

## INTISARI

*Streptococcus mutans* merupakan salah satu penyebab utama terjadinya masalah kesehatan gigi, yaitu karies. Beberapa bahan alami seperti *Chlorella vulgaris* dan minyak atsiri kulit kayu manis mengandung zat aktif seperti alkaloid, flavonoid, triterpenoid, *cinnamaldehyde*, dan eugenol yang bersifat antibakteri. Kedua bahan tersebut dikombinasikan dengan kitosan yang berperan sebagai zat pembawa obat dengan sifat biokompatibilitasnya sehingga penghantaran obat menjadi lebih baik. Penelitian ini bertujuan untuk mengetahui pengaruh *nanospray* ekstrak *Chlorella vulgaris*, kayu manis (*Cinnamomum burmannii*), dan kitosan terhadap peningkatan diameter zona hambat pertumbuhan bakteri *Streptococcus mutans*.

Metode yang digunakan dalam penelitian ini yaitu difusi cakram (Kirby Bauer) pada media *Mueller Hinton Agar*. Kelompok uji pada penelitian ini yaitu kitosan *spray* (kontrol negatif), *nanospray* kombinasi ekstrak *Chlorella vulgaris*, kayu manis, dan kitosan (perlakuan), dan *Alocclair spray* (kontrol positif). Setiap kelompok uji dilakukan pengulangan sebanyak 9 kali sehingga total sampel yang digunakan sebanyak 27 sampel. Pengujian yang dilakukan di penelitian ini yaitu uji kualitas sediaan dan uji *in vitro* untuk mengetahui diameter zona hambat bakteri *Streptococcus mutans* ATCC 25175. Data penelitian ini dianalisis menggunakan *Kruskal-Wallis* dan *Dunn's test* dengan tingkat signifikansi 95%.

Rerata diameter zona hambat tertinggi pada kelompok *nanospray* kombinasi (31,81 mm), diikuti kontrol positif (25,78 mm), dan kontrol negatif (6 mm). Terdapat perbedaan yang signifikan antar kelompok perlakuan ( $p < 0,05$ ). Berdasarkan analisis *Post Hoc Dunn's Test*, sediaan *nanospray* berpengaruh paling signifikan terhadap diameter zona hambat pertumbuhan bakteri *Streptococcus mutans*. Kesimpulan dari penelitian ini yaitu *nanospray* ekstrak *Chlorella vulgaris*, kayu manis (*Cinnamomum burmannii*), dan kitosan dapat meningkatkan diameter zona hambat pertumbuhan bakteri *Streptococcus mutans*.

**Kata Kunci:** *nanospray*, *Chlorella vulgaris*, kayu manis, kitosan, antibakteri, *Streptococcus mutans*

## ABSTRACT

*Streptococcus mutans* is one of the main causes of dental health problems, namely caries. Several natural ingredients such as *Chlorella vulgaris* and cinnamon bark essential oil contain active substances such as alkaloids, flavonoids, triterpenoids, *cinnamaldehyde*, and eugenol which are antibacterial. Both ingredients are combined with chitosan which acts as a drug carrier so that drug delivery is better. This study aims to determine the effect of nanospray of *Chlorella vulgaris* extract, cinnamon (*Cinnamomum burmannii*), and chitosan on increasing the diameter of the *Streptococcus mutans* bacterial growth inhibition zone.

The method used in this study was disc diffusion (Kirby Bauer) on Mueller Hinton Agar media. The test groups in this study were chitosan spray (negative control), nanospray combination of *Chlorella vulgaris* extract, cinnamon, and chitosan (treatment), and Alocclair spray (positive control). Each test group was repeated 9 times so that the total sample used was 27 samples. The tests conducted in this study were the quality test of the preparation and in vitro test to determine the diameter of the inhibition zone of *Streptococcus mutans* ATCC 25175 bacteria. Data were analyzed using the Kruskal-Wallis and Dunn's test with a 95% significance level.

The highest inhibition zone diameter was in the combination nanospray group (31.81 mm), followed by the positive control (25.78 mm), and the negative control (6 mm). There was a significant difference between treatment groups ( $p < 0.05$ ). Based on the Post Hoc Dunn's Test, the nanospray preparation had the most significant effect on the diameter of the inhibition zone of *Streptococcus mutans* bacterial growth. This study concludes that nanospray of *Chlorella vulgaris* extract, cinnamon (*Cinnamomum burmannii*), and chitosan can increase the diameter of the *Streptococcus mutans* bacterial growth inhibition zone.

**Keywords:** nanospray, *Chlorella vulgaris*, cinnamon, chitosan, antibacterial, *Streptococcus mutans*