

## INTISARI

*Streptococcus mutans* merupakan bakteri utama penyebab karies gigi, bakteri tersebut menghasilkan enzim glukosiltransferase (GTF) yang dapat mengubah sukrosa menjadi glukosa yang bersifat lengket, sehingga memudahkan perlekatan biofilm pada permukaan gigi. Ekstrak daun stevia (*Stevia rebaudiana* B.) mengandung bahan bioaktif seperti flavonoid, fenol, tanin dan alkaloid yang berpotensi berinteraksi dengan protein, termasuk enzim, sehingga dapat menghambat aktivitas GTF. Penelitian ini bertujuan untuk meneliti kemampuan ekstrak daun stevia dalam menghambat aktivitas enzim GTF bakteri *S. mutans*.

Penelitian ini menggunakan ekstrak daun stevia konsentrasi 5,36%, 2,68%, dan 1,34% sebagai kelompok uji, klorheksidin glukonat 0,12% sebagai kontrol positif, dan akuades sebagai kontrol negatif. Enzim GTF diperoleh dengan menginkubasi suspensi *S. mutans* selama 48 jam, kemudian disentrifugasi selama 30 menit dan disaring dengan membran filter ukuran 0,45  $\mu\text{m}$ . Setiap tabung reaksi diisi dengan 250  $\mu\text{L}$  ekstrak, klorheksidin, atau akuades, ditambah 20  $\mu\text{L}$  GTF, dan 730  $\mu\text{L}$  larutan substrat (sukrosa 1,25%, larutan penyangga kalium fosfat 6,35 mM pH 6,5, dan natrium azida 0,025%). Pengujian setiap kelompok diulang sebanyak tiga kali. Tabung reaksi diinkubasi pada suhu 37°C selama 18 jam, dilanjutkan ultrasonifikasi, dan pengukuran hasil menggunakan spektrofotometer UV-Vis 1800 pada panjang gelombang 550 nm.

Hasil uji One Way ANOVA menunjukkan adanya perbedaan yang signifikan ( $p < 0,05$ ) antar kelompok perlakuan dalam menghambat aktivitas enzim GTF *S. mutans*. Uji *Least Significant Difference* (LSD) juga menunjukkan perbedaan signifikan antara ekstrak daun stevia pada konsentrasi 5,36%, 2,68%, dan 1,34% dibandingkan dengan klorheksidin glukonat 0,12% ( $p < 0,05$ ). Berdasarkan penelitian ini, dapat disimpulkan bahwa ekstrak daun stevia pada konsentrasi 5,36%, 2,68%, dan 1,34% mampu menghambat aktivitas GTF *S. mutans* ATCC 25175, meskipun tingkat efektivitasnya masih lebih rendah dibandingkan klorheksidin glukonat 0,12%. Semakin tinggi konsentrasi ekstrak daun stevia, semakin besar daya hambatnya terhadap aktivitas GTF bakteri *S. mutans*.

**Kata kunci:** *Streptococcus mutans*, ekstrak daun stevia, glukosiltransferase

## ***ABSTRACT***

*Streptococcus mutans* is a primary bacterium responsible for dental caries, producing the enzyme glucosyltransferase (GTF), which converts sucrose into sticky glucans that facilitate biofilm adherence on tooth surfaces. Stevia leaf extract (*Stevia rebaudiana* B.) contains bioactive compounds such as flavonoids, phenols, tannins, and alkaloids that have the potential to interact with proteins, including enzymes, and may influence GTF activity. This study aimed to evaluate the ability of stevia leaf extract to inhibit the GTF activity of *S. mutans*.

This study employed stevia leaf extract at concentrations of 5.36%, 2.68%, and 1.34% as the treatment groups, 0.12% chlorhexidine gluconate as the positive control, and distilled water as the negative control. The GTF enzyme was obtained by incubating *S. mutans* suspension for 48 hours, followed by centrifugation for 30 minutes and filtration using a 0.45  $\mu\text{m}$  membrane filter. Each reaction tube contained 250  $\mu\text{L}$  of stevia extract, chlorhexidine, or distilled water, supplemented with 20  $\mu\text{L}$  of GTF and 730  $\mu\text{L}$  of substrate solution consisting of 1.25% sucrose, 6.35 mM phosphate buffer (pH 6.5), and 0.025% sodium azide. Each experimental group was tested in triplicate. The reaction mixtures were incubated at 37°C for 18 hours, followed by ultrasonication, and the results were measured using a UV-Vis 1800 spectrophotometer at a wavelength of 550 nm.

One-way ANOVA results showed a significant difference ( $p < 0.05$ ) among treatment groups in inhibiting GTF activity of *S. mutans*. The Least Significant Difference (LSD) test also revealed significant differences between all stevia extract concentrations (5.36%, 2.68%, and 1.34%) and 0.12% chlorhexidine gluconate ( $p < 0.05$ ). In conclusion, stevia leaf extract at concentrations of 5.36%, 2.68%, and 1.34% was able to inhibit the GTF activity of *S. mutans* ATCC 25175, although its inhibitory effect remained lower than that of 0.12% chlorhexidine gluconate. Higher concentrations of stevia leaf extract resulted in greater inhibitory activity against *S. mutans* GTF..

**Keywords:** *Streptococcus mutans*, stevia leaf extract, glucosyltransferase