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A review of the most important medicinal plants effective on cough in children and adults

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ABSTRACT

Cough is referred to the strong explosive exhalation which causes removal of secretions and foreign bodies from tracheobronchial tract. Given the prevalence of children's and adults' involvement with and acquisition of cough, this review article was aimed to report the plants used to treat and relieve cough in traditional culture and ethnobotany of Iran's different regions. To select the articles, the key words such as ethnobotany, ethnopharmacoligy, ethnomedicine, phytopharmacology, phytomedicine, traditional medicine, and Iran in combination with the words cough, upper respiratory tract, and children were used to search in Web of Science, PubMed, Scopus, International Science Citation Center, and Magiran.The findings indicated that 51 medicinal plants are used in Iran traditional medicine to specifically treat cough. Most of the plants identified in this study were antimicrobial and anti-inflammatory, which can affect the upper respiratory tract because of containing antimicrobial and anti-inflammatory compounds, and relieve and treat cough. The anti-cough property of some of these plants has been studied in clinical trials but not confirmed, which could be a basis for clinical trials in future.

Key words: Cough, Medicinal plants, Ethnobotany, Iran.

INTRODUCTION

Cough is the strong explosive exhalation, which exits the secretions and foreign bodies from tracheobronchial tract. If coughing becomes intense and persistent, it causes discomfort and increases the likelihood of cancer incidence [1,2]. Cough could be intentional or reflexive, and afferent and efferent are involved in its development. Efferent is a recurrent, laryngeal and spinal nerve and afferent is a sensory trigeminal, glossopharyngeal, superior laryngeal and vagus nerve [3].Cough is a common reason for children's referring physicians, and description of previous coughing, the time of exacerbation, and its quality help greatly to diagnosis. Any children on acquire respiratory infection on average 5-8 times a year, each lasting for 6-9 days. Therefore, a healthy child experiences coughing at a variety of intensities on average for 50 days a year [4-6]. Cough is a very important defensive mechanism of upper tract [7-9]. In fact, cough is a very common symptom of pulmonary diseases and the most common symptom which physicians deal with and patients request for healthcare and medical practices for, particularly if cough is chronic (lasts for more than eight weeks) [10-14].Based on the affected location of nervous system, anti-cough drugs are generally divided into two classes, peripheral and central [15]. Peripheral anti cough drugs cause suppression of responding in one or more sensory receptors of vagus nerve that produce cough [16,17]. Central anti cough drugs act in central nervous system at brainstem surface where basal neural circuits responsible for creating cough reflex are located

[18-21]. However the chemical drugs of use lead consistently to unpleasant side effects which make their use somehow limited. This encourages researchers and healthcare community to identify the naturally derived drugs with no side effects and also with higher efficiency. In this regard, medicinal plants are valuable natural resources which have long been used to treat different diseases. Further, their therapeutic effects have been studied and confirmed for fungal [22-36] and neurological [37-43] diseases, diabetes [44], respiratory diseases [45-47], hyperlipidemia and obesity [48-50], children's diseases [51], liver diseases [52,53], cardiovascular diseases [54], and other disorders and diseases [55-68].

However, many of their specific therapeutic effects have been addressed only in traditional medicine and have not yet been investigated and confirmed in clinical trials. Therefore, since the prevalence of cough incidence in both children and adults and the significant role of medicinal plants in preventing and treating various diseases, this study is aimed to identify and report the plants that are used to relive and treat cough in traditional culture and ethnobotany of Iran's different regions.

MATERIALS AND METHODS

In this review article, the key words including ethnobotany, ethnopharmacology, ethnomedicine, phytopharmacology, phytomedicine, traditional medicine, and Iran combined with cough, upper respiratory tract, and children were searched for in Web of Science, PubMed, Scopus, International Science Citation Center, and Magiran. Duplicate articles and the articles with no accessible full text were excluded from analysis.

RESULTS

The present study indicated that Iran's people of different cultures and in various regions such as West Azarbaijan, Ilam, Kerman, Persian Gulf, Khouzestan, Sistan, northern Iran, Kazeroun, Marivan, Natanz, and Lorestan totally use 51 medicinal plants in traditional medicine to specifically treat cough. Most of the identified plants were from Lamiaceae family. Table 1 gives further data on the medicinal plants effective on cough.

