



## Bacterial bioluminescence: Biology and applications

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Luminous bacteria are light emitting prokaryotes that carry *lux* genes responsible for luminescence emission. Luminous bacterial diversity is well known with symbiotic association with luminescent organisms such as squid and fishes. Nevertheless, recent study revealed that their diversity is found across the all invertebrate and vertebrate taxa, indicating their essential role of association with those organisms. Luminous bacterial species distribution in different environments and their role in association with different organisms are very interesting to present. Various physico-chemical parameters and genetical factors which affecting bacterial bioluminescence are overviewed herein. The importance of *luxA* gene in luminescence regulation and its ecological distribution via horizontal gene transfer are detailed. Luminescence intensities and types of luminescence color are compared between different species. Luminous bacteria have been used in different applications to monitor several toxicants from different environments. Recent studies have also revealed that phenolic compounds produced by luminous bacterial species exhibited potential antimicrobial applications against human pathogens. Bacterial luciferases and *lux* genes have numerous applications in environmental, industrial and medical applications. This review shows the last decade and recent discoveries on ecological distribution and diversity of several novel luminous bacterial species in various samples and their function. Major outlines about history of bacterial bioluminescence and other luminous organisms will also be delivered. A proper guidelines and suggestions to work on bacterial bioluminescence aspect will be shared for the benefit of new researchers.

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### References

[1] Dunlap PV (2014) Biochemistry and genetics of bacterial bioluminescence, Pp. 37-64. In G. Thouand, and R. Marks (ed.). Bioluminescence: Fundamentals and applications in biotechnology-Vol. 1. Springer-Verlag, Berlin, Heidelberg.

[2] Ramesh CH (2016) Studies on bioluminescent bacteria from Andaman Islands. PhD Thesis, Pondicherry University.