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Measurement of growth curves of microorganisms influenced by radiation

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Relatively high attention is paid to various agents (e.g. chemical substances [1], hyperthermia and/or radiation [2,3]) influencing the growth of microorganisms. The influence of radiation on the microbial cells may be indicated not only by the survival curves, but also by the growth curves of irradiated and non-irradiated cultures.

The aim of the study is to point out to some aspects of the measurements of such growth curves. The Saccharomyces cerevisiae culture from variously irradiated inoculum in liquid peptone-glucose medium was used in all experiments. Irradiation of yeast cells in solution physiological (salt) was performed with γ -rays of $\langle sup > 60 \langle sup > Co \rangle$ in Gammacell 220 or with UV-irradiation using ultraviolet lamp UVH 1016-6 for various time periods. Various dose rates of both types of radiation were used. The absorbed doses reached some hundreds Gy for both γ and UV radiation. The growth curves were measured using the nephelometric data of yeast suspension in various time periods of growth. The results of many measurements showed that the slope of growth curves expressed relatively exactly the negative influence of irradiation when the standard and uniform method of evaluation was used. When the curves were fitted to the data points by the least-squares method, the average standard errors were found to be in the range from 0.6 to 0.8 % and from 0.2 to 0.5 % for γ - and UV- irradiation, respectively. The negative effect of irradiation depended monotonously and non-linearly on the applied dose of irradiation. Quantitatively different effects were found in the case of γ and UV irradiation.

References:

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