Rufin Kikakedimau Nakweti et al., Nat Prod Chem Res 2018, Volume 6
DOI: 10.4172/2329-6836-C1-019

Improvement of secondary metabolites from *Phyllanthus odontadenius* against malaria by mutagenesis

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Majority of deaths in children aged less than 5 years are due to *Plasmodium falciparum* malaria. Malaria deaths in children decreased but malaria remains a major killer of children, taking the life of a child every 2 minutes. This study aims to investigate the increase of the *in vitro* antiplasmodial activities by mutagenesis techniques using gamma-rays (Cs-137) or sodium azide (NaN_3) as mutagens. It will allow the importance of mutagenesis use as tools for improvement of secondary metabolites against malarial parasites using chemical or physical mutagens. Aerial parts of plants M1 and M2 from Gamma-rays irradiation of *P. odontadenius* seeds or from immersion of *P. odontadenius* seeds in Sodium azide (SA) solutions were used as biological material for the *in vitro* antiplasmodial analysis. The *in vitro* antiplasmodial activities assays on clinical isolates of *P. falciparum* and on chloroquine-resistant *P. falciparum* strain K1 was determined using microscopic method, isotopic micro-test method and using HRP2-based ELISA assay. Gamma-rays (Cs-137) increased (multiplied) the *in vitro* antiplasmodial activities from 2.48 up to 7.6 in comparison to control. Thus, the *in vitro* antiplasmodial activities were improved or exceeded from 147.57% up to 660% than those of control plant. SA had increased (multiplied) the *in vitro* antiplasmodial activities from 1.24 up to 10.15 comparing to the control plants. The *in vitro* antiplasmodial activities were exceeded compared to the control plants from 24.43% up to 915%. The treatments of *Phyllanthus odontadenius* seeds by Gamma-rays or by SA give plants with high *in vitro* antiplasmodial activities. Values of *in vitro* antiplasmodial activities varied from 1.24 (147.57%) to 10.15 (915%). 125, 150 and 225 Gy of Gamma-rays (Cs-137) for physical mutagenesis and 10.15 and 17.5 mm of SA solutions for the chemical mutagenesis could be used for improving *in vitro* antiplasmodial activities against *P. falciparum* (clinical isolates of *P. falciparum* or chloroquine-resistant *P. falciparum* strain K1). Thus, plants extracts from treated seeds have justified the usefulness of mutagens in plant breeding particularly in the increasing production of secondary metabolite against malarial parasite.

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