# HERBAL USAGE IN ROOT CANAL IRRIGATION: A REVIEW

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#### **ABSTRACT:**

Endodontic and root canal treatment involves removal of infected tissue and micro organisms for the root canal space to prevent further infection of the periradicular tissues as well as to allow healing of these tissues. This process involves use of some chemical substances for disinfection of root canal space. One of the major advantage of a root canal treatment is to disinfect the root canal system. Irrigation is carried out to reduce the number of bacteria in the root canals. For this purpose, a wide variety of synthetic drugs are available today but due to the ineffectiveness, safety concerns and side effects of these synthetic drugs, the herbal alternatives for endodontic irrigants might be advantageous. Herbal alternatives are popular mainly due to their easy availability, cost effectiveness, increased shelf life and low toxicity. Recently, there has been a growing trend to seek natural remedies as part of dental treatment. This may be termed as ethnopharmacology or phytotherapy.

Thus this review aims at providing a comprehensive overview of the various herbal endodontic irrigants and their efficacy in carrying out root canal irrigation.

Keywords: chlorhexidine, herbs, irrigation, root canal, sodium hypochlorite



# **INTRODUCTION:**

The prime objective of root canal treatment is to clean the root canal system thoroughly, free of microbiota and debris, so that it can be sealed with a microbialtight filling. This process mainly revolves around a process called "chemomechanical preparation", wherein chemically active solutions are used along with mechanical instrumentation of the root canal space [1]. The most commonly used chemical for this process is sodium hypochlorite [NaOCI] in concentrations ranging from 1-6%. The preference for this chemical over other irrigants stems from its unique ability to dissolve pulp tissue, and its excellent antimicrobial potency [2].

Irrigation is carried out to reduce the number of bacteria in the root canal system and to control the periapical disease.[3] The ideal properties of a root canal irrigant are: it should be systemically nontoxic, should not harm the periodontal tissues, should not cause an anaphylactic reaction, should possess a broad antimicrobial spectrum, should be capable of dissolving necrotic pulp tissue, inactivating endotoxins, and either preventing the formation of a smear layer or dissolving it once it has formed.[4] Removing this layer can dissolve attached microbiota and their toxins from root canal walls and reduce the potential for bacterial survival and reproduction.<sup>[5]</sup>

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The weaknesses of NaOCl include the unpleasant taste, toxicity, and its inability to remove the smear layer by itself, as it dissolves only organic material. For this reason Ethylenediaminetetraacetic (EDTA) was used. which effectively demineralises the smear layer [6] but has to be used along with NaOCl to remove the part<sup>[7]</sup> organic and does not have ability.<sup>[8]</sup> disinfective Chlorhexidine is another commonly used antimicrobial agent which is being used to irrigate the canals due to its wide spectrum antimicrobial activity, biocompatibility and ability to disinfect the infected root canals. However it does not have tissue dissolving capabilities<sup>[9]</sup> and also has some undesirable effects as it may discolour the teeth, [10] may lead to dryness of the oral cavity and may even cause burning sensation of the mouth. [11]

To overcome the side effects of the above agents and to meet the requirements of an ideal irrigant, a new agent was introduced known as MTAD. It is an aqueous solution of 3% doxycycline, a broad-spectrum antibiotic; 4.2% citric acid, a demineralizing agent; and 0.5% polysorbate 80 detergent (Tween80). It also has some disadvantages such as high cost, reduced shelf life, less compatibility dental pulp cells. [12] Herbal or natural products have also become more today due popular to their antimicrobial activity, biocompatibility, anti-inflammatory and anti-oxidant properties.<sup>[13]</sup> A wide variety herbal products have been used in the past in medicine. Thus the aim of this review is to enlist and describe the various herbal alternatives available today for use as effective endodontic irrigants.

# **II. Herbal Endodontic Irrigants**

# 2.1 Curcuma longa (Turmeric):

Curcumin, a member of a ginger family possesses anti inflammatory [14], anti oxidant [15], anti microbial [16] and anti activity<sup>[17]</sup>. Α recent suggested that curcumin in aqueous preparations exhibits phototoxic effect against gram positive and gram negative bacteria.[18] In a study conducted by Prasanna Neelakantan, it has been shown that curcumin has significant anti bacterial activity against E.faecalis and can be used as an alternative to sodium hypochlorite for irrigation. Thus this herb can be used especially in endodontics for root canal failure cases.[19]

#### 2.2 Acacia nilotica (Babool):

Acacia nilotica also known as the gum Arabic tree, possesses good anti microbial <sup>[20]</sup>, anti oxidant <sup>[21]</sup>, anti fungal <sup>[22]</sup>, anti viral <sup>[23]</sup> and antibiotic activity <sup>[24]</sup>. In a study by Dhanya Kumar et al, extracts of liquorice, clove, cinnamon, babool were investigated for their anti microbial activity. It was shown that babool at a concentration of 50% had the highest activity against E.faecalis. <sup>[25]</sup>

