

Biophoton Emission from Lichens

Rajendra Prasad Bajpai

Sophisticated Analytical Instrument Centre
North Eastern Hill University, Shillong 793022, India
And

International Institute of Biophysics IIB e.V. Raketstation,
Kapleiner Strasse, Neuss D41472, Germany

Rpbajpai@nehu.ac.in or rpbajpai@yahoo.com

Biophoton emission is the incessant emission of photons of unknown origin and unusual features by living systems. The emitted photons are called biophotons and the signal is called biophoton signal. The unusual features of biophotons require quantum framework for description and have biological relevance. Biophoton signals are determined by detecting the number of photons in successive bins of definite size by a photomultiplier from an *in vivo* sample placed inside a dark chamber. A sample of lichen is an ideal system for demonstrating the unusual features of biophoton signals. A biophoton signal has a small decaying part followed by a long non-decaying part. The decaying part is non-exponential in character and is describable by a simple form of four parameters that characterise the state of the emitting system. The non-decaying part has fluctuations that are not washed out by increasing the bin size. The fluctuations determine another three characteristic parameters of the emitting system. These parameters reflect many nuances of the biological state and are sensitive to many environmental and physiological factors. The sensitivity of two parameters is easy to measure; has been investigated extensively and has been applied for assessing pollution of water, quality of food and its degradation with storage, germination capacity of seeds and effect of different factors (drought, salinity, temperature and pathogens, among others) on plant physiology. The other parameters are now being measured and show similar sensitivity. The parameters appear unique identifying tags of the state of living systems.