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Ministry of Higher Education
and Scientific Research
University of Baghdad
College of Dentistry

THE EFFECT OF ADDING BERGAPTEN-FREE CITRUS BERGAMIA ESSENTIAL OIL ON *STAPHYLOCOCCUS AUREUS* ACTIVITY AND SOME MECHANICAL PROPERTIES OF TYPE III DENTAL STONE

A thesis submitted to the Council of the College of Dentistry/University of Baghdad in partial fulfillment of the requirements for the degree of Master of Science in Prosthodontics

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ABSTRACT

Background: A very important field in dentistry to be investigated is the cross-contamination between dental patients and dental personnel especially dental laboratory personnel regarding which dental cast is considered a medium. Many researchers suggested the disinfection of dental stone by substitution a partial percentage of the gauging mixing water with a certain disinfection while ensuring both antimicrobial activity and preserving the properties of dental stone within acceptable limits.

Aim of the study: The research aim is the evaluation of the antibacterial effect of bergamot essential oil incorporation against *staphylococcus aureus*, in addition to evaluate the ultimate compressive strength, diametral tensile strength, initial setting time, linear setting expansion, reproduction of details and compatibility with various impression materials.

Materials and methods: After isolation and identification of *staphylococcus aureus*, pilot study was carried out in order to determine the minimum inhibitory concentration of bergamot essential oil by broth micro dilution method, results of this test were ascertained by both direct colony count and disk diffusion tests. In the main study, (0% as control), (8%) and (10%) concentrations were determined to be incorporated into dental stone mixture. A total of 240 specimens were prepared according to the test and were split into six categories, 30 specimens for each test, each group involved 10 specimens for each concentration. For the compatibility with impression materials test, additional 90 specimens (30 specimens for each impression material) were prepared. Fourier transform infrared spectroscopy analysis was performed in order to detect the availability of any chemical reaction between the essential oil and dental stone.

Results: Broth micro dilution test revealed that the minimum inhibitory concentration is 8%, this finding was ascertained by both direct colony count and disk diffusion tests which both revealed a highly significant difference as compared to the control group. Results revealed a significant improvement in the experimental groups of ultimate compressive strength, diametral tensile strength and initial setting time after addition of both 8% and 10% concentrations. On the other hand, linear setting expansion test results revealed a significant increase after the aforementioned addition. Reproduction of details and compatibility with impression materials tests revealed that all the specimens had met the tests requirement.

Conclusion: Bergamot essential oil was successfully incorporated into dental stone mixture and could act as a potent antibacterial agent against *staphylococcus aureus* to obtain a disinfected dental cast. It seemed that the 8% concentration was beneficial against *it*, which also improved the strength of dental stone and had no adverse effect on the reproduction of details or the compatibility with impression materials properties, however, it caused a reduction in initial setting time and an increase in linear setting expansion.

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بغداد
كلية طب الأسنان

تأثير إضافة زيت البرغموت الخالي من البرغابتن على نشاط المكورات العنقودية الذهبية و بعض الخواص الميكانيكية لحجر الكلس السني من النوع الثالث

رسالة

مقدمة إلى مجلس كلية طب الأسنان/جامعة بغداد كجزء من متطلبات نيل شهادة الماجستير في التعويضات الاصطناعية

من قبل

ليث طاهر عمر

بكالوريوس طب وجراحة الفم والأسنان

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