In vitro and In vivo wound healing studies of methanolic fraction of Centella asiatica extract


Abstract

Ethnomedical relevance. Aftasoula is claimed to be a bioactive compound capable of wound healing. In order to ensure that the pharmacological activity of the extract is translatable and measurable, the present study attempted to evaluate the bioactivity of the extracted extract of Aftasoula. As for the study, the current study evaluates the wound healing efficacy via in vitro scratch assay and in vivo circular wound excision model. Materials and methods. The ethanolic extract was fractionated into seven fractions via vacuum liquid chromatography. The component of interest in the fractions was qualitatively identified using the laser chromatography and the positive fraction containing ethanolic was further quantitated using reverse-phase HPLC. The methanolic fraction was subjected to (i) colourimetric MTT (3-(4,5-dimethylthiazol-2-yl)2,5-diphenyltetrazolium bromide) cytotoxicity assay following incubation with human dermal fibroblast (HDF) and human dermal haemocytes (NHDFC). (ii) alkali 12% well plate scratch assay using HDF and NHDFC cells and (iii) topically applied (4%, 10% and 25%) or as a 0.1 cm circular wound excision model. Data on wound contraction, epithelialisation period, histopathological and histopathological analysis were collected from in vivo model. Results. The results showed that the methanolic fraction of the extract contained a 2-4% alcoholic-based on the results of colometric MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, both HDF and NHDFC showed significant proliferation upon application of the methanolic fraction of extract at concentrations of 10 μg/ml and 0.1 μg/ml. Since all the concentrations tested allowed for more than 50% cell viability, the concentrations chosen for the scratch assays were randomly chosen and designated as highest (100 μg/ml), medium (50 μg/ml) and lowest (10 μg/ml) concentrations. In the scratch assay, the methanolic fraction of extract with concentration of 0.1 μg/ml, 100 μg/ml, showed significant effect on HDF and NHDFC compared to the positive control (p < 0.05). In vivo, it was shown that the methanolic fraction of the extract induced collagen synthesis. Histopathology data also concluded that concentration-dependent effect of the tested extract as a wound healer was present. Conclusions. Taken together, recent findings suggest that methanolic fraction of C. asiatica demonstrated remarkable polyvalent activity, and thus has potential as an efficient wound healer. In conclusion, the claim of the presence of wound healing properties in C. asiatica had well-supported based on the results obtained in this study. © 2016 South African Association of Botanists