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The effect of thermal treatment on the catalytic activity and biological properties of bacillus intermedius ribonuclease

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Abstract

Bacillus intermedius ribonuclease (binase), which is known to exert a growth-stimulating effect at low concentrations and a genotoxic effect at high concentrations, loses these abilities completely after exposure to 100°C for 10 min, but retains approximately 96% of its catalytic activity and structural integrity. Other types of modification, such as photoinactivation and site-specific mutagenesis, gave rise to enzyme forms with unaltered structure but reduced (sometimes to trace amounts) catalytic activity. Genotoxicity was always proportional to the catalytic activity of the native enzyme, while a notable growth-stimulating effect may be exerted by enzymes with low activity. The loss of biological activity of thermoinactivated binase was related to the increase in the number of negatively charged groups on the enzyme surface, which led to a substantial decline in the adhesive properties of the enzyme.

Keywords

Adsorption, Bacillus intermedius ribonuclease, Catalytic activity, Genotoxicity, Growth stimulation, Thermoinactivation