The Cytotoxic Effect of Iraqi *Rhus coriaria* against Breast and Esophagus Cancer Cells

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الساعة 10 صباحا

INTRODUCTION

- Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020. The most common new cases of cancer in 2020 were, breast 2.26 million cases , lung 2.21 million cases , skin (non-melanoma) 1.20 million cases; and stomach (1.09 million cases). By 2030, it is expected that there will be 26 million newly diagnosed cancer cases and 17 million cancer deaths.

- Breast cancer is one of the major common types of cancer in women worldwide, accounting for approximately 570,000 deaths in 2015. Over 1.5 million females (25% of all women with cancer) are diagnosed with breast cancer yearly throughout the world.

- Esophageal cancer is considered a serious malignancy regarding its prognosis and death rate. Approximately more than 400000 death cases worldwide in 2005. Esophageal carcinoma is the 8th common type of cancer, and the 6th most common cause of cancer-related deaths worldwide in developing countries, which account for more than 80% of total cases and deaths

- Sumac is the common name of the *Rhus* genus, which comprises 91 of accepted species names in the Anacardiaceae family, represented in Iraq by one species namely ***Rhus coriaria* L.** which growth wildly and cultivated near the villages in the north of Iraq

- Sumac has been used traditionally in the treatment of diarrhea, ulcer ,hemorrhoids ,liver disease, animal bites, pain , dysentery, diuresis, hemorrhage, hematemesis, hemoptysis, ophthalmia , conjunctivitis, leucorrhea, and stomach tonic.

Preliminary Phytochemical Examination of plant extract

- The preliminary phytochemical screening tests may be useful in the detection of the bioactive principles and
- subsequently may lead to the drug discovery and development. Further, these tests facilitate their quantitative estimation and qualitative separation of pharmacologically active chemical compounds.

- In this study use ethyl acetate fraction to evaluate the cytotoxic effect of ***Rhus coriaria***. Since contain many active constituents like flavonoids , phenolic acids, tannins, anthocynins and others bioactive compounds

Chemicals and Reagents

No.	Items	Company	Country
1	Trypsin/EDTA	Capricorn	Germany
2	DMSO	Santacruz Biotechnology	USA
3	RPMI 1640	Capricorn	Germany
4	MTT stain	Bio-World	USA
5	Fetal bovine serum	Capricorn	Germany

- **SK-GT-4:** esophageal carcinoma cell line was established from a primary tumors in 1989 from a 89 year-old Caucasian male who presented with dysphagia secondary to a well-differentiated adenocarcinoma arising in the Barrett epithelium of the distal esophagus .
- **AMJ13:** breast cancer cell line has been established from an Iraqi breast cancer patient. was established from the primary tumor of a 70-year-old Iraqi woman with a histological diagnosis of infiltrating ductal carcinoma.

