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Short Communication

Medicinal Plants from Democratic Republic of the Congo as Sources of Anticancer Drugs

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Abstract

According to the WHO, more than 80% of the population in Africa resort to the traditional medicine for their health care. In the present study, a survey was carried out among traditional practitioners and the most cited plant species was submitted to anti-cancer experiments in vitro. The results revealed that *Gardenia ternifolia* contains secondary metabolites with anticancer activity and is selective towards breast (MCF-7) cancerous cell lines.

Keywords: Botanical Medicine; Cancer; DR Congo; Evidence Based Medicine; Indigenous Knowledge

Introduction

Cancer is a major public health problem all over the world and constitutes the second leading cause of death after cardiovascular disease [1]. Because of serious side effects of both chemo-and radiation therapies, many patients seek alternative and complementary methods of treatment. Several anti-cancer agents derived from plant species (Taxol, Camptothecin, Topotecan, etc. and their derivatives) are in clinical use or in preclinical development (Flavopiridol, Silvestrol, Betulinic acid, etc.) [2].

Democratic Republic of the Congo (DRC) as one of the hotspots of plant biodiversity in the world could play a key role in the R & D of new anti-cancer agents from it flora [3]. The aims of this multidisciplinary research program were:(a)To validate scientifically the traditional use of selected plant species by investigating anti-cancer activity of their extracts as a possible source of anti-cancer hits using human prostate (PC-3) and breast (MCF-7) cancerous cell lines and non-cancerous rat skeletal muscle L6 cell lines as model systems (Scientific evidence based Traditional Medicine); (b)To evaluate the therapeutic index of the biologically active extracts; (c)To develop anti-cancer phytomedicines as a result of the transformation of indigenous/ ethno-medical knowledge into large scale action by the mean of Science and Technology(Research for sustainable development).

Materials and Methods

An ethno-botanical survey was conducted in DRC according to the principles laid out in the Declaration of Helsinki and the Nagoya protocol. Traditional Healers and/or medicinal plant vendors (50) were interviewed about medicinal plants used in Congolese folk medicine [4]. The powdered leaves of *Gardenia ternifolia* were extracted by maceration. Successive extractions were carried out with organic solvents of increasing polarity (Petroleum ether, Chloroform, Ethyl acetate, Methanol and Methanol 80%). Anti-cancer bioactivity of different extracts was assessed by MTT assay. Paclitaxel was used as positive control [5].

Results and Discussion

Ethno-botanical survey revealed that the most cited plant species was *Gardenia ternifolia* (or Lembanzau in Kikongo) with a high value of informant consensus factor (0.361). Biological screening revealed that chloroform and ethyl acetate soluble

fractions are biologically active against MCF-7 cell lines with a CC_{50} (50% cytotoxic concentration) of 21.62±1.6µg/mL and 45.44±2.2µg/mL respectively. For PC-3 cell lines, the CC_{50} were 9.66±2.6µg/ml and 24.47±1.1µg/ml, respectively for chloroform and ethyl acetate extracts. The petroleum ether, methanol and methanol 80% crude extracts were inactive against both MCF-7 and PC-3 cell lines ($50 < CC_{50} < 100$ or $CC_{50} > 100$ µg/ml).The chloroform extract displayed interesting therapeutic index or safety ratio (CC_{50} L6/CC_{50} MCF-7 or PC-3 ≥3).This extract is 3 or 7 times selective in killing the cancerous cell lines (MCF-7 or PC-3) than the non-cancerous cell lines (L6) [5]. This could be due to the different secondary metabolites extracted with the chloroform solvent. (Figure 1)

Figure 1: *Gardenia ternifolia.*

Conclusion

The chloroform extract of *Gardenia ternifolia* decreases the cancerous cell lines density *in vitro*. As potential candidate, *G. ternifolia* could be developed as therapeutic phytomedicine against human prostate and breast cancers. Further studies are therefore in progress to purify and elucidate the structure(s) of bioactive compounds.

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