β-Carotene-Rich Carotenoid-Protein Preparation and Exopolysaccharide Production by *Rhodotorula rubra* GED8 Grown with a Yogurt Starter Culture

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Z. Naturforsch. **61 c**, 571–577 (2006); received December 29, 2005/February 6, 2006

The underlying method for obtaining a β-carotene-rich carotenoid-protein preparation and exopolysaccharides is the associated cultivation of the carotenoid-synthesizing lactose-negative yeast strain *Rhodotorula rubra* GED8 with the yogurt starter culture (*Lactobacillus bulgaricus* 2-11 + *Streptococcus thermophilus* 15HA) in whey ultrafiltrate (45 g lactose/l) with a maximum carotenoid yield of 13.37 mg/l culture fluid on the 4.5th day. The chemical composition of the carotenoid-protein preparation has been identified. The respective carotenoid and protein content is 497.4 μg/g dry cells and 50.3% per dry weight, respectively. An important characteristic of the carotenoid composition is the high percentage (51.1%) of β-carotene (a carotenoid pigment with the highest provitamin A activity) as compared to 12.9% and 33.7%, respectively, for the other two individual pigments – torulene and torularhodin. Exopolysaccharides (12.8 g/l) synthesized by the yeast and lactic acid cultures, identified as acid biopolymers containing 7.2% glucuronic acid, were isolated in the cell-free supernatant. Mannose, produced exclusively by the yeast, predominated in the neutral carbohydrate biopolymer component (76%). The mixed cultivation of *R. rubra* GED8 with the yogurt starter (*L. bulgaricus* 2-11 + *S. thermophilus* 15HA) in ultrafiltrate under conditions of intracellular production of maximum amount of carotenoids and exopolysaccharides synthesis enables combined utilization of the culture fluid from the fermentation process.

Key words: Carotenoid-Protein Preparation, Exopolysaccharides, Microbial Association