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The Potential of Rhizophoramucronata in Extracting the Chemical Composition and Biological Activities as Mangrove Plants: A Review

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ABSTRACT

In this review article, the general importance of mangrove plants including the direct and indirect uses was presented. Attemptswere made to create awareness as well as emphasize the potentiality of mangrove plants especially for the pharmaceutical benefits. Specific emphasis was laid on the Rhizophora species.An updated report on the conventional extraction methods of the chemical constituents from this plant species is presented herein.Also, biological activities of the minor and major compounds extracted from Rhizophora plants are discussed. Furthermore, an updated report was made on the chemical groups present in Rhizophora plants with direct emphasis on the four commonly investigated species which are *R. apiculata, R. mangle, R. mucronata,*and *R. stylosa.* Structures of some extracted compounds obtained from Rhizophora plants are also illustrated. In effect, Rhizophora species have been presented here as a viable alternative source of many biological and chemically active compounds which are already known to be of great economic and pharmaceutical importance.Moreover, efforts were made to expose the potential of Rhizophora plants as possible sources of many yet unknown chemical compounds which could provide great beneficial activities.

INTRODUCTION

Rhizophora species are some highly beneficial representative of a broader group of plants known as mangroves. The term mangroves are generally used to describe woody plant and other forest communities which combine to form a marginal ecosystem. This group of plants are able to withstand harsh environmental factors due to their specially developed adaptive features such as their upright roots with buttresses, pneumatophore, as well as the vast distribution of salt-ejecting pores on their leaves among other features (Nebula, M., *et al*., 2013). Possession of these features makes the mangroves able to survive under certain unfavourable conditions such as heavy tides, continuous inundation, high salinity, strong winds, high temperature, and so on whereas ordinary plants would not have survived (Nebula, M.,; Vannucci, M., 2001).

Mangroves are vastly distributed across Asia including Indonesia, Pakistan, India, Bangladesh, Japan and Philippines. They are also largely found in East Africa, New Zealand as well as south regions of Australia (Bandaranayake, W.M., 2002). Mangroves plants have been widely reported to possess compounds with high potential medicinal values, highly bioactive components as well as highly desirable agrochemical properties (Bandaranayake, W.M., 2002; Sachin, R., K. Shahana and G. Rupali, 2014). Thus, mangrove plants can serve food and medicinal purposes with possibilities of using either the stems, flowers, roots, leaves or the fruits. The use of different parts of the mangrove plants is closely related to theirinherent nutrients (fats, vitamins, proteins, carbohydrates and minerals) which can be easily extracted from the plant parts (Hardoko, E.S., *et al*., 2015). Bioactive components as well as other compounds of chemical value which are extractable from mangrove

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