

INTISARI

Protesa maksilofasial dibuat dengan tujuan mengembalikan dan merehabilitasi defek maksilofasial, mengganti struktur ekstra oral yang rusak, cacat ataupun hilang, yaitu Mata, telinga, hidung, bibir, area tulang wajah, kranium dan membantu proses penyembuhan jaringan serta trauma psikologis. *Polyurethane* adalah bahan yang umum digunakan dalam pembuatan prothesa maksilofasial ekstraoral. Kelebihan *polyurethane* yaitu tidak mudah robek atau rusak, kemampuan elongasi material yang baik, pengerutan minimal saat polimerisasi, tekstur permukaan dan kekerasan berada pada rentang kulit manusia, membutuhkan sedikit instrument dalam pembuatan, kekuatan tensil optimal, serta proses pewarnaan yang mudah. Dalam penggunaannya, bahan ini memiliki kekurangan yaitu sering ditemukan mikroorganisme yang menempel seperti *Candida albicans* dan dapat berubah warna karena radiasi sinar ultraviolet. Nanopartikel titanium dioksida (TiO_2) memiliki sifat antimikroba khususnya terhadap *Candida albicans* karena memiliki kemampuan fotokatalisis dan mampu menghambat degradasi serta pemudaran warna pada *Polyurethane*. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian TiO_2 pada plat *polyurethane* terhadap pertumbuhan koloni *Candida albicans* dan perubahan warna *polyurethane*.

Sampel terdiri dari 9 kelompok perlakuan yaitu 1 (satu) kelompok kontrol, 4 (empat) kelompok penambahan titanium dioksida filler (1%, 2%, 3%, 4%) dan 4 (empat) kelompok penambahan titanium dioksida coating (1%, 2%, 3%, 4%). Sampel perlakuan berupa *polyurethane* dengan tambahan filler dan tambahan coating TiO_2 . Kedua jenis sampel dilakukan uji karakteristik menggunakan FTIR. Selanjutnya dilakukan uji pengukuran warna menggunakan CIEL*a*b* dan uji perlekatan *C. albicans*. Data dianalisis menggunakan uji Manova dan uji *post hoc* Gomes Howell.

Hasil uji Manova menunjukkan nilai $F = 17,784$ dengan $p < 0,05$ sehingga dapat disimpulkan terdapat pengaruh pemberian titanium dioksida (TiO_2) metoda filler dan coating pada plat *polyurethane* terhadap pertumbuhan koloni *Candida albicans* dan ketahanan warna. Uji *post hoc* Gomes Howell menunjukkan kelompok penambahan filler dan coating berbeda pada perlekatan *C. albicans* dan perubahan warna terhadap kelompok kontrol. Kesimpulan: terdapat pengaruh pemberian titanium dioksida (TiO_2) metoda filler dan coating pada plat *polyurethane* terhadap pertumbuhan koloni *Candida albicans* dan ketahanan Warna.

Kata kunci: Plat *polyurethane*, titanium dioksida, *Candida albicans*, Ketahanan warna

ABSTRACT

*Maxillofacial prostheses are made with the aim of restoring and rehabilitating maxillofacial defects, replacing damaged, deformed or missing extra-oral structures, such as eyes, ears, nose, lips, facial bone area, cranium and assisting the process of tissue healing and psychological trauma. Polyurethane is a material commonly used in the manufacture of extraoral maxillofacial prostheses. The advantages of polyurethane are that it is not easily torn or damaged, good material elongation ability, minimal shrinkage during polymerization, surface texture and hardness are in the human skin range, requires little instrumentation in manufacture, optimal tensile strength, and easy coloring process. In its use, this material has drawbacks, which are often found adhering microorganisms such as *Candida albicans* and can change color due to ultraviolet radiation. Titanium dioxide nanoparticles (TiO_2) have antimicrobial properties, especially against *Candida albicans* because they have photocatalytic abilities and are able to inhibit degradation and color fading in polyurethane. This study aimed to determine the effect of TiO_2 application on polyurethane plates on *Candida albicans* colony growth and polyurethane discoloration.*

*The sample consisted of 9 treatment groups, that were 1 (one) control group, 4 (four) groups with titanium dioxide filler addition (1%, 2%, 3%, 4%) and 4 (four) groups with titanium dioxide coating addition (1%, 2%, 3%, 4%). The treatment sample was polyurethane with additional filler and additional coating TiO_2 . Both types of samples were tested for characteristics by using FTIR. Then a color measurement test was performed by using $\text{CIEL}^*a^*b^*$ and the *C. albicans* attachment test. The data were analyzed by using Manova test and Gomes Howell post hoc test.*

*The results of the Manova test showed a value of $F = 17,784$ with $p < 0,05$ so it could be concluded that there was an effect of titanium dioxide (TiO_2) filler and coating method on polyurethane plates on the growth of *Candida albicans* colonies and color retention. The Gomes Howell post hoc test showed that the groups with fillers and coatings addition differed in *C. albicans* adhesion and discoloration compared to the control group. Conclusion: there was an effect of titanium dioxide (TiO_2) filler and coating method on polyurethane plates on the growth of *Candida albicans* colonies and color resistance.*

Keywords: *Polyurethane plate, titanium dioxide, *Candida albicans*, Color resistance*