

**Evaluation of Mechanical and Histological  
Significance of *Nigella Sativa* Oil Extract  
on the Osseointegration of Hydroxyapatite  
Coated cpTi-Implants**

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## ABSTRACT

**Background:** In the recent era, natural plants considered as a promising source of active ingredients with potential therapeutic application and can provide biological molecules which are biocompatible, abundant in source and have low cost which can result in improvement of osseointegration.

**Aim of this study:** The aim of this study is to evaluate the beneficial additive effect gained from dip coating of hydroxyapatite (HA) coated cp Ti implants in black seed oil extract (BSO) on the mechanical and histological properties of bone-implant interface.

**Materials and methods:** 48 cp Ti screw shaped implants (3.0 mm in diameter, 8.0 mm in length) were electrophoretically coated with hydroxyapatite (HA) and then sterilized by gamma irradiation to be implanted in the tibia bone of 12 New Zealand rabbits. The HA coated implants were divided in to two groups of (24) screws distributed on two healing intervals of 6 and 12 weeks. In every healing period each of 6 animals received 4 implants, 2 in each tibia (right & left), the first screw electrophoretically coated with HA within deposition time of 4 min (control) and the second screw electrophoretically coated with HA and dip coated in BSO extract for 5 seconds (experimental). After each healing interval 2 tests were performed: mechanical test using manual torque meter device to remove 20 screw, and histological test for 4 implants removed with bone block for histological study.

**Results:** The mean removal torque values for HA & BSO coated implants was significantly higher than those for implants coated with HA only and over different periods of time. In addition, the

histological analysis showed improved quality of bone response to HA & BSO coated screws.

**Conclusions:** The HA & BSO coated implants showed improved bone maturation represented by better torque resistance compared with those coated with HA only in both healing periods, which indicates that the black seed oil extract enhanced the action of HA by producing osteophilic surface favoring early osseointegration.