

THERMODYNAMICS BASES OF BIOLOGICAL EVOLUTION

The physiology at limiting and stress conditions challenges the current view that the overall reaction of metabolic processes is always far from equilibrium and, therefore, that organisms are not committed to lower their rates of entropy production. Plausibly, critical steps of natural selection takes place at limiting conditions, near equilibrium, in the linear range response of entropy production, and consequently the trend to lower the rate of entropy production could be the fitness arrow of biological evolution. The evolutionary relevance of the Prigogine theorem is considered in connection with the ergodic hypothesis of Boltzmann. The emergence of metabolic strategies to economise carbon/energy resources, of resource-waste systems like active transport and the irreversible increase in the complexity of organisms during evolution may be consequences of a more general trend of metabolic systems to lower the rates of entropy production.