THE EFFECT OF GAMMA-RADIATION ON YEAST CELL WALL GLUCANS

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The solubility and the degree of degradation of water-insoluble particulate glucan isolated from Saccharomyces cerevisiae were studied after γ-irradiation. The different radiolytically stable linkages of β/1-3/-, β/1-6/- and α-glucan linkages of the complex polysaccharide can be used to achieve its fragmentation and provide a new insight to its macromolecular structure.

INTRODUCTION

Studies carried out during the last decade demonstrated that radiation induces chemical and physical transformation of polysaccharides, these effects became a matter of serious scientific and practical attention. Radiation treatment of starch, cellulose, hemicellulose, and other plant polysaccharides has found application in sterilization of food and sanitary materials, in pulping process and viscose production, in bioconversion of lign-
nocellulosics into fermentable sugars and microbial biomass, and also as an effective method for oriented modification of polysaccharides and elucidation of their supramolecular structure $^{1-5}$.

It was found that $\beta$-glucans isolated from fungi have expressive immunomodulating activity. They are effective in various microbial infections stimulate phagocytosis, humoral and cell mediated immunity, inhibit different kind of tumour growth and show significant radioprotective effects $^{6,7}$. These findings, coupled with the observations that they can be used as a potent adjuvant, provide the basis for the continued development of polysaccharide immunomodulators for therapeutic purposes. Hence, it is the reason that structural investigations of microbial $\beta$-glucans have gained in significance.

The aim of the present work is to study the degradation, changes in solubility and fractionation of yeast cell wall glucans after $\gamma$-irradiation in different media.

EXPERIMENTAL

Isolation of glucan

The particulate glucan of yeast cell wall was isolated from baker’s yeast /Saccharomyces cerevisiae/ by alkaline and subsequent acid treatment as a water-insoluble glucan $^8$.

Irradiation was performed in an RCH gamma 30 equipment /USSR/ with $^{60}$Co as the source. The glucan samples were placed in glass vials and irradiated in air, nitrogen and distilled water /twice of glucan weight/ at constant temperature with different radiation doses.