

Coumarinolignoid and indole alkaloids from the roots of the hybrid plant *Citrus × paradisi* Macfad (Rutaceae) and research of anticancer compounds.

ESSOMBE MALOLO F.A.^{1,2}; KENMOGNE KOUAM A.D.¹; NGO NYOBE J.C.²; NGAH L.²; FRESE M.³, NDOM J.C.¹; LANGAT M. K.⁴; NDJAKOU LENTA B.^{3,5}; MULHOLLAND D.A.⁶; SEWALD N.^{3*}; and WANSI J.D. ^{1,3,*}

¹Department of Chemistry, Faculty of Sciences, University of Douala, Douala P.O. Box 24157, Cameroon

²Department of Pharmaceutical Sciences, Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala P.O. Box 2701, Cameroon

³Organic and Bioorganic Chemistry, Department of Chemistry, Bielefeld University, 33501 Bielefeld, Germany

⁴Royal Botanic Gardens, Kew, Richmond TW9 3AE, UK

⁵Department of Chemistry, Higher Teacher Training College, University of Yaoundé 1, Yaoundé P.O. Box 47, Cameroon

⁶Natural Products Research Group, Department of Chemistry, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford GU2 7XH, UK

* Corresponding authors: Norbert SEWALD. Jean Duplex WANSI. e-mail: jdwansi@yahoo.fr.



POS N° cwcp2023.07e00f9

INTRODUCTION

❑ *Citrus × paradisi* (C.P) is a hybrid of *Citrus maxima* (Burm.) Merr. and *Citrus sinensis* (L.) Osbeck. The plant is reputed for its use as a local treatment of an array of human diseases. For example, it is believed to be effective in cancer prevention, cellular regeneration, lowering cholesterol, detoxification and heart health maintenance. [1-3].

❑ Our recent work on the MeOH extract of the stem bark of *C. × paradisi* led to the isolation of a 23-S-isolimonic acid derivative, as well as coumarin and acridone alkaloids.[4] Here, as part of our continuous study of the phytochemistry and pharmacology of the genus *Citrus*, we present the results of the chemical and biological investigation of the MeOH extract of the roots of the hybrid species *C. × paradisi*.