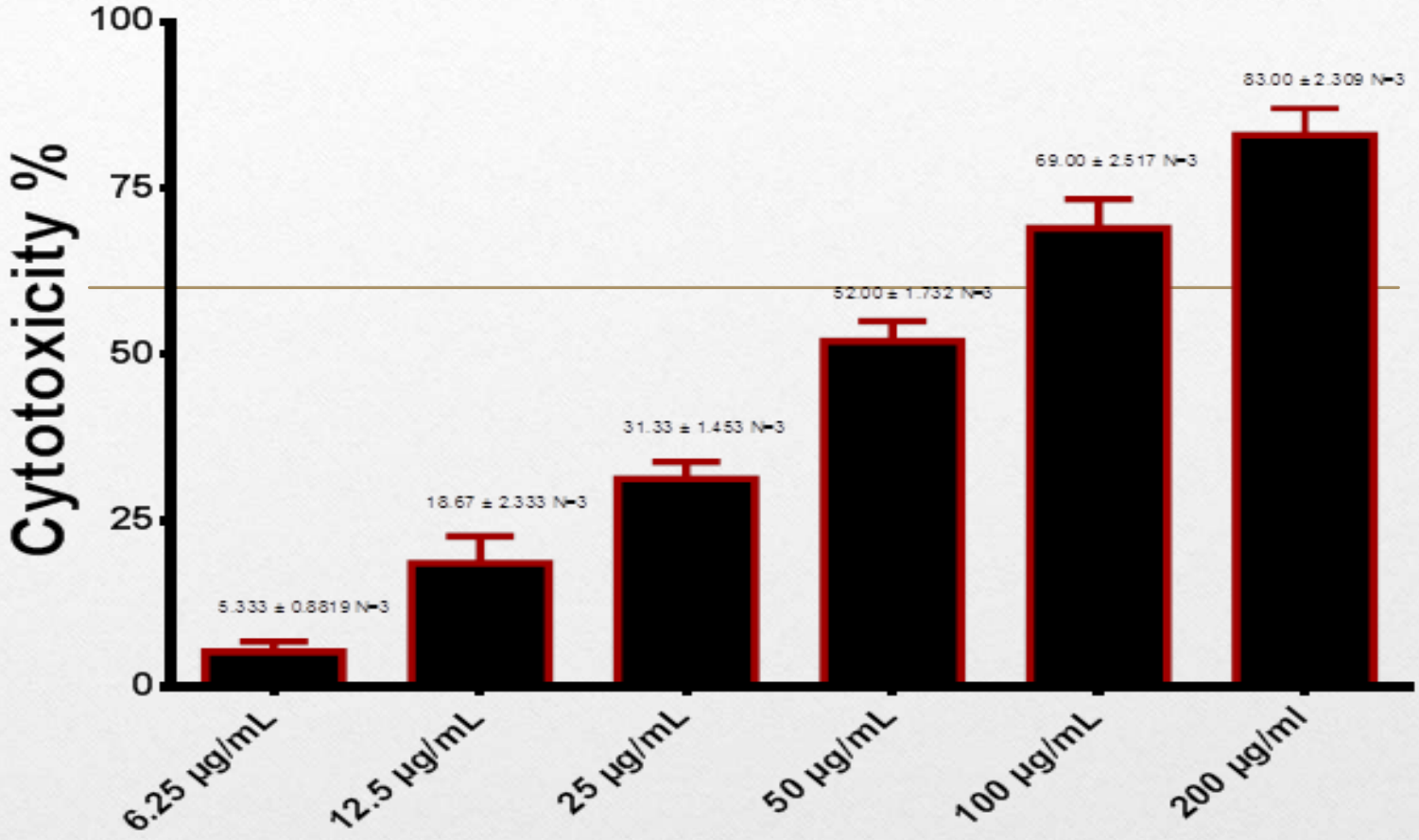
Cytotoxicity Assays

- To determine the cytotoxic effect of ***Rhus coriaria***, the MTT (**Molecular Targeted Therapies**)assay was done using 96-well plates .Cell lines were seeded at 1 × 104cells/well. After 24 hrs. or a confluent monolayer was achieved, cells were treated with tested compounds at different concentrations. Cell viability was measured after 72 hrs of treatment by removing the medium, adding 28 μL of 2 mg/mL solution of MTT, and incubating the cells for 2.5 h at 37 °C.

- After removing the MTT solution, the crystals remaining in the wells were solubilized by the addition of 130 μL of DMSO (Dimethyl Sulphoxide) followed by 37 °C incubation for 15 min with shaking .The absorbency was determined on a microplate reader at 492 nm; the assay was performed in triplicate. The inhibition rate of cell growth (the percentage of cytotoxicity) was calculated as the following equation .
- Inhibition rate = A- B/A*100
- where A is the optical density of control, and B is the optical density of the samples.

Results and Discussion

- The result suggest that there is an ability of ***Rhus coriaria*** to suppress the growth of cancer cell lines and importantly, this effect is concentration-dependent manner. The underline mechanisms for cytotoxic effect of ***Rhus coriaria*** against cancer cells may be related to the scavenging activity against nitric oxide, the hydroxyl radical inhibition, metal chelating activities ,peroxides decomposition and oxygen quenching.



