

Antimicrobial Activities of Medicinal Plant on the Oral Diseases

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ABSTRACT

Herbal therapy has long been used to treat and control human diseases including mouth diseases and disorders. Also, it can minimize the potential side effects of chemical drugs. However, may be a side effects appear from plants or herbs therapy. Most of the challenges with herbal therapy revolves around inadequate information about the effect of herbs in the mouth, the mechanism of action, and potential side effects. There are several herbs and plants described in this paper that have anti-bacterial, anti-viral, anti-fungal, anti-disorders and anti-inflammatory in oral cavity. It includes 31 medicinal plants and herbs: Alakata pepper, Aloe vera, Airy shaw, Banana plant, Bird eye view, Bitter leaves, Bush pepper, Camelina, Cashew nut, Castor, Cinnamon, Clove, Common coleus, Common wire weed, Cypress, Fennel, Garcinia, Garden eggplant, Garlic, Ginger, Holy basil, Maca, Mint, Mexican tea, Neem, Okra, Onion, Orange fruits, Purple coneflower, Sunset shrub and Turmeric that act as alternative management option to current treatments for oral conditions such as caries, gingivitis, periodontitis, oral ulcers. In addition to, inflammation treatment after extraction, reduction dry mouth, pain, anesthesia, ill-fitting dentures. The current review of literature provides a summary of secondary metabolites most commonly used medicinal herbs and plants in maintaining oral health. They can be used in different forms such as mouthwashes, toothpastes, topical agents or local drug delivery devices. These findings show the role of antioxidant secondary metabolites in inhibiting the growth of oral pathogens and reducing oral diseases and mouth disorders.

KEYWORDS: Herbs, Phytochemicals, medicinal plants, essential oils, oral health.

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INTRODUCTION

Medicinal plants and herbs produce chemicals as primary or secondary metabolites that have beneficial and good health effects that why are used effectively to treat oral diseases and disorders [1, 2, 3, 4]. Specifically, it is the secondary metabolites that exert therapeutic actions in humans [5, 6, 7]. It has been stated that a good percentage of the entire plant species, at one time or another, are used for medicinal purposes necessarily due to the type of secondary metabolite they contain [8, 9,10,11]. These plants origin drugs have saved lives of many residents of developing countries because of their good effects in treating many infectious and noninfectious chronic diseases [12, 13, 14, 15]. The global need for alternative prevention and treatment options and products for oral diseases that are safe, effective, and economical comes from the rise in disease incidence, increased resistance by pathogenic microorganisms to

currently used antibiotics and chemotherapeutics, opportunistic infections in immune-compromised individuals, and financial considerations [16, 17, 18]. Generally, there is a real need for alternative natural preventative products for treatments of oral illnesses that are safe and highly effective [19, 20, 21, 22]. For example, microbial resistance to most (if not all) of the antibiotics commonly used to treat oral infections (penicillin and cephalosporin, erythromycin, tetracycline and derivatives, and metronidazole) has been documented [23, 24, 25, 26, 27,28]. These drugs also alter oral microbiota and have undesirable side effects such as vomiting, diarrhea, and tooth staining. The herbal products today confirm their safety use in contrast to the synthetic drugs that are regarded as unsafe to human and environment [29, 30, 31]. This review presents a comprehensive compilation of traditional medicines or phytochemicals extracts that inhibit the growth of oral

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pathogens, dental plaque and decrease the warning sign of oral illnesses [32, 33, 34]. Further, the review also revealed that information related to antimicrobial components and their beneficial role in treating oral diseases and improving the oral health.

METHODS

The current review focus on the antimicrobial and beneficial effects of secondary metabolites derived from medicinal herbs and plants in oral health. A literature search is carried out on Scopus, PubMed, Google Scholar, Elsevier, and Springer using the following keywords: oral health, essential oils, medicinal herbs, medicinal plants, phytochemicals, periodontitis, dental caries, dental plaque, gingivitis, microbial infections. The inclusion criteria were original research papers, studies among various herbal and plants products. All the articles were selected based on herbal products in dentistry. They are determined by article title, abstract and complete article. The useful and effective data

and articles that related to the treatment of disorders and diseases in oral cavity were selected and reviewed.

