Anti-proliferative and Apoptotic Effects of Selected Saudi Herbs from the *Rhamnaceae*, *Polygonaceae*,and *Apocynaceae* Families Against Various Cancer Cell Lines

Sara Abdulaziz Alghashem[1], Raghad Abdullah Alshfi[1], Allulu Yousef Alturki[1], Rasha Saad Suliman[1.2], Zeyad Alehaideb[2], Rizwan Ali[2], and Sahar Saleh Alghamdi[1.2].

1 College of Pharmacy, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia.
2 Medical Research Core Facility and Platforms, King Abdullah International Medical Research Center (KAIMRC), Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia.

Background:

Cancer is acknowledged as a global public health issue. Therefore, the search for new, potent drugs with fewer side effects is ongoing. As various plant species have demonstrated promising biological actions against fatal human diseases, researchers' interest in medicinal plants has grown recently.

Objective:

To examine three families of medicinal plants, including those from the Rhamnaceae, Polygonaceae, and Apocynaceae families, which are frequently found in the Middle Eastern region. We will assess these plants' effectiveness against three cancer cell lines, including those from breast, colorectal, and liver cancers.

Material and Experimental Protocol of Study:

1. *Calligonum Comosum (CC)*
2. *Rumex Vesicarius (RV)*
3. *Ziziphus Nummularia (ZN)*
4. *Ziziphus Spina-christi (ZS)*
5. *Calotropis Procera (CP)*
6. *Rhazya Stricta (RS)*

\+

1. Ethanol
2. Ethyl acetate
3. Chloroform
4. Water

→ In-vitro study of cytotoxic activity of multiple cell lines → HIT identification for the extract that have higtest potency → Novel bioactive metabolite

(6 plants extraction with 4 solvents)

Results:

Table 1. The IC_{50}values range for 6 plants extractions in HepG2 and HCT8 cell lines.

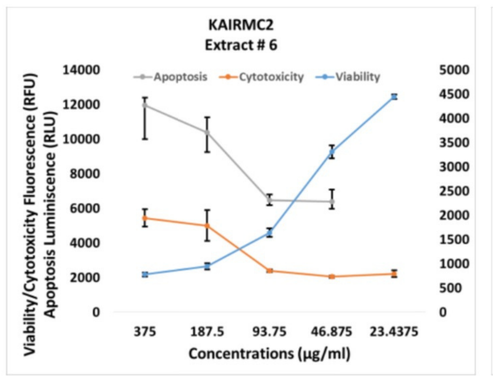
HepG2 (0.089 - 9.84mg/dL)
HCT8 (0.080 - 15.08 mg/dL)

The MDA-MB-231 and KAIMRC2 cell lines were used for additional screening for the seven extracts with the highest activity.

1. ***ZS* in Ethanol.**
2. ***ZN* in Ethanol.**
3. ***CC* in Ethanol.**
4. ***CP* in Ethyl Acetate.**
5. ***ZS* in Ethyl Acetate.**
6. ***ZN* in Ethyl Acetate.**
7. ***CC* in Water.**

Table 2. The IC_{50} values range for the seven extracts in MB-231 and KAIMRC2 cell lines.

MDA-MB-231 (0.058 – 0.51 mg/dL)
KAIMRC2 (0.029 – 0.19 mg/dL)



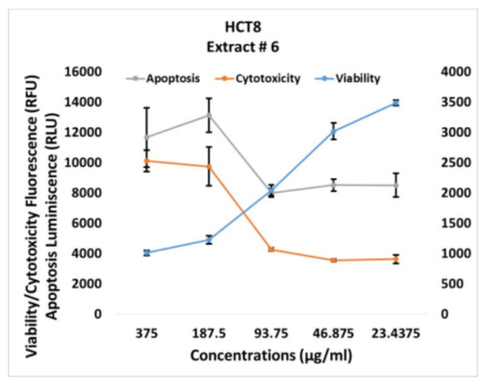


Figure3. ApoTox-GloTM Triplex Assay on *Calligonum Comosum* in ethanol.

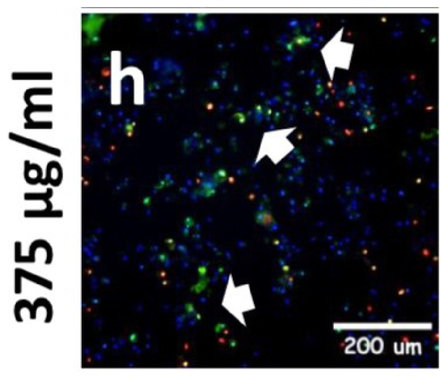


Figure 2. High Content Imaging (HCI) of *Calligonum Comosum* in ethanol.

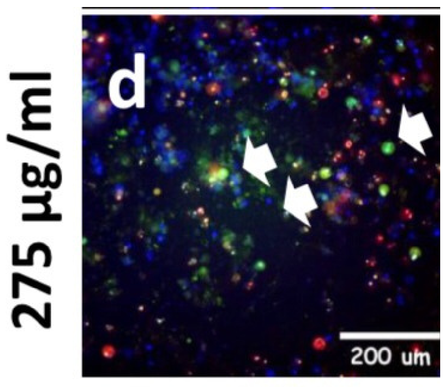


Figure 1. High Content Imaging (HCI) of *Ziziphus Nummularia* in ethanol.

Conclusion:

These results imply that the *Polygonaceae*, *Apocynaceae*, and *Rhamnaceae* families possess promising anti-cancer properties. Therefore, further studies are needed to identify and extract the highly bioactive phytochemical(s).