Low-fat set yogurt enhanced with EPS3 and EPS8 recorded the highest sensory evaluation values with overall acceptability, especially EPS3b, EPS3c, EPS8c, and EPS8b; of 97.50, 97.43, 96.51, and 96.36 in fresh age compared to control yogurt (92.64). In conclusion, *Leuconostoc* EPSs, especially EPS8, can be explored for anti-cancer effects on Caco-2 colorectal cancer cells. It could also improve the rheological and organoleptic qualities of low-fat set yogurt.

Keywords: Anticancer, Caco-2 cells, Cytotoxicity, Exopolysaccharide, Glucan, *Leuconostoc* strains, Low-fat set yogurt, Organoleptic and Rheological properties.