

INTISARI

Karies yang mencapai pulpa pada gigi desidui dapat menyebabkan gigi nekrotik. Pemberian antibakteri (*dressing* intrakanal) merupakan prosedur rutin pada perawatan saluran akar gigi yang bertujuan untuk mensterilkan saluran akar gigi. Bawang putih bersifat biokompatibel dan mengandung *allicin* dan polifenol yang berkhasiat sebagai antibakteri, flavonoid sebagai antiinflamasi dan analgetik serta merangsang pertumbuhan sel sehingga diharapkan dapat menjadi alternatif bahan *dressing*, sebuah upaya dalam pemanfaatan herbal kekayaan lokal. Penelitian ini bertujuan untuk mengkaji potensi bawang putih secara *in vitro* dan klinis sebagai alternatif bahan *dressing* intrakanal pada saluran akar gigi desidui nekrotik yang ditinjau dari aspek biokompatibilitas dan aktivitasnya sebagai antibakteri, antiinflamasi, analgetik serta meningkatkan proliferasi sel fibroblas.

Penelitian terbagi menjadi 3 tahap: tahap I (persiapan sediaan bawang putih), tahap II penelitian secara *in vitro*, dan tahap III secara klinis. Tahap I meliputi identifikasi kandungan ekstrak bawang putih (kualitatif dan kuantitatif) dan preformulasi gel bawang putih. Tahap II berupa uji biokompatibilitas ekstrak bawang putih dan aktivitasnya (antibakteri, penghambatan COX-2 dan TNF-alfa dan proliferasi sel fibroblas gingiva manusia). Tahap III mengkaji secara klinis pengaruh gel bawang putih sebagai bahan *dressing* (biokompatibilitas, antibakteri, antiinflamasi, analgetik dan perbaikan kondisi klinis). Penelitian dilakukan pada subjek anak usia 4-9 tahun berjumlah 36 yang sesuai dengan kriteria inklusi, dibagi menjadi 2 kelompok: kelompok perlakuan gel bawang putih dan kelompok kontrol (*dressing* Ca(OH)₂). Seluruh subjek diberi perlakuan *dressing* selama 7 hari sesuai dengan kelompoknya. Sebelum dan sesudah *dressing* dilakukan pengamatan terhadap jenis dan jumlah koloni bakteri; kuantitas cairan sulkus gingiva (CSG); pH, odor dan keadaan saluran akar gigi; perkusi, palpasi dan keadaan gingiva. Uji *independent t-test* dilakukan untuk menganalisis perbedaan jumlah koloni bakteri, kuantitas CSG, dan perubahan pH. Untuk melihat perbedaan jenis bakteri dan kondisi klinis (perkusi, palpasi, keadaan gingiva, odor dan keadaan saluran akar gigi), dilakukan menggunakan uji *Chi square* dan *Fisher exact probability test*.

Hasil penelitian menunjukkan bahwa gel dengan konsentrasi ekstrak 20% berbasis CMC-Na dan Carbomer (3:1) dapat diaplikasikan sebagai bahan *dressing*. Adapun secara *in vitro* dan klinis memberikan hasil, ekstrak bawang putih memiliki biokompatibilitas yang baik. Secara *in vitro* menunjukkan ekstrak bawang putih memiliki daya hambat terhadap bakteri isolat klinis gigi desidui nekrotik, menghambat ekspresi COX-2 dan TNF α serta merangsang proliferasi sel fibroblas. Secara klinis memberikan hasil, *dressing* gel bawang putih dapat menurunkan jumlah koloni bakteri, CSG dan pH saluran akar gigi; mengurangi jenis bakteri, memperbaiki kondisi klinis gigi (palpasi, keadaan gingiva, odor, dan keadaan saluran akar gigi).

Kesimpulan dari penelitian ini adalah gel ekstrak bawang putih dapat dijadikan sebagai alternatif bahan *dressing* pada perawatan saluran akar gigi desidui ditinjau dari aspek biokompatibilitas dan aktivitasnya sebagai antibakteri, antiinflamasi, analgetik serta perbaikan kondisi klinis gigi.

Kata kunci :gel ekstrak bawang putih, *dressing* intrakanal, biokompatibel, antibakteri, antiinflamasi, analgetik, pertumbuhan sel

ABSTRACT

Caries that reaches the pulp in deciduous teeth can cause necrotic teeth. Intracanal dressing is a routine endodontic procedure aims to sterilize root canal. Garlic is biocompatible and contains allicin and phenolic as an antibacterial, flavonoid as anti-inflammatory, analgesic and stimulates cell growth so that it is expected to be an alternative dressing material, an effort in utilizing local wealth herbs. The aim of this study was to examine the potential of garlic in vitro and clinically as an alternative of intracanal dressing material in the necrotic deciduous teeth root canal in terms of its biocompatibility aspects and its activities as an antibacterial, anti-inflammatory, analgesic and increase fibroblast cell proliferation.

The study was divided into three steps: 1st step was formulation of garlic gel, 2nd step was in vitro study and 3rd step was clinical study. The first step include identification of garlic extract content (qualitative and quantitative) and preformulation of garlic gel. The second step involved the biocompatibility test of garlic extract and its properties (antibacterial, inhibition of COX-2 and TNF-alfa and also proliferation of human gingival fibroblast cell). The 3rd step was a clinical evaluation of garlic gel as an intracanal dressing (biocompatibility, antibacterial, anti-inflammatory, analgesic and the improvement of clinical dental conditions). The study was conducted on 36 children aged 4-9 years old fit in the inclusion criteria, divided into two groups: garlic gel treatment group and control group (dressing Ca(OH)₂). All subjects were treated with dressing for 7 days based on each group. Observation of bacterial types and number of colonies, the quantity of gingival crevicular fluid (GCF), pH, odor and the condition of the root canal teeth, percussion, palpation and gingival condition were performed before and after dressing. The independent T-test was used to analyze differences in the number of bacterial colonies, GCF quantity and pH changes. Chi square and fisher exact probability test were used to see the differences of bacterial types and clinical condition (percussion, palpation, gingival condition, odor, and root canal condition)s.

The result of the study showed that the gel with an 20% extract concentration based on CMC-Na and Carbomer (3:1) gel was applicable as intracanal dressing in children. Both in vitro in clinical studies showed good compatibility of garlic extract gel. The in vitro study proved that garlic extract gel have inhibition ability against isolated bacteria from clinically necrotic deciduous teeth, inhibit COX-2 and TNF-alpha expression and stimulate the proliferation of fibroblast cells. The clinical study showed that garlic gel can reduce of both type and colonies bacterial number, GCF and root canal pH. The use of garlic gel as a dressing intrakanal also improved the clinical konkition of the teeth (palpation, gingival conditions, odor and the root canal the condition).

The conclusion of this study is garlic extract gel has a good potential ability as an alternative intracanal dressing during endodontic treatment in deciduous teeth in terms of biocompatibility and its activities as antibacterial, anti-inflammatory, analgesic as well as the improvement of the clinical conditions of teeth.

Key words: *garlic extract gel, intracanal dressing, biocompatible, antibacterial, antiinflammatory, analgesic, cell growth*