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REVIEW

Systematic appraisals of naturally occurring alkaloids from medicinal plants

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Abstract

Alkaloids are a complex class of biologically active compounds with a broad spectrum of health-related applications. Particularly the alkaloids of indole, steroidal, terpenoids, isoquinoline, and bisbenzylisoquinoline have been extensively investigated. Ultimately, substantial advancement has been highlighted in the investigation of chemical constituents and the therapeutic benefits of plant alkaloids, particularly during the last ten years. A total of 386 alkaloids have been isolated from over 40 families, including Apocynaceae, Annonaceae, Rubiaceae, Menispermaceae, Ranunculaceae, Buxaceae, Papaveraceae, Magnoliaceae, Rutaceae and Phyllanthaceae. This paper will investigate several alkaloids that have been isolated from botanical medicines as well as offer an in-depth analysis of their cytotoxic properties.

Keywords Alkaloids · Bioactive compounds · Therapeutic benefits · Indole · Isoquinoline · Bisbenzylisoquinoline · Cytotoxicity

Introduction

Alkaloids are one of the major groups of therapeutically active secondary metabolites in plants. They are primarily distributed among monocotyledon, however, in recent times; studies have revealed their bioavailability in dicotyledon. About 60 plant families have been considered as major contributors of alkaloids, these include: Cupressaceae (Zeng et al. 2020), Phyllanthaceae (Xu et al. 2020), Alliaceae (Mai et al. 2020), Ranunculaceae (Pang et al. 2020), Boraginaceae (Benamar et al. 2020), Verbenaceae (Ono et al. 2020), Asteraceae (Aliyu et al. 2020), Portulacaceae (Xu et al. 2020), Burseraceae (Sánchez-monroy et al. 2020), Taxaceae (M. Wang et al. 2018a, b, c), Euphorbiaceae (Gao et al. 2020; Chao et al. 2016), Leguminosae (Y. Hu et al. 2017), Apocynaceae (S. Lim et al. 2013), Stemonaceae (Alino et al. 2015), Ranunculaceae (Q. Guo et al. 2018), Zygophyllaceae (Bournine et al. 2017), Annonaceae (Yu et al. 2019) and Amaryllidaceae (Wang et al. 2018a, b, c). The plants under this taxonomy have exhibited significant therapeutic applications and their chemical structural framework is a major concern to chemists all over the planet. Furthermore, these secondary metabolites have also been isolated in fungus (*Cyathus stercoreus*) (X. Yin et al. 2020) and corals of the

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