

PENGARUH KOMBINASI ASAM MALAT DAN ASAM GALAT SEBAGAI BAHAN *BLEACHING* TERHADAP PERUBAHAN WARNA GIGI

INTISARI

Bleaching merupakan perawatan untuk mengurangi diskolorasi gigi menggunakan bahan berbasis peroksida. Karbamid peroksida 10% merupakan bahan *bleaching* komersial yang digunakan pada prosedur *at-home bleaching*. Penelitian pendahuluan menyatakan bahwa efek pemutihan karbamid peroksida 10% setara dengan asam malat 1%. Namun, penggunaan bahan tersebut menimbulkan penurunan kekerasan dan kekasaran gigi akibat radikal bebas. Maka dari itu, diperlukan bahan pendamping berupa antioksidan yang mampu menangkal radikal bebas yakni asam galat. Tujuan penelitian ini adalah untuk mengetahui pengaruh aplikasi asam malat 1% + asam galat 1% sebagai bahan *bleaching* terhadap perubahan warna gigi.

Digunakan 21 spesimen gigi premolar rahang atas dan rahang bawah dengan kondisi gigi utuh, tidak karies, tidak memiliki tumpatan, dan tidak pernah dilakukan perawatan ortodonti. Dilakukan perendaman spesimen di dalam larutan kopi selama 14 hari untuk membuat diskolorasi. Kemudian, pengukuran warna gigi awal menggunakan spektrofotometer. Spesimen terdiri dari tiga kelompok perlakuan ($n=7$), yaitu karbamid peroksida 10%, asam malat 1%, dan asam malat 1% + asam galat 1%. Bahan *bleaching* diaplikasikan selama 6 jam per hari selama 14 hari. Spesimen direndam dalam larutan salin dan disimpan di inkubator dengan suhu 37°C. Lalu, spesimen diuji warna akhir menggunakan spektrofotometer.

Hasil penelitian menunjukkan efek pemutihan pada ketiga kelompok (karbamid peroksida 10%, asam malat 1%, dan asam galat 1% + asam galat 1%) adalah sama. Berdasarkan uji *Saphiro-Wilk* dan *Levene's Test*, data terdistribusi normal tetapi tidak homogen. Uji dilanjutkan dengan *Kruskal-Wallis* dan didapatkan tidak adanya perbedaan yang bermakna pada kelompok karbamid peroksida 10%, asam malat 1%, dan asam galat 1% + asam galat 1%.

Kata kunci: *bleaching*, *at-home bleaching*, asam malat, asam galat, karbamid peroksida, perubahan warna gigi.

EFFECT FROM COMBINATION OF MALIC ACID AND GALLIC ACID AS A BLEACHING AGENT ON TOOTH DISCOLORATION

ABSTRACT

Bleaching is a treatment to reduce tooth discoloration using peroxide-based materials. Carbamide peroxide 10% is a commercial bleaching agent used in at-home bleaching procedures. Preliminary research suggests that the whitening effect of 10% carbamide peroxide is equivalent to 1% malic acid. However, the use of these materials causes a decrease in the hardness and roughness of teeth due to free radicals. Therefore, additional ingredients are needed in the form of antioxidants that can prevent free radicals, namely gallic acid. The aim of this study was to determine the effect of application of 1% malic acid + 1% gallic acid as a bleaching agent on changes in tooth color.

Twenty one specimens of maxillary and mandibular premolars with intact teeth, no caries, no fillings, and no orthodontic treatment were used. The specimen was soaked in coffee solution for 14 days to create discoloration. Then, the initial tooth color is measured using a spectrophotometer. The specimens consisted of three treatment groups (n=7), namely 10% carbamide peroxide, 1% malic acid, and 1% malic acid + 1% gallic acid. The bleaching agent is applied for 6 hours per day for 14 days. The specimens were soaked in saline solution and stored in an incubator at 37°C. Then, the specimen is tested for final color using a spectrophotometer.

The results showed that the whitening effect in the three groups (10% carbamide peroxide, 1% malic acid, and 1% gallic acid + 1% gallic acid) was the same. Based on the Shapiro-Wilk test and Levene's Test, the data is normally distributed but not homogeneous. The test was continued with Kruskal-Wallis and it was found that there were no significant differences in the 10% carbamide peroxide, 1% malic acid, and 1% gallic acid + 1% gallic acid groups.

Keywords: bleaching, at-home-bleaching, malic acid, gallic acid, carbamide peroxide, tooth discoloration.