PHYTOCHEMICAL AND ANTICANCER SCREENING OF *CITRULLUS COLOCYNTHIS* AND *TALINUM FRUTICOSUM*: POSSIBLE AGENTS AGAINST BREAST, PROSTATE AND CERVICAL CANCERS

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE (M.Sc) DEGREE IN INDUSTRIAL CHEMISTRY IN THE DEPARTMENT OF CHEMISTRY, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY, OTA.

SEPTEMBER, 2021

ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfillment of the requirements for the award of the degree of Master of Science in Industrial Chemistry in the Department of Chemistry, College of Science and Technology, Covenant University, Ota, Nigeria.

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DECLARATION

I, **BAMIDELE**, **JOY OMOWUNMI (19PCC02031)** declares that this research was carried out by me under the supervision of Professor Joseph A. O. Olugbuyiro of the Department of Chemistry, College of Science and Technology, Covenant University, Ota, Nigeria. I attest that the dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation are duly acknowledged.

BAMIDELE JOY OMOWUNMI

Signature and Date

CERTIFICATION

We certify that this dissertation titled "**Phytochemical and Anticancer Screening of *Citrullus colocynthis* and *Talinum fruticosum:* Possible Agents against Breast, Prostate and Cervical Cancers**" is an original research work carried out by **BAMIDELE, JOY OMOWUNMI (MATRIC. NO: 19PCC02031)** in the Department of Chemistry, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of Professor Joseph A. O. Olugbuyiro. We have examined and found this work acceptable as part of the requirements for the award of Master of Science in Industrial Chemistry.

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DEDICATION

This research work is dedicated to God, the Creator of the universe, my source of strength throughout the course of this research study.

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LIST OF ABBREVIATIONS

CC	*Citrullus colocynthis*
TF	*Talinum fruticosum*
CCE	*Citrullus colocynthis* Ethyl Acetate Extract
CCM	*Citrullus colocynthis* Methanol Extract
TFE	*Talinum fruticosum* Ethyl Acetate Extract
TFM	*Talinum fruticosum* Methanol Extract
AR	Androgen Receptor
PF1	Profilin-1
HPV51 E6	Human Papillomavirus51 E6 variant
GLOBOCAN	Global Cancer Observatory
ADMET	Absorption, Distribution, Metabolism, Elimination and Toxicity
GC-FID	Gas chromatography-Flame Ionization Detector
FT-IR Spectroscopy	Fourier Transform Infrared Spectroscopy

ABSTRACT

According to report from Global Cancer Observatory (GLOBOCAN), cervical cancer is rated as one of the most dominant types of cancer in Nigeria. Traditionally, medicinal plants are known to be well utilized in treating cancerous diseases. The research reported herein therefore aimed at screening the extracts of *Citrullus colocynthis* (CC) and *Talinum fruticosum* (TF) for their potential cytotoxic effects against targeted cancer cells. Qualitative phytochemical screening of the secondary metabolites was done. GC-MS analysis of TF extract was engaged to evaluate the compounds for structure-activity relationship (SAR). Twelve compounds were selected for molecular docking.The HeLa cell line, a model of cervical cancer, was then exposed for 24 h then 48 h to a range of concentrations, up to 500 µg/ml, of the ethyl acetate (CCE) and methanol extracts (CCM) of the whole fruit of *C. colocynthis*, followed by cell viability quantification with the [3-(4,5-dimethylthiazol-2-yl)-2,5-dipenyltetrazolium bromide] (MTT) assay. The phytochemical screening confirmed phenols, tannins, flavonoids, cardiac glycosides, saponins, triterpenoids and alkaloids in the sample vegetables. Molecular docking study revealed *Talinum fruticosum* to possess high binding affinity for prostate, breast and cervical cancer treatment through androgen receptor, profiling-1 and HPV51 E-6 inhibition. The preliminary cytotoxicity assay at 24h showed CCE was thrice more potently cytotoxic with an IC_{50} value of 33.95 ± 3.39 (µg/ml) than CCM with an IC_{50} value of 101.59 ± 24.37. The IC_{50} (µg/ml) value for the 48 h treatment was found to be 16.0 ± 5.7 for CCE and 76.3 ± 12.9 for CCM ($p < 0.05$). FT-IR analysis showed important functional groups such as the hydroxyl, alkane, amine, amide and acid functionalities. The findings therefore, suggest that *Citrullus colocynthis* and *Talinum fruticosum* could serve as a potential drug for prostate, breast and cervical.

KEYWORDS: Anticancer, Cancer, *Citrullus colocynthis,* Molecular docking, *Talinum fruticosum*