Performance of green roofs with respect to water quality and reduction of energy consumption in tropics: A review

Abstract

Green roofs are an increasingly important component of water-sensitive urban design systems that can potentially improve the quality of urban runoff, reduce the energy consumption of buildings, and add esthetic value to the environment. The most important green roof abilities, which appear as a key feature in urban catchments are the ability of rainwater detention and retention and reduction in energy consumption. This paper aims to provide an overview of the effects of the application of the green roof strategy on the quality of runoff water and the reduction of energy consumption. The components of a green roof are discussed, and the advantages and disadvantages of different types of green roofs are assessed. In addition, the origins and concentrations of the main pollutants are discussed, moreover environmental cost-benefits of green roofs are also considered. In addition, the main factors that affect the quality of green roof runoff water, e.g., plant species, fertilization, pH, growth media as well as how green roofs could reduce energy consumption are discussed. Green roofs are considered as sustainable approach for runoff management with achieved aesthetical values and in combination with energy saving on heating/cooling. Hence, green roof causes a sufficient decrease in energy consumption and consequently in the related energy costs. It can help to improve the micro climate around the buildings and save money and also improve water quality. Therefore, green roofs may turn into a profitable investment. Some recommendations for future study also are proposed.