Pengaruh Pajanan Nitrat Asal Daun Arugula terhadap Pertumbuhan Bakteri Rothia spp. pada Biofilm Saliva Perokok Usia Dewasa Muda = Nitrate Originating from Arugula Leaves in Increasing the Number of Rothia spp. in the Salivary Biofilm of Young Adult Smokers

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Abstrak

Latar belakang: Penelitian terdahulu telah menunjukkan peran penting bakteri Rothia spp. dalam keseimbangan mikrobioma oral. Mikrobioma oral yang seimbang berperan terhadap pencegahan berbagai penyakit rongga mulut. Namun, pengaruh pemberian nitrat terhadap pertumbuhan bakteri tersebut masih belum sepenuhnya dipahami, terutama pada kelompok individu yang memiliki kebiasaan merokok. Merokok dapat mengubah komposisi mikrobiota oral dan memengaruhi metabolisme bakteri, sehingga penting untuk menyelidiki bagaimana pajanan nitrat dapat memodulasi pertumbuhan bakteri ini dalam konteks tersebut. Dasar dilakukannya penelitian ini adalah untuk mengeksplorasi potensi pajanan nitrat yang berasal dari sayur-sayuran dalam meningkatkan jumlah bakteri pereduksi nitrat pada biofilm saliva subjek perokok usia dewasa muda.Tujuan: Melihat potensi nitrat larutan daun arugula dalam meningkatkan pertumbuhan bakteri Rothia spp. pda perokok usia dewasa muda. Metode: Sampel saliva hasil pooling dikelompokkan berdasarkan pH supernatant saliva dan kebiasaan merokok. Kemudian, sampel diberikan pajanan larutan daun arugula dengan konsentrasi nitrat berbeda (6,25 M dan 3,25 M) dan durasi pajanan berbeda (5 dan 9 jam) untuk melihat perubahan terhadap pH supernatant saliva, kadar nitrit saliva dan jumlah bakteri Rothia spp. Pengukuran pH supernatant saliva dilakukan menggunakan kertas strip pH. Pengujian kadar nitrit saliva dilakukan dengan uji griess pada sampel yang merepresentasikan kadar nitratnya. Metode Total Plate Count digunakan untuk menghitung jumlah bakteri Rothia spp. yang tumbuh pada medium spesifik. Untuk memastikan benar bakteri Rothia spp. yang tumbuh, dilakukan pewarnaan gram dan PCR konvensional dengan primer Rothia. Hasil: Tidak terdapat perbedaan yang signifikan antara pajanan larutan daun arugula terhadap kadar nitrit saliva dan jumlah bakteri Rothia spp. Terdapat pola peningkatan kadar nitrit saliva berdasarkan durasi pajanan dengan hasil yang berbanding lurus dengan jumlah bakteri Rothia spp. Kesimpulan: Hasil penelitian menunjukkan pajanan larutan daun arugula mampu mempertahankan dan mengurangi asidifikasi pH supernatant saliva. Secara umum, potensi nitrat asal daun arugula konsentrasi 3,25 M memiliki potensi yang lebih tinggi dibandingkan dengan nitrat asal daun arugula konsentrasi 6,25 M dalam meningkatkan pertumbuhan bakteri Rothia spp.
.....Background:Previous research has shown the important role of Rothia spp. in maintaining the balance of oral microbiome. A balanced oral microbiome plays a crucial role in preventing various oral diseases. However, the effects of nitrate administration on the growth of these bacteria are not fully understood, especially in individuals who smoke. Smoking can alter the composition of oral microbiota and affect bacterial metabolism, making it important to investigate how nitrate exposure can modulate the growth of these bacteria. The basis of this research is to explore the potential of nitrate exposure derived from

vegetables in increasing the number of nitrate-reducing bacteria in the salivary biofilm of young adult smokers. Objectives: The objective of this study is to investigate the potential of nitrate originating from arugula leaves in increasing the number of Rothia spp. bacteria in young adult smokers. Methods: Saliva samples were pooled based on supernatant pH and smoking habit. The samples were then exposed to arugula leaf solution with different nitrate concentration (6,25 M dan 3,25 M) and different exposure durations (5 and 9 hours) to observe changes in supernatant pH, nitrite levels, and the viability of Rothia spp. bacteria. Supenatant pH was measured using pH strips. The nitrite levels in saliva were tested using the Griess assay. The total plate count method was used to calculate the viability of Rothia spp.bacteria growing on specific media. To confirm that the bacteria growing were indeed Rothia spp., gram staining and conventional PCR with Rothia primers were performed. Results: There is no significant difference between the exposure of arugula leaf solution regarding the level of nitrite in saliva and the viability of Rothia spp. This study shows a pattern of increased nitrite levels in saliva according to the duration of exposure, which are linear with the viablity of Rothia spp. Conclusion: The results of the study indicate that exposure to arugula leaf solution can maintain and reduce the acidification of supenatant pH. In general, the nitrate potential of arugula leaves at a concentration of 3,25 M has a higher potential compared to the nitrate potential of arugula leaves at a concentration of 6,25 M in enhancing the growth of Rothia spp. bacteria.