



## ***In vitro* investigation of anticancer activities of green synthesized gold nanoparticles prepared from extracted leaf of *Olea europea L***

Ayat Al-laeiby\*, Afrodet A. Saleh, Ekhlās Qanber Jasim

Department of Pathological Analyses, College of Science, University of Basrah, Basrah, Iraq

\*) Email: [ayat.esmaeel@uobasrah.edu.iq](mailto:ayat.esmaeel@uobasrah.edu.iq)

Received 21/3/2026, Received in revised form 21/5/2026, Accepted 15/6/2026, Published 15/7/2026

---

The emergence of nanoparticles with remarkable physical and chemical properties has provided a fertile ground for solving modern problems, such as the limitations of cancer treatment. The current study is designed to investigate the anticancer activity of the gold nanoparticles synthesized from *Olea europea L.* leaf against human lung cancer cell line (A549), and induction of apoptosis. AuNPs are prepared from *Olea europea L.* leaf, and their morphological and physical features are characterized. Followed by the examination of their anticancer, toxic activities against human lung cancer cell line (A549), and DNA fragmentation is evaluated. The results suggest that the synthesized AuNPs are spherical in shape and highly dispersible, with an average size ranging between 32-48 nm. In vitro investigation confirms that AuNPs show anticancer and toxic activities against human cancer cells, the A549 cell line. The anticancer and toxic activities are concentration-dependent. Induction of apoptosis in A549 is approved using fluorescent staining ethidium bromide (EB)/acridine orange (AO) method and DNA fragmentation. Our study concludes that small size nanoparticles that induce apoptosis process in cancer cells lead to decrease cells viability. It could be considered AuNPs as a promising anticancer therapy in the future. Future research should include in vivo investigation of AuNPs to confirm their activities.

---

**Keywords:** Apoptosis; AuNPs; Cancer cell line; MTT; *Olea europea L.*