

Therapeutic Potential of Alkaloids in Cough Treatment

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Cough is one of the most common symptoms for which patients have to take physicians and pulmonologists consultation, because it sometime can so intensely and adversely affect the quality of patients' lives [1]. Cough is an important characteristics of larynx and respiratory system which help out in the removal of foreign substances and secretions and prevent aspiration of food and fluids and thus prevent choking (suffocation) which may provoked by the presence of such agents [2]. Additionally, some of the drugs like ACE inhibitors also induce cough due to over production of bradykinin which intern cause hyperactivity of cough reflex or fentanyl can provoke cough by inducing a pulmonary chemo-reflex in 50% of patients; this is inhibited by terbutaline [3].

There are two types of cough i.e. productive cough with mucus and dry cough without mucus. Importantly, both types of cough required special treatment in order to improve patient's compliance. Different therapeutic agents have been practicing to treatment cough such as codeine alone or in combination; most of these formulations are sold as over-the-counter (OTC) drugs without caring the official guidelines and are found irrational. The American College of Chest Physicians suggested various guidelines for treating acute cough having no regards for OTC products [4]. Another irrational approach in cough formulations that enhances the risk of unwanted effects is the combination of two or more drugs in the same formulation, above and beyond having no supporting therapeutic grounds or scientific evidence [5]. Apart from irrational use, natural therapies are found more effective and safe compare to synthetic drugs [6,7], therefore encouraging the exploration of natural treasure for the treatment cough. Natural products serving the humanity by preventing or treating different pathological conditions since time immemorial [8,9]. The safety, affordability and believe of users of such product made an impressive impact on the world trade of such product [10]. Alkaloids represent a very important and most widely therapeutically explored biochemical class of natural compounds. More than 27,000 alkaloids have been reported with more than 4000 years old history of applications [11,12]. There are numerous plants alkaloids reported with marked antitussive and expectorant activity for the treatment of cough while list of various commercial formulation is presented in Table 1. In recent times, several more purified alkaloids and their extracts showed promising antitussive effects coupled with expectorant activity [7,13-15]. Based on the preliminary effects, further detail studies on the mechanism(s) of these finding is suggested as the cough reflex may be due to sensory limb, central control or efferent limb as indication of various pathological conditions. The cough sensitive receptors are located in the bronchial tree, particularly in the junction of the trachea which can be stimulated mechanically or chemically e.g. by inhalation of various irritants than nerve impulses activate the

cough center in the brain [16]. It is, therefore, deem necessary to explore the clinical potential of such reported compounds in term of efficacy and safety.

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S. No	Alkaloid Name	Commercial brand (s)
	Codeine	Antitus™, Codicaps™, Tussipax™
	Lobeline	Citotal™, Lobatox™, Refrane™, Stopsmoke™
	Noscapine	Bequitusin™, Degoran™, Tossamine™, Tussisedal™
	Theophylline	Adenovasin™, Aerobin™, Euphyllin™, Theochron™
	Ephedrine	Amidoyna™, Bronchicum™, Peripherin™, Solamin™

Table 1: List of commercial alkaloids used for the treatment of cough.

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