Table 1. Medicinal plants effective on cough in different subcultures and regions of Iran

Number	Scientific name	Family	Persian name	Used organs	Province
1	*Artemisia aucheri Boiss.*	Asteraceae	Dermane	Leaves	West Azarbaijan [69]
2	*Brassica Napus L.*	Brassicaceae	Kolza	Leaves	West Azarbaijan [69]
3	*Nymphaea alba L.*	Nymphaceae	Nilofar	Leaves	West Azarbaijan [69]
4	*Ziziphora spp*	Lamiaceae	Kakouti	Flower	West Azarbaijan [69]
5	*Rhamnus pallasii Fisch. & C. A. Mey*	Rhamnaceae	Siah tangers	Fruits	Ilam [70]
6	*Cannabis sativa L.*	Canabinaceae	Shah daneh	Fruits	Ilam [70]
7	*Echinops viscidulus Mozaff.*	Asteraceae	Shekar tiqal	Bulb	Ilam [70]
8	*Ficus carica L.*	Moraceae	Anjir	Fruits	Ilam [70]
9	*Thymbra spicata L.*	Lamiaceae	Avishan zoufaei	Leaves and shoot	Ilam [70]
10	*Vicia angustifolia L.*	Fabaceae	Mashak bargpahn	Fruit	Ilam [70]
11	*Acinus graveolens*	Lamiaceae	Sheng	Fruit and seeds	Kerman [71]
12	*Adiantum capillus veneris*	Adiantaceae	Par siavashan	Leaves	Kerman [71]
13	*Lallemantia royleana*	Lamiaceae	Balang	Leaves and seeds	Kerman [71]
14	*Descurania sophia* (L.)Webb & Berth.	Brassicaceae	Khakeshire irani	Seeds	Persian Gulf [72]
15	*Ficus carica L.*	Moraceae	Anjir khoraki	Fruits	Persian Gulf [72]
16	*Plantago coronopus subsp commutata L.*	Plantaginaceae	Barhang shakhegavazni	-	Persian Gulf [72]
17	*Solanum nigrum* L.	Solanaceae	Tajrizi	Shoots	Persian Gulf [73]
18	*Allium Akaka S.G.Gmel.*	Amaryllidaceae	Tare kouhi	All organs	Khouzestan [73]
19	*Dorema ammoniacum*	Apiaceae	Vosha	Resin	Khouzestan [73]
20	*Kelussia odoratissima* Mozaff.	Apiaceae	Karafs kouhi	All organs	Khouzestan [73]
21	*Artemisia maritime L.*	Asteraceae	Dermaneh	Flowering shoot	Khouzestan [73]
22	*Carthamus tinetorius L.*	Asteraceae	Golrang	Flowers	Khouzestan [73]
23	*Centurea depressa*	Asteraceae	Gole gandom	Stem	Khouzestan [73]
24	*Brassica napus L.*	Brassicaceae	Shalgham	Seed and root	Khouzestan [73]
25	*Raphanus sativus L.*	Brassicaceae	Torb	Glandular root	Khouzestan [73]
26	*Alyssum campestre L.*	Brassicaceae	Ghodoumeh	Seed	Khouzestan [73]
27	*Hyssopus officinale L.*	Lamiaceae	Zoufa	Flowering shoot	Khouzestan [73]
28	*Lallementia iberica L.*	Lamiaceae	Balang	Fruits and seeds	Khouzestan [73]
29	*Thymus serpyllum L.*	Lamiaceae	Avishan	Aerial organs	Khouzestan [73]
30	*Thymus vulgaris L.*	Lamiaceae	Avishan	Aerial organs	Khouzestan [73]
31	*Alhagi pseudalhagi*	Papilionacea	Toranjabin	-	Khouzestan [73]
32	*Astragalus gossypinus Fisch.*	Papilionacea	Katira	Gum	Khouzestan [73]
33	*Amygdalus communis L.*	Rosaceae	Badame talkh	Fruits	Khouzestan [73]
34	*Foeniculum vulgare*Mill.	Apiaceae	Razianeh	Flowers and seeds	Sistan [74]