RESULTS

A total of 31 medicinal plants were identified, which are used in the management of problems in forms of toothache, sore throat, mouth sores, mouth ulcers, bullous lesion abscess, broken tooth, dentine sensitivity, mouth thrush, dental caries, gingivitis, sinusitis, tonsillitis, dry mouth, oral syphilis, and oral cancer, 23 medicinal plants (Table1) including leaves, stems, stems barks, seeds, roots, fruits and flowers were most common parts of identified plants used for treatment of the specific oral diseases, and the other 8 medicinal plants (Table 2) including the management of the medicinal plants in oral problems, used in the forms of toothache, sore throat, mouth sores and dry mouth. The frequency and percent of the plant parts used for oral treatments (leaves, stems, stems barks, seeds, roots, fruits and flowers) in addition to whole medicinal plants used for treatment of oral diseases and oral problems are recorded (Table 3).

Table 1: The Main Medicinal Plants Specific for Treatment of the Oral Diseases.

No.	Plant name		Plant parts used	Name of essential components	Forms of preparations for treatments	Oral disease treated
	Common name	Scientific name				
1	Mint (sweet basil)	<i>Ocimum basilicum</i>	Leaves	Methyl eugenol	Solution / mouth wash	Sinusitis
2	Bush pepper	<i>Piper guineense</i>	Fruits	Alkaloids include piperine	Tooth paste	Dental caries
3	Orange fruits	<i>Citrus simensis</i>	Leaves	Limonene	Decoction / Gargling	Gingivitis
4	Alakata pepper	<i>Aframomum Danielli</i>	Seed	Sesquiterpene hydrocarbons, oxygenated monoterpenes,	Tooth paste / Rubbing	Sore mouth
5	Aloe Barbadosis Miller	<i>Aloe vera</i>	Leaves	Vitamins, enzymes, minerals,	Gel / Rubbing	Gingivitis
6	Banana plant	<i>Musa cavendishit</i>	Roots	Vitamins A and C, minerals	Solution / Drinkable	Sore throat
7	Onion	<i>Allium cepa</i>	Leaves	Onionin A and cysteine sulfoxides	Paste / chewing gum	Sore throat, tooth ache, dental abscess
8	Garden eggplant	<i>Solanum torvum</i>	Leaves / roots	Moisture fat, protein, antioxidants	Mouth rinse / Gargling	Mouth inflammation, dental pain
9	Camelina	<i>Camelina benghalensis</i>	Whole plant	Palmitic acid, oleic acid	Drinkable solution	Dry mouth and thrush
10	Cashew nut	<i>Anacardium occidentale</i>	Unripe fruits	Glycerides of oleic acid	Decoction / Mouth rinse	Oral syphilis
11	Cypress	<i>Cupressus bethanis</i>	Seeds, leaves, barks	Lactic acid	Mouth rinse / paste for brushing	Bullous lesion, toothache
12	Purple coneflower	<i>Echinacea purpurea</i>	Leaves, stems	polysaccharides, glycoproteins, alkamides	Paste for brushing	Toothache, sinusitis, oral cancer
13	Maca	<i>Lepidium meyenii</i>	Roots	Antioxidants	Mouth rinse / gargling	Inflammation

