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Extracellular Polysaccharide from *Weissella confusa* OF126: Production, Optimization, and Characterization

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Abstract

The production, optimization, and characterization of exopolysaccharide (EPS) from *Weissella confusa* OF126 and the *in-vitro* probiotic potentials of this strain was investigated. The EPS produced on sucrose modified-MRS broth was characterized. The purified EPS had an average molecular weight of 1.1×10^6 Da. HPLC analysis revealed the presence of glucose monomers, indicating its homopolysaccharide nature. The structural characteristics of the EPS were investigated by FTIR, and NMR spectroscopy. FTIR spectroscopy revealed the presence of hydroxyl, carboxyl, N-acetyl and amine groups. NMR analysis confirmed that the EPS contained α -(1 $\rightarrow$ 6) linkage and α -(1 $\rightarrow$ 3) branched linkage. The EPS showed strong *in-vitro* antioxidant activity. Four significant factors were optimized using Central Composite Design (CCD) and Response Surface Methodology (RSM). The predicted optimum conditions for EPS production were cultivation time (48.50 h), sucrose concentration (24.00 g/L), pH (7.00) and yeast extract (2.50 %). The EPS produced was predicted to be 3.10 g/L, while the experimental yield was 3.00 g/L. This strain was found to possess desirable probiotic attributes by its ability to survive at pH 2.0 and in the presence of bile salts (0.50 % (w/v)) for 4 h. The results obtained from this study demonstrate *W. confusa* OF126 as a promising probiotic and the EPS produced can find useful applications in industries.

Keywords: Exopolysaccharide; Probiotic; FTIR

1. Introduction

Lactic acid bacteria (LAB) are beneficial microorganisms commonly isolated from various fermented foods [1, 2]. They are known to perform essential roles during the fermentation of many Nigerian indigenous fermented food products such as *gari*, *fufu*, *ogi*, *kunu*, *masa*

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