

# Cytotoxicity evaluation of *Clinacanthus nutans* through dimethylthiazol diphenyltetrazolium bromide and neutral red uptake assays

La-Onghthong Vajrabhaya<sup>1</sup>, Suwanna Korsuwannawong<sup>2</sup>

**Correspondence:** Mrs. Suwanna Korsuwannawong  
Email: [suwanna.aut@mahidol.ac.th](mailto:suwanna.aut@mahidol.ac.th)

<sup>1</sup>Endodontics Section, Faculty of Dental Medicine, Rangsit University, Pathumthani, Thailand,  
<sup>2</sup>Research Office, Faculty of Dentistry, Mahidol University, Bangkok, Thailand

## ABSTRACT

**Objectives:** The aim of this study was to compare the results of dimethylthiazol diphenyltetrazolium bromide (MTT) and neutral red uptake (NRU) assays of *Clinacanthus nutans* cytotoxicity. **Materials and Methods:** Mouse fibroblast (L929) cells were exposed to 0.01%, 0.1%, 0.25%, and 0.5% (W/V) *C. nutans* in a 96-cluster-well-culture plate for 24 h. The cell viability after exposure to *C. nutans* was determined by MTT and NRU assays in separate tissue culture plates. The two assays were compared through an intra-class correlation coefficient (ICC) analysis. **Results:** No significant differences in cytotoxicity were noted between the two assays ( $P > 0.05$ ). The ICC values for agreement between two assays for the negative and positive control groups and *C. nutans* concentrations of 0.01%, 0.1%, 0.25%, and 0.5% were 0.84, 0.83, 0.77, 0.68, 0.74, and 0.71, respectively. **Conclusion:** In general, the MTT and NRU assays performed similarly, exhibiting moderate to good correlation for the evaluation of the cytotoxicity of *C. nutans*.

**Key words:** *Clinacanthus nutans*, dimethylthiazol diphenyltetrazolium bromide, intra-class correlation coefficient, neutral red uptake

## INTRODUCTION

Herbal ingredients are commonly found in many products, including cosmetics, drugs, foods, and oral hygiene products, such as mouth rinse, toothpaste, and lozenges. Herbal ingredients can exhibit antibacterial effects to maintain health. The essential properties of a given herb should be thoroughly evaluated before its use. For example, the biological properties of herbal substances should be evaluated to exclude the possibility of adverse effects on human tissue. The toxic effects of an herbal substance are of particular concern because the damage caused can not only be acute, such as a degeneration of tissue, but can also be chronic, such as a delay in wound healing.

*Clinacanthus nutans* is widely grown in tropical Asian countries and constitutes an important herbal medicine in Thailand. This plant exerts a potential beneficial effect on wound healing based on evidence provided by practitioners of folk medicine and detailed several scientific reports from Thailand.<sup>[1]</sup> *C. nutans* or Phaya-Yor in Thai [Figure 1] has been

traditionally used in Thailand for the treatment of herpes infections.<sup>[2]</sup> In addition, this herb also exhibits excellent and rapid-acting anti-inflammatory activity, which makes a topical product of *C. nutans*, a valuable natural product for the relief of minor skin inflammation.<sup>[3,4]</sup> However, scientists in Thailand found that dysentery and fever can be treated by this plant. Due to its anti-cell lysis property, the plant has been used as an anti-venom agent for snake and scorpion bites and to remove nettle rashes. In addition, this plant has recently received much attention because of its potential application in cancer treatment.<sup>[5]</sup>

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Vajrabhaya LO, Korsuwannawong S. Cytotoxicity evaluation of *Clinacanthus nutans* through dimethylthiazol diphenyltetrazolium bromide and neutral red uptake assays. *Eur J Dent* 2016;10:134-8.

**DOI:** 10.4103/1305-7456.175701