#### 2.3 Azadirachta indica (Neem):

Neem's anti viral <sup>[26]</sup>, anti fungal <sup>[27]</sup>, anti bacterial <sup>[28]</sup> and anti carcinogenic activity <sup>[29]</sup> makes it a potential agent for root canal irrigation. Furthermore, it also has an anti-adherence activity by altering

bacterial adhesion and ability of organism to colonize <sup>[30]</sup>. Naiyak Arathi et al observed that ethanolic extract of neem had significant anti microbial activity against E.faecalis. <sup>[31]</sup> Use of neem as an endodontic irrigant might be advantageous because it is a biocompatible antioxidant as compared to NaOCI. <sup>[32]</sup>

# 2.4 Propolis:

Propolis is a resin widely used in folk medicine for centuries. Propolis is a resinous material that honeybees [Apis mellifera L.] collect from various plant species and mix with wax and other substances.

Scientific research has revealed its antioxidant. antibacterial. anti- fungal. antiviral, antiinflammatory, anti-tumor and immunomodulating properties<sup>[33]</sup>. possesses anti bacterial activities against streptococcus sobrinus and streptococcus mutans.[34] It also possesses good anti oxidant [35] and anti inflammatory activities [36]. It has been used as a pulp capping agent<sup>[37]</sup>, cariostatic agent <sup>[38]</sup>, as a mouth rinse<sup>[39]</sup> and in the treatment periodontitis<sup>[40]</sup>. Al-Qathami and Al-Madi compared the antimicrobial efficacy of propolis, sodium hypochlorite and saline as an intracanal irrigants and indicated that propolis has antimicrobial activity equal to that of sodium hypochlorite.[41]

# 2.5 Morinda Citrifolia (noni):

Morinda Citrifolia also known as Indian mulberry has a wide range of uses due to its biocompatibility, and anti bacterial, anti inflammatory, anti viral, anti oxidant and analgesic effects. It is one of the first herbal alternatives given for an intra canal irrigant. An in vitro study compared the effectiveness of the juice of MC with NaOCl and Chlorhexidine to remove the smear layer from root canal walls of instrumented teeth. It was concluded that the efficacy of Morinda Citrifolia was similar to NaOCl conjunction with EDTA as an intracanal irrigant [42]. Morinda Citrifolia appears to be the first juice to be identified as a possible alternative to the use of NaOCl as an intracanal irrigant.

#### 2.6 Aloe Vera (Aloe barbadensis miller):

Aloe vera possesses good anti bacterial and anti fungal activity. In a study conducted by Suresh Chandra, anti microbial effect of water, alcohol, chloroform extracts of aloe vera gel were investigated and it was found that chloroform extract of aloe vera had significant anti microbial effect against E.faecalis. [43]

### 2.7 Triphala and Green tea polyphenols:

Triphala is an Indian ayurvedic herbal formulation consisting of dried and powdered fruits of three medicinal plants Terminalia bellerica, Terminalia chebula, and Emblica officinalis. Triphala's fruit is rich in citric acid which helps in removing the smear layer. It's chelating property makes it an effective alternative to sodium hypochlorite for root canal irrigation. [44] Green tea polyphenols have significant anti oxidant, anti cariogenic, anti inflammatory, thermogenic, probiotic and anti microbial properties. [45] Triphala and Green tea

polyphenols are preferred over the traditional root canals irrigants due to their curative properties such as anti oxidant, anti inflammatory and radical scavenging activities. In a study by Madhu Pujar et al, antimicrobial efficiency of triphala, gren tea polyphenols and 3% sodium hypochlorite were compared against and E.faecalis and it was observed that triphala and green tea polyphenols showed significantly better antibacterial activity against 2 week biofilm.

# 2.8 Salvadora Persica Solution (Miswaksiwak):

In a study conducted by Nawal A.K.Al-Sabawi et al, alcoholic extract of Salvadora Persica was compared with 5.25% sodium hypochlorite, 0.2% Chlorhexidine and normal saline. It was shown that Salvadora Persica extract had a significant anti

microbial effect against both aerobic and anaerobic bacteria with its efficacy being maximum at 15%. [47]

#### **CONCLUSION:**

Herbal medicines are used in endodontics and are gaining popularity, as herbs are generally safe if used with proper knowledge, but they can be harmful if misused. Herbs can also be considered for use for endodontic treatment procedures as they have been proved to be effective with minimal side effects. The major advantages of herbal irrigants are safety, easy availability, increased shelf life, cost effectiveness and lack of microbial resistance so far. Combination of irrigants and sequential of use of irrigants will help to achieve all the prerequisites of irrigation of root canal leading to success in root canal treatment.

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