Research article No. (6) (Accepted for Publication).

Article title	**Evaluation of Antioxidant, Antimicrobial, and Cytotoxic Effects of *Cymbopogon citratus* Essential Oil.**
Participants	Nira A. Mohamed [a], **Abir M.H.A. Mohamed** [b], Marwa Sharaky [c], Yasser M. Diab[a], Ahmed S. Abdelbaky [a,*]
Affiliations	[a]Department of Biochemistry, Faculty of Agriculture, Fayoum University, Egypt. [b]**Department of Agricultural Microbiology, Faculty of Agriculture, Fayoum University, Egypt.** [c]Pharmacology unit, Cancer Biology Department, National Cancer Institute, Cairo University, Giza, Egypt
Journal name	Fayoum Journal of Agricultural Research and Development, 2025
Impact Factor	Accepted for Publication

Abstract

Lemongrass (*Cymbopogon citratus*) is widely grown because of the medicinal benefits of its essential oil. The present study intends to provide the benefits of *Cymbopogon citratus* essential oils as antioxidant, antimicrobial, and anti-cancer activities. The GC-MS technique was used to determine the chemical composition. A radical scavenging assay (DPPH) was utilized to measure the antioxidant activity. Additionally, the antimicrobial abilities were assessed. *In vitro*, the potential anti-cancer activity was assessed towards seven cancer cell lines, i.e., colon (HCT116), breast (MDA-MB-468), liver (HEPG2 and HuH7), kidney (HEK), lung (H1299), oral (HNO97), and splenic (HSF) cancer. The findings revealed that citral, neral, geranial, geraniol, nerol, and others were the main constituents of lemongrass essential oil (Lemongrass EO). Lemongrass EO has the highest antioxidant activity using DPPH (IC_{50} = 27.910 $\mu g.ml^{-1}$). The *in vitro* study using lemongrass EO showed the largest inhibition zone for bacterial strains tested and exhibited a complete inhibition against the growth of the fungus *A. alternata*. Lemongrass EO effectively inhibited all cancer cell line growth tested at an IC_{50} ranging from 8.5 to 34 $\mu g.ml^{-1}$. This herb has antioxidant, antimicrobial, and anti-cancer properties, and we recommend using it in many industry applications. Additionally, using lemongrass EO in the treatment of cancer creates new opportunities in the therapeutics industry.

رئيس مجلس القسم **القائم بأعمال**
عميد الكلية