35	*Malva sylvestris L.*	Malvaceae	Panirak	Flowers and leaves	Sistan [74]
36	*Thymus sp.*	Lamiaceae	Avishan	Aerial organs	Northern Iran [75]
37	*Adianthum capillus-veneris L.*	Adiantaceae	Pare siavashan	-	Kazeroun [76]
38	*Plantago amplexicaulis Cax.*	Plantaginaceae	-	-	Kazeroun [76]
39	*Plantago coronopus subsp.commutata* (Guss.) *pilger*	Plantaginaceae	Barhange	-	Kazeroun [76]
40	*Amygdalus elaeagnifolia*	Rosaceae	Badame kouhi	-	Kazeroun [76]
41	*Anchusa italica Retz.var. italica.*	Boraginaceae	Gavzaban	All organs	Marivan [77]
42	*Malva neglecta Wallr.*	Malvaceae	Panirak mamouli	Flowers and leaves	Marivan [77]
43	*Astragalus gossypinus Fisch.*	Fabaceae	Gavane sefid	Gum	Natanz Kashan [78]
44	*Astragalus verus Olivier.*	Fabaceae	A type of gavan	Gum	Natanz Kashan [78]
45	*Allium haementhoides*	Liliaceae	Sourpa	Aerial organs	Lorestan [79]
46	*Allium ursinum*	Liliaceae	Sire kouhi	Bulbs	Lorestan [79]
47	*Althaea officinalis*	Malvaceae	Gole khatmi	Flowers	Lorestan [79]
48	*Anchusa italica*	Boraginaceae	Gavzaban	Flowers	Lorestan [79]
49	*Eucalyptus comaldulensis L.*	Myrtaceae	Okaliptus	Leaves	Lorestan [79]
50	*Falcaria vulgaris*	Apiaceae	Ghazyaghi	Aerial organs	Lorestan [79]
51	*Malva neglecta*	Malvaceae	Panirak	Seeds	Lorestan [79]

DISCUSSION

In this review article conducted to identify the effective medicinal plants on cough in traditional culture and ethnobotany of different regions across Iran, the findings indicated that 51 medicinal plants contribute to specific treatment of cough. The number of these plants somehow indicates the high richness of Iran's medicinal plants and traditional medicine, addressing use of natural resources to treat various diseases including respiratory diseases and their symptoms and associated problems for a long time. Further, pharmaceutical companies of Iran that produce chemical drugs and medicinal herbs are currently producing medicinal herbs that are effective on cold and the associated symptoms such as rhinorrhea and cough, so that they may be able to replace chemical drugs with plant-derived ones. In this regard, a variety of anti-cough herbal medicines are produced by pharmaceutical industry in Iran, including avipect, thymex, ocaliptus inha, bronchotidi, thymian, thymikeld, ocaliptus dineh, B. B. Kold, bronchosin, tosionin, lickofar, tosigul, menthol, and tosian. All of these herbal medicines have been derived from Iran traditional medicine and have recently introduced into pharmaceutical market. However, many of the medicinal plants identified in this study remain to be known and their anti-cough effects have not been yet investigated and confirmed in clinical trials.

Cough could be due to a variety of reasons such as infectious, viral, bacterial, and fungal diseases. Since many of the plants in this study are antimicrobial plants of Iran and contain effective antimicrobial compounds, their contribution to treating cough could be attributed to their antimicrobial property [810,81].Most of the identified plants were from Lamiaceae and Sunflower families which contain phenolic compounds and could exhibit significant antimicrobial and anti-inflammatory effects [82,99]. In fact, the phenolic compounds existing in these plants could relieve cough by reducing microbial load and hence inflammation of upper respiratory tract thanks to exerting their antimicrobial and anti-inflammatory effects [100]. It should be noted that usually the plants which have phenolic compounds possess antioxidant activities which these properties [100-108]. Numerousness of the plants of this review study have anti-microbial activity of important infectious diseases[109-129].may also be involved in their effects Therefore, researchers can do complementary studies on the plants from these families whose therapeutic effects on cough have not been yet investigated, considering the plants used to treat cough in Iran's traditional medicine, and conduct clinical trials to develop the anti-cough herbal medicines and help to make them commercially available.

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