

Glowing bacteria and bio light article review sample

[Literature](#), [Russian Literature](#)



1. 0 Introduction

In an effort to move towards cleaner sustainable technologies, Philips, the Dutch based electronics company, has designed a microbial home project. The project envisions homes where traditional waste is recycled to address sustainability issues. As part of this project, Philips designers have developed the “ bio-light” concept in which bacteria are made to produce a green glow when fed with methane gas that is derived from household waste digesters. The bacteria in this case create light in the similar way that living organisms like glow worms and fireflies do through a phenomenon known as bioluminescence . The bacteria produce the light through an enzymatic reaction.

2. 0 The Mechanism of light production

The enzymatic reaction occurring in the bacteria requires several components. Bioluminescence is basically a biochemical reaction in which an enzyme known as liciferase catalyzes the reaction of a substance known as liciferin with oxygen to produce light. This reaction requires an activating ion and energy. It therefore takes place in the presence of the energy rich molecule known as ATP and can be summarized by the equation below:

$$\text{Luciferin} + \text{Luciferase} + \text{ATP}$$
$$\text{Luciferyl adenylate} - \text{liciferase} + \text{Pyrophosphate}$$
$$\text{Lucciferyl adenylate} - \text{liciferase} + \text{O}_2 \text{ Oxyluciferin} + \text{Luciferase} + \text{AMP} + \text{Light.}$$

The methane supplied to the bacteria in the bio-light concept is used by

these micro-organisms to produce energy in the form of ATP that is necessary for the light producing reaction .

3. 0 Lamp Design and Application

The bio-light lamp consists of a collection of hand-blown jars which are supported by a steel frame pinned on a wall. The jars contain the bioluminescent bacteria and are attached to silicon tubes that are routed through a household waste digester for the supply of methane gas .

Admitting that the bio-light would be best suited for the provision of mood lighting than functional illumination, Philips envisions various applications of the technique. From developing diagnostic indicators of pollution levels to the creation of biosensor monitors for diseases like diabetes, the promise of bioluminescence application is ever growing. It is worth noting that the applications of this technology is more likely to occur in places out of the normal lighting areas (such as illuminated walkways) where things could be growing and giving free light. A likely example of such application would be the use of glowing organisms as warning strips on flights of stairs or to light road verges .

5. 0 Conclusion

While appreciating that everyone may not start putting bacterial culture into their own homes for lighting, Philips' efforts to harness the bioluminescence technique to help in redefining energy consumption in homes is commendable. It demonstrates their designers' commitment to explore non-polluting and less energy consuming solutions to lighting. This would in turn

help in rethinking how homes consume energy and how whole communities can pool their resources .

Works cited

Knight, Matthew. "Glowing bacteria could power 'bio-light'." 3 December 2011. CNN. 2011 December 7 .

Wilson, Tracy V. "How Bioluminescence Works." 10 July 2007.

HowStuffWorks. com. 7 12 2011 .