Fig(1): Cytotoxic effect of Leaves extract in AMJ13 cells.

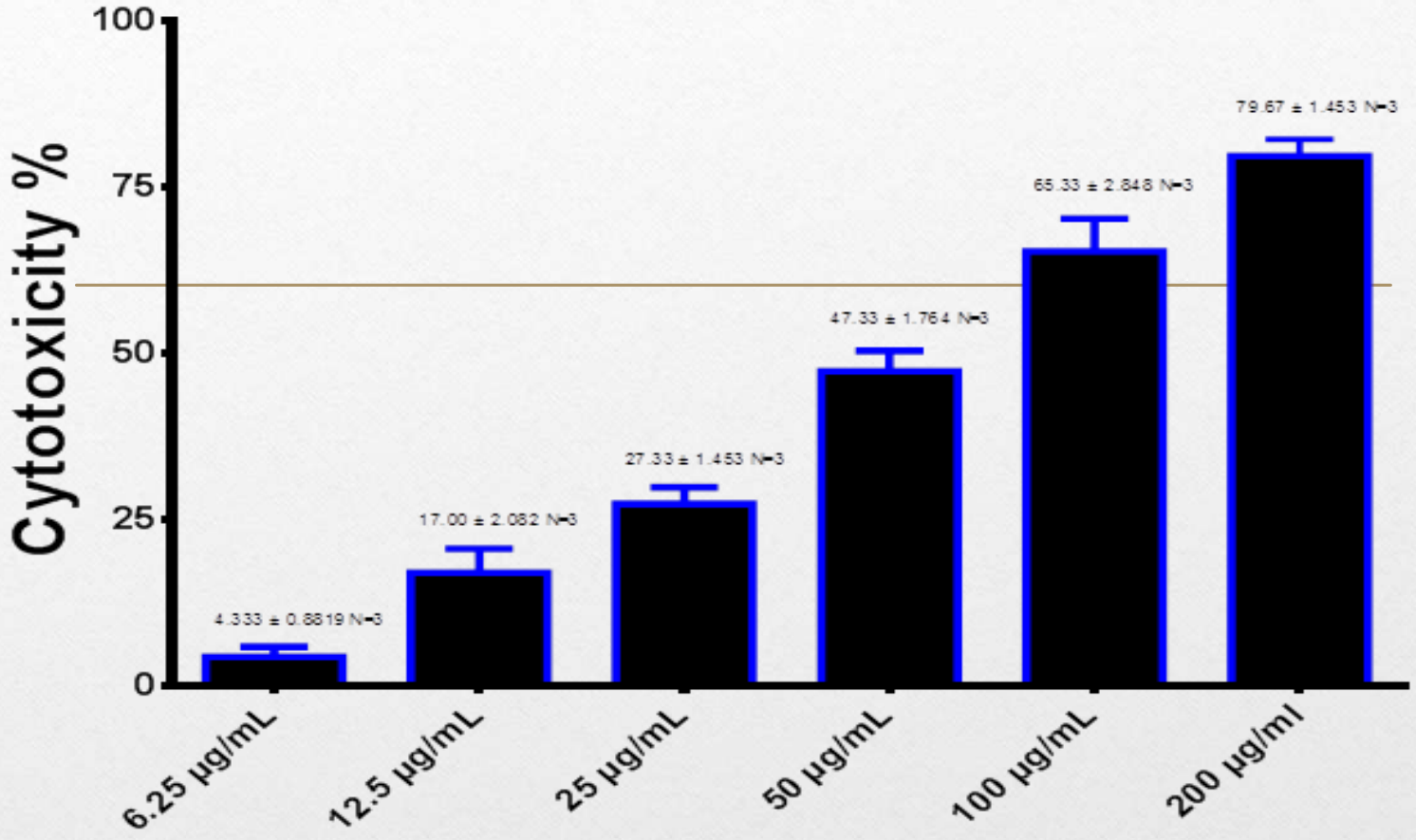


Fig2: Cytotoxic effect of fruits extract in AMJ13 cells.

