

Intisari

Prosedur preparasi gigi vital untuk pembuatan restorasi gigi tiruan cekat (GTC) mengakibatkan terbukanya tubuli dentinalis sehingga terjadi hipersensitif dentin dan kerusakan odontoblas yang dapat menyebabkan nekrosis pulpa. Kelemahan bahan desensitasi saat ini adalah mudah larut oleh saliva, makanan dan minuman bersifat asam di dalam rongga mulut dan tidak memicu terbentuknya *odontoblast like cell*. Kerang abalon (*Haliotis varia* Linnaeus) mempunyai kandungan arginin tinggi, sehingga diharapkan dapat menjadi alternatif bahan desensitasi yang tidak mudah larut, mampu menutup tubuli dentinalis dengan baik dan memicu aktivitas *odontoblast like cell*. Tujuan penelitian ini adalah mengetahui pengaruh gel desensitasi kerang abalon terhadap penutupan tubuli dentinalis dan aktivitas *odontoblast like cell*.

Ekstraksi kerang abalon dilanjutkan prosedur kromatografi preparatif dan kromatografi lapis tipis. Metode pembuatan sampel dilakukan dengan metode pengendapan (dengan dan tanpa sentrifugasi), pengeringan (*freeze drying* dan oven), penambahan (dengan dan tanpa *protease inhibitor*). Gel dibuat dengan melarutkan 5 mg sampel kering ke dalam 250 μ l CMCNa 1%. Pengujian dilakukan pada karakterisasi ekstrak abalon dan uji *in vitro* pengaruh aplikasi gel abalon terhadap penutupan tubuli dentinalis. Uji *in vivo* dilakukan untuk mengetahui pengaruh aplikasi gel abalon terhadap pembentukan dentin tersier dengan pengecatan imunohistokimia iNOS dan nestin. Data komposisi berat molekul karakterisasi ekstrak abalon dianalisis dengan uji ANAVA satu jalur. Data karakterisasi ekstrak abalon lainnya diuji dengan regresi linier berganda. Data uji *in vitro* dianalisis dengan ANAVA tiga jalur. Data uji *in vivo* dianalisis dengan ANAVA dua jalur.

Uji ANAVA satu jalur menunjukkan perbedaan bermakna ($p < 0,05$) komposisi berat molekul kecil, sedang, besar pada ekstrak abalon. Regresi linier berganda menunjukkan perbedaan bermakna ($p < 0,05$) kadar protein total, arginin, kalsium terhadap penutupan tubuli dentinalis dengan komponen utama adalah kadar arginin yang berpengaruh sebesar 38,9% terhadap penutupan tubuli dentinalis. ANAVA tiga jalur menunjukkan perbedaan bermakna ($p < 0,05$) metode pembuatan gel abalon terhadap penutupan tubuli dentinalis, tertinggi pada kelompok sampel dengan *protease inhibitor* pengeringan oven tanpa sentrifus. ANAVA dua jalur perubahan ekspresi iNOS dan nestin menunjukkan perbedaan bermakna ($p < 0,05$) pada kelompok kontrol, gel abalon (A) fraksi 3 dengan *protease inhibitor* pengeringan oven tanpa sentrifus dan (B) fraksi 3 dengan *protease inhibitor* pengeringan *freeze drying* sentrifus. Kesimpulan penelitian ini adalah gel abalon meningkatkan penutupan tubuli dentinalis dan aktivitas *odontoblast like cell* pada pembentukan dentin tersier, tertinggi pada gel abalon sampel (A).

Kata kunci: hipersensitif dentin, arginin, abalon, penutupan tubuli dentin

Abstract

Vital tooth preparation procedure for making of fixed partial denture restoration (FPD) has caused the open of dentinal tubules later on leading to the dentinal hypersensitivity and the odontoblast damage resulting in pulp necrosis. The weakness of desensitisation material today is solvable by acidic saliva, food and drinking in the oral cavity and does not stimulate the formation of odontoblast like cell. Abalone shells (*Haliotis varia* Linnaeus) contains the high arginine content thus, it is expected to be an alternative of desensitizing material that is not easily dissolved, able to cover the dentinal tubule and stimulate the activity of odontoblast like cell as well. The aim of this research is to observe the effects of abalone shell desensitisation gel on dentinal tubule closure and odontoblast like cell activity.

The process began with abalone shell extraction and followed by preparative chromatography and thin layer chromatography. The method of making samples were carried out by the deposition (with and without centrifuge), drying (freeze drying and oven), addition (with and without protease inhibitors). The gel was prepared by dissolving 5 mg of a dry sample into 250 μ l CMCNa 1%. Analysis were carried out on the characterization of abalone extract and in vitro test of the effect of abalone gel on dentinal tubule closure. An in vivo test was carried out to determine the effect of abalone gel application on tertiary dentin formation by immunohistochemical iNOS and nestin staining. Abalone extract characterization with molecular weight data composition were analyzed by one-way ANOVA. Others abalone extract characterization data were analyzed with multiple linear regression test. In vitro test data were analyzed with three-way ANOVA. In vivo test data were analyzed with two-way ANOVA.

The one-way ANOVA with molecular weight composition parameters of abalone extract characterization showed a significant difference ($p < 0.05$) in the composition of small, medium, large molecular weight. Multiple linear regression showed a significant difference ($p < 0.05$) on the effect of total protein, arginin, calsium levels on dentinal tubule closure with arginin levels as a main component in 38.9% of tubule closure. The three-way ANOVA revealed a significant difference ($p < 0.05$) of abalone gel making methode to dentinal tubule closure, the highest in the sample group with a protease inhibitor oven-drying without centrifuge. Two-way ANOVA results of iNOS and nestin expression change showed a significant difference ($p < 0.05$) between the control group, abalone gel (A) fraction 3 with protease inhibitors oven-drying without centrifuge and (B) fraction 3 with protease inhibitor freeze drying with centrifuge. Thus, it is concluded that abalone gel increases dentinal tubule closure and triggers odontoblast like cell activity for tertiary dentin formation and the highest is in the abalone gel sample (A).

Keywords: dentin hypersensitivity, arginine, abalone, dentinal tubule closure