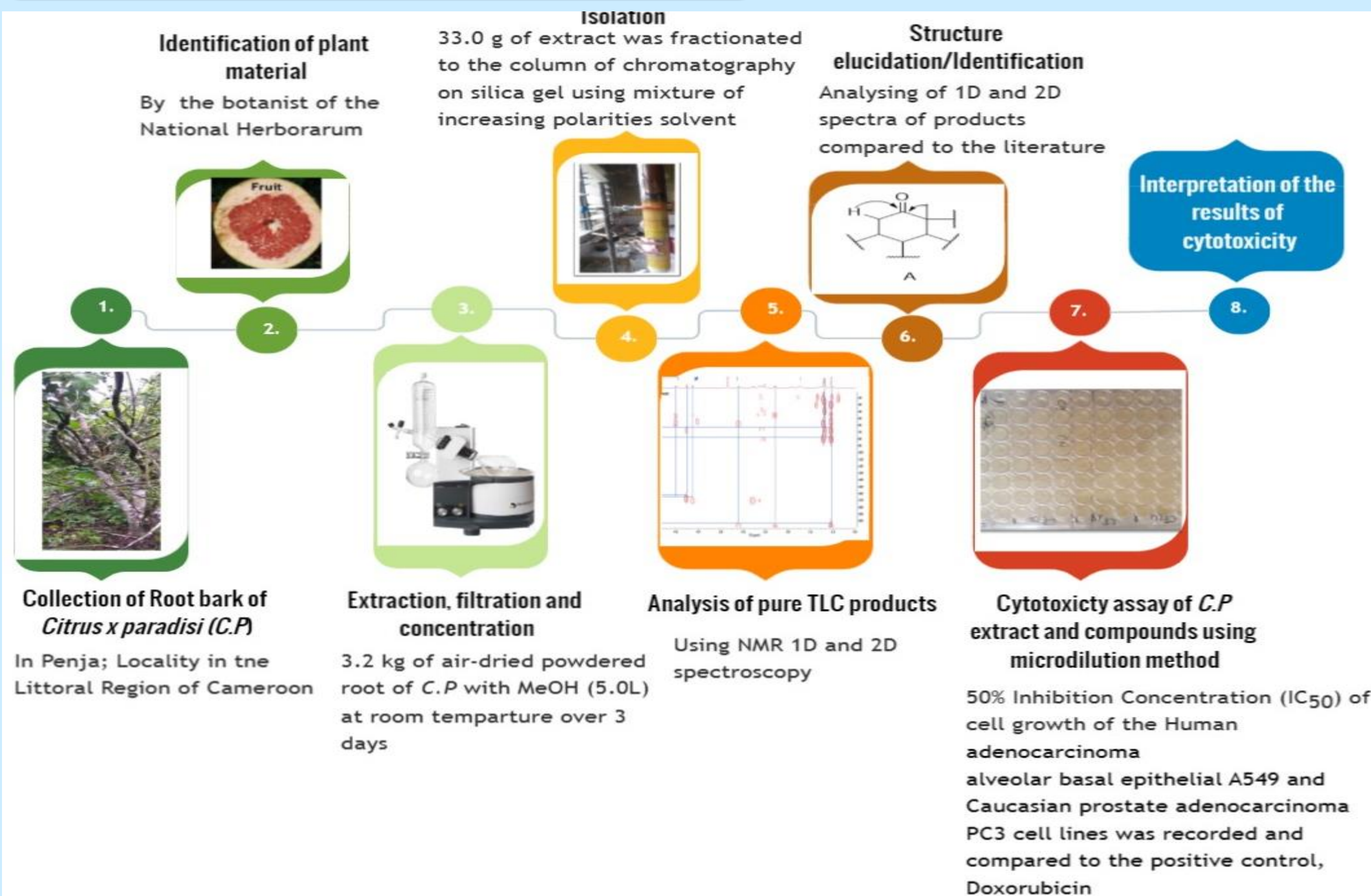
OBJECTIVE

❑ Isolate and identify compounds from hybrid plant with anticancer activities.