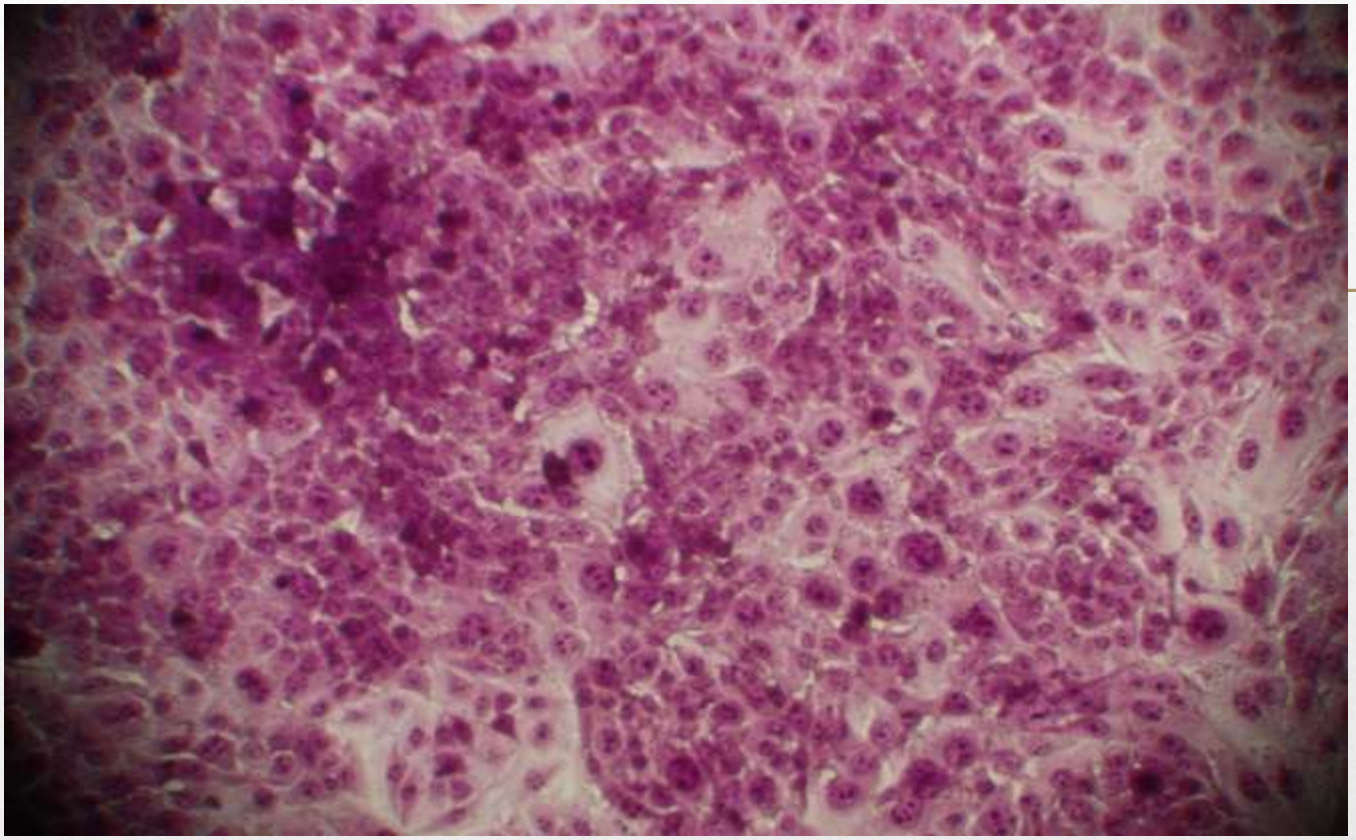


Fig 3: Control untreated AMJ13 cells

