

## ANALYSIS OF TINNEVELLY SENNA LEAVES HERBAL MEDICINE USING LASER-INDUCED BREAKDOWN SPECTROSCOPY AND ITS ANTI-CANCEROUS & ANTIBACTERIAL EFFICACY STUDIES

MOHAMMED A GONDAL, *Department of Physics, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*; R. K. ALDAKHEEL, M A. ALMESSIERE, *Physics, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia*.

Tinnevelly Senna is a herbal plant whose leaves are being applied to cure many diseases in developing countries due to containing many bioactive compounds such as sennosides, phenols, and flavonoids. The conventional methods to determine the main contents of such Senna leaves are lengthy, cost-effective, require hazardous chemical solvents and reagents. In this work an elegant technique like LIBS was applied as a qualitative and quantitative method for Senna leaves sample's elemental analysis and their biological activities were measured by evaluating anti-cancer and anti-bacterial analysis. The quantitative analysis of Senna leaves was conducted using calibration-free LIBS) algorithm indicating the concentration of many nutrient elements, and the LIBS results were counter verified by using the standard analytical ICP-OES technique. The bactericidal efficacy of the Senna leaves was also studied against *Staphylococcus aureus* (S. aureus) by AWD assays and morphogenesis by scanning electron microscopy (SEM) and the anticancer activity was also investigated where different concentrations of Senna leaves extract were tested on cancer cells (HCT-116 and HeLa) and normal cells (HEK-293) using the cell metabolic activity MTT assay and Propidium iodide (PI) staining. We also estimated the inhibitory concentration (IC50) value for the various extracts' concentrations. The bactericidal efficacy of the Senna leaves extract showed significant inhibition against Gram-positive bacterium. Both MTT and PI analysis showed that Senna leaves extract induced profound inhibition on HCT-116 growth and proliferation. Additionally, Senna leaves extract did not exert an inhibitory influence on normal (HEK-293), which is non-cancerous cells. The extract specifically targets the cancerous cells is highly beneficial for the development of future safe anticancer and antibacterial drugs using these extracts.