**Acacia Gums:** **Innovative Metabolites Extraction Techniques for Beating and Understanding Behavior of Human Prostate Cancer (PC3) Cell Lines**

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**Abstract**

Cancer is a leading cause of death (16.2%) in the European Union, costing 0.08% of the gross domestic product. This study focuses on innovative metabolite extraction techniques for Acacia *seyal* gum (natural secondary metabolite), considered a worthy supplier of antioxidants used conventionally in folk medicine. This research aims to investigate the antiproliferative effect of *Acacia seyal* gum extract (ASG) and a blended sample of *Acacia seyal* and *Acacia sengal* (80:20%) as an optimum formula and their active fractions on Human Prostate Cancer (PC3) cell lines, and their antioxidant activities. The approaches include extracting *ASG* and the optimum formula into methanol crude extract. We studied antiproliferative activity on PC3 cell lines for each extract using sulforhodamine B assay (SRB). We analyzed both samples of *ASG* and the optimum formula for its leading bioactive compounds using the high-performance liquids chromatography technique. The results showed an optimum sample (blended) revealed the significantly (p≤0.05) most antiproliferative activity (IC50=11.480±0.0091µg/mL) for methanol crude extract and (IC50=9.694±0.006) for methanol fraction compared to ASG (IC50=11.530±0.0324 µg/mL) for methanol crude extract and (IC50=10.74±0.027) for methanol fraction. Regarding the flavonoid content, we detected only Quercetin as a flavonoid in both samples, approximately 4640 µg/100g of ASG, with almost the binary value of 2560 µg/100g for blended samples. Finally, Acacia gums may have promising leading bioactive compounds such as Quercetin for inhibiting and understanding the behavior of the human prostate (PC3) cell lines.

**Keywords:** Antioxidants activity; Gum Arabic; Prostate Cancer (PC-3) cell lines; Flavonoids Content; High-Performance Liquid Chromatography.

**Speaker's Biography**

**Dr. Elnour** received his B.Sc. degree in Biochemistry (Hon's **first-class 3.50/4.00CGPA**) from the University of Kordofan (**2003**)-Sudan in Biochemistry. He also holds a Master's Degree "Excellent" in Analytical Chemistry (**2007**) from Khartoum University and a Doctorate (PhD) "Excellent/best thesis" in Biotechnology Engineering (2020) from the International Islamic University Malaysia (IIUM). In **2020**, he was appointed as a postdoctoral research fellowship (**PDF**) sponsored by the Islamic Development Islamic Development Bank (IsDB) Merit Scholarship Program (**IsDB-MSP**). His project is entitled "*Cancer-on-a-Chip Base as a New Paradigm Potential Application of Gum Arabic Extraction Toward Development of Breast Cancer Therapeutics*". **Dr. Elnour's** main research interests are integrating Biotechnology engineering and phytochemistry related to medicinal plants using a green solvent system for extracting leading bioactive compounds (LBCPs) to apply to the human organs-on-a-chip (OoCs) model as a novel technique for **personalized medicine** and **anti-inflammatory** agents. **Dr. Elnour** has been using a fractionation of LBCPs extracted from ACGGs as a model for the last five years to assess fundamental issues such as the **physicochemical properties**, **nutritional values**, and **functional foods** involved in such extracted LBCPs. The overall research aim of **Dr Elnour** is to explain the **mechanism** of actions that make LBCPs obtained from ACGGs, not behavior the same in responding to inhibition of human breast carcinoma (**MCF-7**), colon adenocarcinoma (**HCT-116**), and prostate cancer (**PC3**) human cell lines. For this reason, **Dr Elnour** has applied a wide range of Biochemistry, Biological Chemistry and Molecular biology levels to address complex questions. The results obtained have been published in **20 scientific papers**, four (4) **book chapters**, and presented articles in **20** internationals (conferences during a short period (https://scholar.google.com/citations?user=undo98wAAAAJ&hl=en). Research results of **Dr. Elnour’s** work have been used for building new capacities. These **capacities** are mainly used in **post-graduate courses**, such as the **Elnour Leadership** at Kordofan University (**KU**), Sudan, University of Khartoum, Sudan, Qassim University (**Saudi Arabia**), Michigan State University-**USA** (MSU), and the IIUM, and they have also been cited in many research articles and some review articles and book chapters. Therefore, as a principal investigator (PI), **Dr Elnour** has led one of the most successful international projects. One of them is the project funded by the IsDB grant number ID:(2020-276278) as a merit postdoctoral fellowship (https://113572.thankyou4caring.org/success-stories). Dr. Elnour has also served as a **reviewer** for several international journals, illustrating international recognition in the main fields covered by the cancer project highlighted by the **European Union's initiatives** to combat human **breast cancer**. In the meantime, **Dr Elnour** is a member of the IsDB-Alumni for Science Development Network (IDB-ASDN), which focuses on saving women's lives from breast cancer and cervical cancer in collaboration with IsDB and the International Atomic Energy Agency (**IAEA**) for research on Cancer in Middle-and Low-Income IsDB-Member Countries. Consequently, **Dr Elnour's** field of specialization positively impacts multiple SDGs, including; SDG-1, SDG-2, SDG-3, SDG-4, SDG-8, SDG-9, SDG-13, and SDG-17. Further information about **Dr. Elnour** CV, kindly look at (https://europa.eu/europass/eportfolio/screen/profile?lang=en&actionId=66eaaa89-1c3a-4896-b257-ac03f3d46f06) and about the key research and publication (<https://orcid.org/my-orcid?orcid=0000-0002-1924-094X>).

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