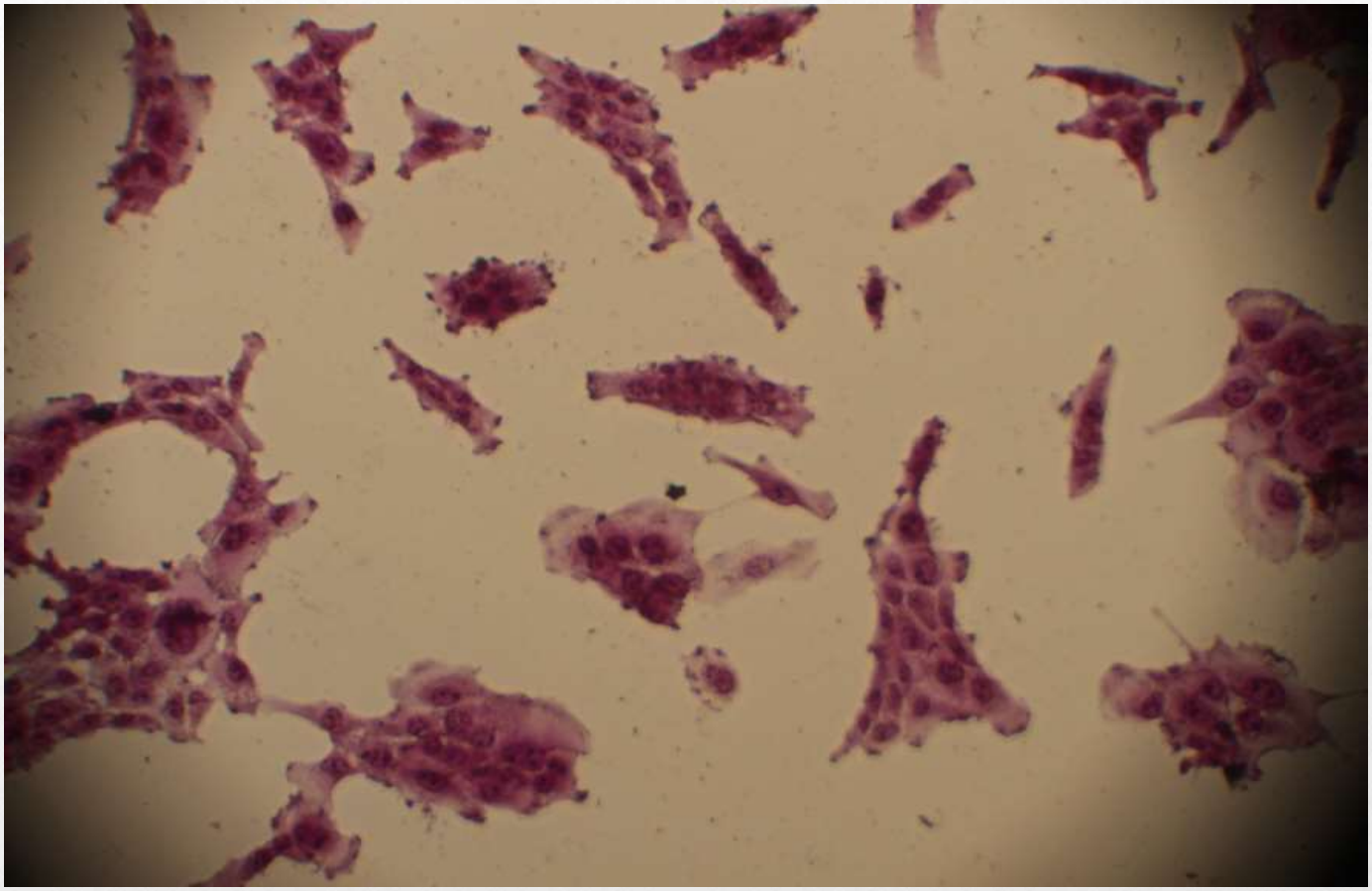


Fig 4: Morphology of AMJ13 cells after treated with leaves extract