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14	Okra	<i>Hibiscus esculentus</i>	Leaves	Propranolol hydrochloride	Decoction / gargling / hot liquid	Sore throat
15	Garcinia	<i>Garcinia mannii</i>	Stems	Biflavonoids	Direct chewing	Arrest caries
16	Cinnamon	<i>Cinnamomum</i> spp.	Stems bark	Phenylpropene oil	Paste, candy, gum	Caries, periodontitis, candidiasis, toothache
17	Garlic	<i>Allium sativum</i>	Cloves of garlic	Thiosulfonates, allicin	Drinkable solution	Periodontitis, tooth decay, toothache
18	Castor	<i>Ricinus communis</i>	Seeds oil	Propylene, glycol	Mouth wash	Thrush, toothache
19	Fennel	<i>Foeniculum vulgare</i>	Shoots, leaves, seeds	Polyphenols	Tooth paste	Gum diseases
20	Clove	<i>Syzygium aromaticum</i>	Flowers	Eugenol	Toothpaste, mouthwash	Toothaches
21	Turmeric	<i>Curcuma caesia</i>	Cloves, leaves	Curcumin, turmeric	Mouthwash	Gingivitis, gum diseases
22	Neem	<i>Azadirachta indica</i>	Leaves, stems bark	Nimbidin, nimbinin	Toothpaste	Periodontal pockets, gingivitis
23	Holy basil	<i>Ocimum tenuiflorum</i>	Leaves flowers	Eugenol, chlorhexidine	Mouthwash	Gingivitis, periodontal diseases

Table 2: Medicinal Plants Used for the Management of the Oral Problems.

Plant name			Plant parts	Forms of preparations	Method of administration	Oral problems
No.	Common name	Scientific name				
1	Sunset Shrub	<i>Acalypha</i> sp.	Leaves	Boil	Gargling	Toothache
2	Common coleus	<i>Coleus blumei</i>	Leaves	Paste	Brushing	Sore mouth, toothache
3	Common wire weed	<i>Sida rhombofrica</i>	Whole plant	Chewing stick and mouth rinse	Gargling/brushing	Toothache
4	Mexican tea	<i>Chenopodium ambrosioides</i>	Whole plant	Paste	Placing on painful tooth	Toothache
5	Airy Shaw	<i>Ancistrocladus abbreviatus</i>	Stems bark	Boiled bark	Calm down pain after mouth rinse	Toothache
6	Bird eye view	<i>Aspilia africana</i>	Whole plant	Paste	Brushing	Dry mouth, toothache
7	Bitter leaves	<i>Vernonia amygdalina</i>	Leaves	Solution	Gargling	Toothache
8	Ginger	<i>Zingiber officinale</i>	Roots	Solution	Mouth rinse	Toothache

Table 3: The Frequency and Percent of the Plant Parts Used for Oral Treatments.

No.	Part	Frequency	Percent (%)
1	Leaves	15	34.8
2	Stem	5	11.6
3	Bark	4	9.3
5	Seed	4	9.3
6	Root	4	9.3
4	Whole plant	4	9.3
7	Fruit	2	4.7
8	Cloves	2	4.7

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9	Flowers	2	4.7
10	Shoots	1	2.3
Total		43	100

DISCUSSION

Natural products have been recently investigated more thoroughly as promising agents for the prevention of oral diseases, especially plaque-related diseases such as dental caries. Oral diseases, a major health issue in the world, are economically affecting people of developed countries. Medicinal plants play an essential role in primary oral healthcare as they are used to treat wide varieties of oral diseases because they possess antibiotic (antimicrobial) and anti-inflammatory properties. However, the main problems of traditional health practices uses include incorrect diagnosis, incorrect dosage, low hygiene standards, and the absence of written records about the patients. There is a general information concerning the traditional healers do not have any equipment for the diagnoses of oral pains or disorders post treatment pain so assessment thereby depending on the signs and symptoms. Different surveys showed that herbs and medicinal plant species used by the people for the traditional treatment of dental diseases are inadequately screened for the phytochemical efficiency and therapeutic potential for oral diseases and disorders.

CONCLUSION

It was concluded that local herbs treatments have varied and good effects on oral health. The present study provides comprehensive information on therapeutic methods for the treatment of oral diseases and oral problems. The identification of the active ingredients of the plants used and assessment of their efficacy in the treatment may provide some useful leads for the development of new effective drugs in oral diseases and problems treatment.

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