

UNIVERSITI TEKNOLOGI MARA

**THE EFFECTS OF *CENTELLA*
ASIATICA EXTRACT ON HUMAN
PERIODONTAL LIGAMENT
FIBROBLASTS CELL LINE (2630)**

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the degree of

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulation of University Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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Abstract

Centella asiatica is a member of a tropical plant family, is known to have medicinal properties such as anti-oxidative stress and anti-inflammation. Since human periodontal ligament fibroblasts (HPLF) play a crucial role in the progression and healing of periodontal tissue inflammation. Therefore enhancing the role of the HPLF would result in promoting and accelerating the healing of periodontal tissues. The present study was designed to assess the effect of different concentrations of aqueous extract of *Centella asiatica* on the proliferation, cytoprotective activity and alkaline phosphatase activity of human periodontal ligament fibroblast in-vitro. Aqueous extract of *Centella asiatica* was prepared and concentrations of 2–40 µg/ml were applied to the human periodontal ligament fibroblasts culture. The viability of human periodontal ligament fibroblast was investigated by MTT cell proliferation assay. The protective effect of *Centella asiatica* against oxidative stress was done by measuring its effect on the H₂O₂-induced cell damage. The differentiation of the periodontal ligament fibroblast cell was assessed by alkaline phosphatase (ALP) expression using Fluorescence Microplate Reader. The data were subjected to statistical analysis using ANOVA and Tukey's post hoc test. The concentration of aqueous extract of *Centella asiatica* that enhances highest proliferation of the human periodontal ligament fibroblast cell was 20µg/ml. The alkaline phosphatase activity of the periodontal ligament fibroblasts was significantly increased after 3 days treatment with *Centella asiatica*. It was also found that *Centella asiatica* extract has a significant anti-oxidative effect against the H₂O₂-induced damage subjected on HPLF at concentrations 10 and 20 µg/ml compared to control group. *Centella asiatica* aqueous extract has growth stimulatory effects of HPLF and enhance the fibroblast osteogenic differentiation. These effects of *Centella asiatica* may be useful in the periodontal therapy.

Keywords: *Centella asiatica*, human periodontal ligament fibroblast, alkaline phosphatase activity, proliferation, oxidative stress, osteogenic differentiation.

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