BIBLIOGRAPHY

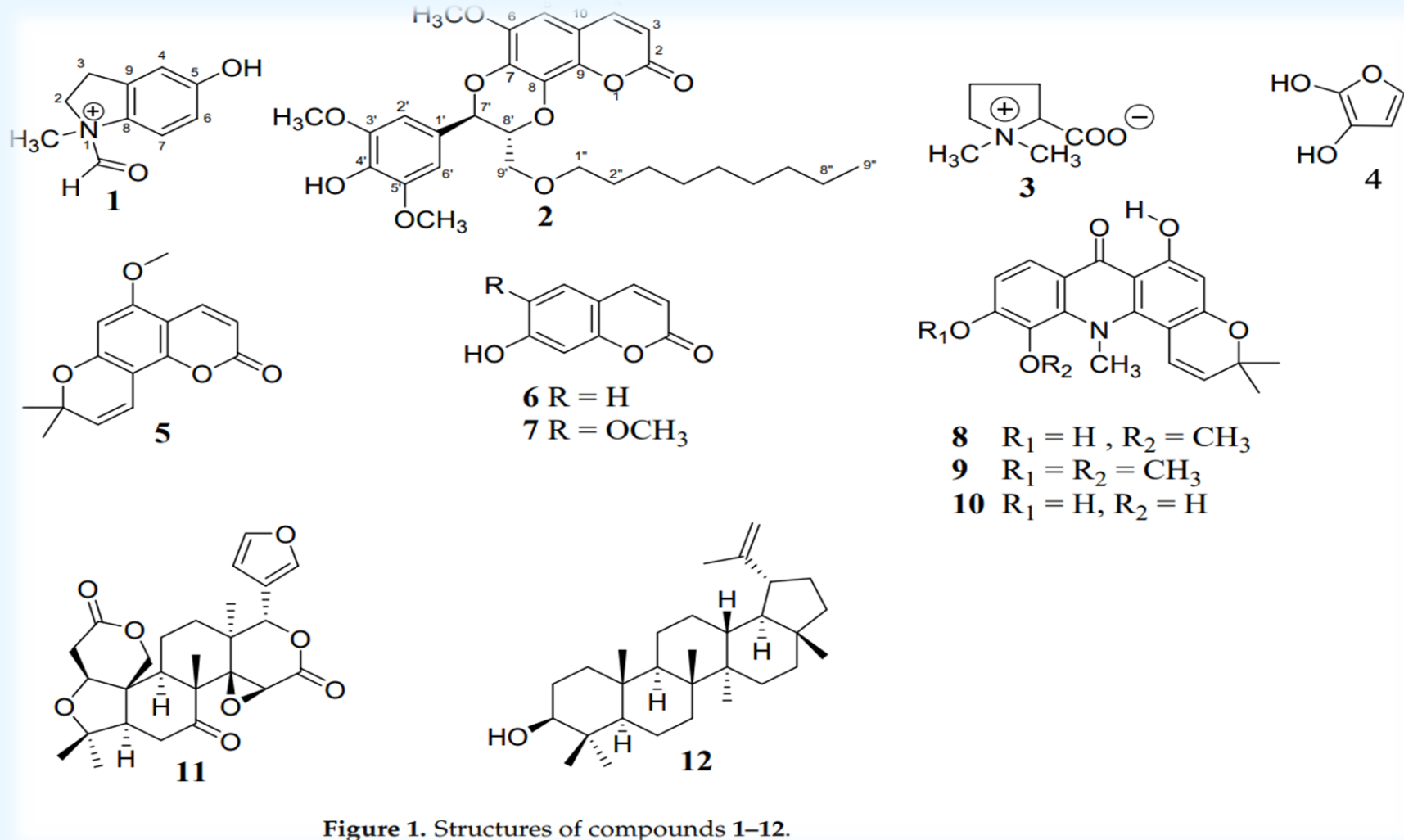
1. Nicolosi, E.; Deng, Z.N.; Gentile, A.; La Malfa, S.; Continella, G.; Tribulato, E. *Citrus* phylogeny and genetic origin of important species as investigated by molecular markers. *Theor. Appl. Genet.* 2000, 100, 1155-1166.
2. Gmitter, F.G., Jr. Origin, evolution, and breeding of the grapefruit. *Plant Breed. Rev.* 1995, 13, 345-363.
3. Adeneye, A.A. Hypoglycemic and hypolipidemic effects of methanol seed extract of *Citrus paradisi* Macfad (Rutaceae) in alloxan-induced diabetic Wistar rats. *Nig. Q. J. Hosp. Med.* 2008, 18, 211-215.
4. Malolo, F.-A.E.; Tabekoueng, G.B.; Tsopgni, W.D.T.; Chimeze, V.W.N.; Kouam, A.K.; Mas-Claret, E.; Langat, M.K.; Ndom, J.C.; Frese, M.; Sewald, N.; et al. Chemical constituents of the stem bark of the hybrid plant *Citrus × paradisi* Macfad. (Rutaceae). *Chem. Biodivers.* 2022, 19, e202101033.

EXPERIMENTAL PART



RESULTS

❑ **2 New compounds isolated (1 and 2) and 10 known.**



❑ **Table: Cell growth inhibitory activity**

Sample	A549	PC-3
1	112.5 ± 11.5 µM	99.5 ± 11.5 µM
2	250.2 ± 10.2 µM	192.7 ± 12.3 µM
3	99.2 ± 9.5 µM	100.2 ± 12.7 µM
4	152.5 ± 11.3 µM	147.3 ± 21.5 µM
5	201.3 ± 13.5 µM	180.2 ± 14.3 µM
6	156.2 ± 18.2 µM	150.2 ± 21.3 µM
7	135.6 ± 21.8 µM	1335 ± 22.6 µM
root extract	35.2 ± 2.3 µg/mL	38.1 ± 2.5 µg/mL
doxorubicin	0.9 ± 0.1 µM	1.6 ± 0.2 µM

Data are represented as mean ± SEM (Standard Error of the Mean) (*n* = 3); IC₅₀ = sample concentration that caused 50% cell growth inhibition.

❑ The MeOH extract showed significant cytotoxicity activities against human adenocarcinoma alveolar basal epithelial A549 and Caucasian prostate adenocarcinoma PC3 cell lines, with IC₅₀ values of 35.2 and 38.1 µg/mL, respectively; the 7 compounds showed weak activity, with IC₅₀ values of 99.2 to 250.2 µM and 99.5 to 192.7 µM, respectively.

ACKNOWLEDGMENT

- ❑ Royal society of Chemistry
- ❑ We thank the Yaoundé-Bielefeld Bilateral Graduate School of Natural Products with Antiparasite and Antibacterial Activity (YaBiNaPA Graduate School) for providing us with research facilities in Cameroon.

e-mail : emjay1@yahoo.fr