Aktivitas Antibakteri Ekstrak Kulit Semangka (Citrullus lanatus) Terhadap Bakteri Porphyromonas Gingivalis dan Treponema Denticola in Vitro = Antibacterial Activity of Watermelon (Citrullus lanatus) Peel Extract Against the Bacteria Porphyromonas Gingivalis and Treponema Denticola in Vitro

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Abstrak

Latar Belakang: Penyakit periodontal merupakan salah satu masalah kesehatan gigi dan mulut utama di Indonesia, dengan prevalensi sebesar 74,1% pada tahun 2018. Salah satu penyebab utama dari periodontitis merupakan akumulasi biofilm yang mengalami pematangan menjadi plak di daerah permukaan gigi, khususnya subgingiva yang kaya akan bakteri anaerobik seperti Porphyromonas gingivalis dan Treponema denticola. Maka dari itu, perlu dilakukan tindakan pencegahan dalam menjaga kesehatan gigi dan mulut. Hingga saat ini, agen antiplak gold standard di bidang kedokteran gigi ialah Chlorhexidine 0,2%. Namun, penggunaan Chlorhexidine dalam jangka panjang dapat menyebabkan beberapa efek samping. Oleh karena itu, dicarilah alternatif dari Chlorhexidine sebagai agen antibakteri—salah satunya yaitu kulit semangka. Kulit semangka merupakan bagian buah semangka yang tinggi akan zat fitokimia yang memiliki kemampuan antibakteri, seperti saponin, tanin, alkanoid, flavonoid, dan terpenoid, namun khasiatnya belum banyak diteliti di Indonesia.

Tujuan: Mengetahui dan menganalisa aktivitas antibakteri ekstrak kulit semangka (Citrullus lanatus) dalam menghambat pertumbuhan serta membunuh bakteri Porphyromonas gingivalis dan Treponema denticola, dan membandingkannya dengan kemampuan antibakteri gold standard anti-plaque agent yaitu Chlorhexidine 0,2%.

Metode: aktivitas antibakteri ekstrak kulit semangka terhadap bakteri Porphyromonas gingivalis (ATCC 33277) dan Treponema denticola (ATCC 35405) diamati melalui uji Kadar Hambat Minimum (KHM) dengan mengukur Optical Density dari sampel menggunakan microplate reader dan uji Kadar Bunuh Minimum (KBM) dengan mengukur secara visual koloni bakteri yang terbentuk setelah dipaparkan ekstrak dengan konsentrasi 30%, 20%, dan 10%. Selanjutnya hasil dioleh secara statistik.

Hasil: Ekstrak kulit semangka (Citrullus lanatus) dapat menghambat pertumbuhan serta membunuh koloni bakteri Porphyromonas gingivalis dan Treponema denticola dengan nilai KHM 10% dan KBM 10%. Uji komparatif secara statistik dengan uji One-Way Anova menunjukkan bahwa tidak terdapat perbedaan bermakna antara aktivitas antibakteri ekstrak kulit semangka (Citrullus lanatus) dengan Chlorhexidine 0,2%.

Kesimpulan: Ekstrak kulit semangka (Citrullus lanatus) dapat menghambat pertumbuhan serta membunuh koloni bakteri Porphyromonas gingivalis dan Treponema denticola sehingga dapat dipertimbangkan sebagai alternatif agen antibakteri untuk mencegah penyakit periodontal.

.....Background: Periodontal disease is one of the main oral and dental health diseases in Indonesia, with a prevalence of 74,1% in 2018. The etiology of periodontal disease is multifactorial. One of the main causes is the accumulation of dental biofilm which matures, forming plaque on tooth surfaces, particularly the subgingival area that has an abundance of anaerobic bacteria such as Porphyromonas gingivalis and Treponema denticola. Hence, preventive measures has to be implemented in order to preserve oral and dental health. One way to do so is by regular usage of oral rinses. Chlorhexidine 0,2% is considered to be the gold-standard antiplaque agent in today's dental field. However, long-term use of Chlorhexidine may lead to several side effects. As a result, researchers have begun looking for alternatives to Chlorhexidine as an antibacterial and antiplaque agent—one of which is watermelon peel. Watermelon peel is rich in phytochemicals which possess antibacterial properties, such as saponin, tannin, alkanoid, flavonoid, and terpenoid; however, its benefits have not been studied much in Indonesia.

Goal: To analyze the antibacterial activity of watermelon (Citrullus lanatus) peel extract in preventing the growth and eliminating bacteria colonies of Porphyromonas gingivalis and Treponema denticola as well as comparing them to the antibacterial activity of Chlorhexidine 0,2% as gold standard.

Method: the antibacterial activity of watermelon peel extract against the bacteria Porphyromonas gingivalis (ATCC 33277) and Treponema denticola (ATCC 35405) is observed through the Minimum Inhibitory Concentration (MIC) test by measuring the Optical Density (OD) of the studied samples through a microplate reader, as well as the Minimum Bactericidal Concentration (MBC) test by visually counting the number of colonies formed after being exposed to the extracts at 30%, 20%, and 10% concentration. Afterwards, the data collected is statistically.

Results: Watermelon peel extract is capable of inhibiting as well as eliminating bacterial colonies of Porphyromonas gingivalis and Treponema denticola with MIC score of 10% and MBC score of 10%. Statistical comparative test reveals that there's no significant difference between the antibacterial activity of all sample groups of watermelon peel extract and Chlorhexidine 0,2%.

Conclusion: Watermelon peel extract can inhibit the growth as well as eliminate bacterial colonies of Porphyromonas gingivalis and Treponema denticola, which makes it a considerable alternative as antibacterial agent in order to prevent periodontal diseases.