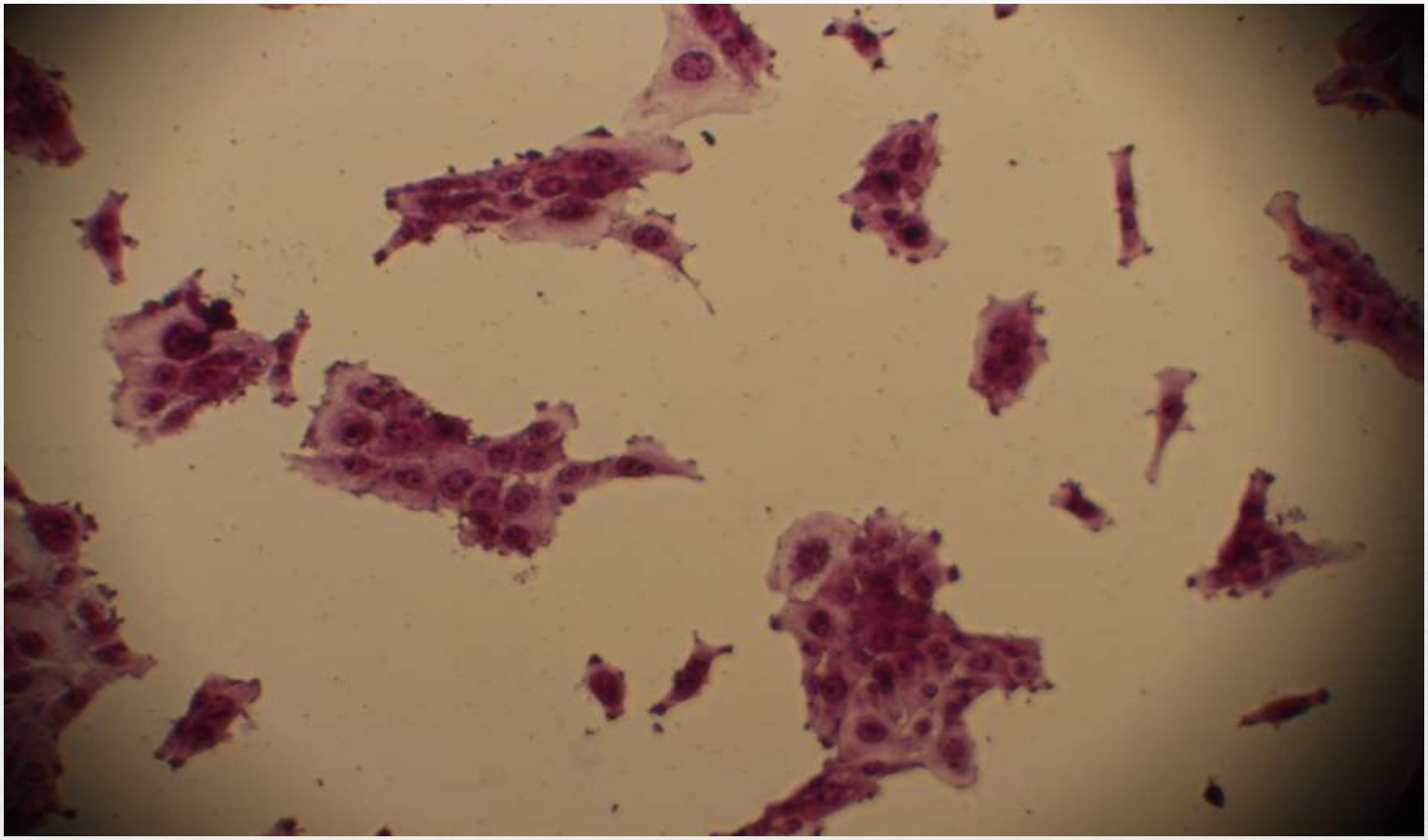


Fig 5: Morphology of AMJ13 cells after treated with fruits extract

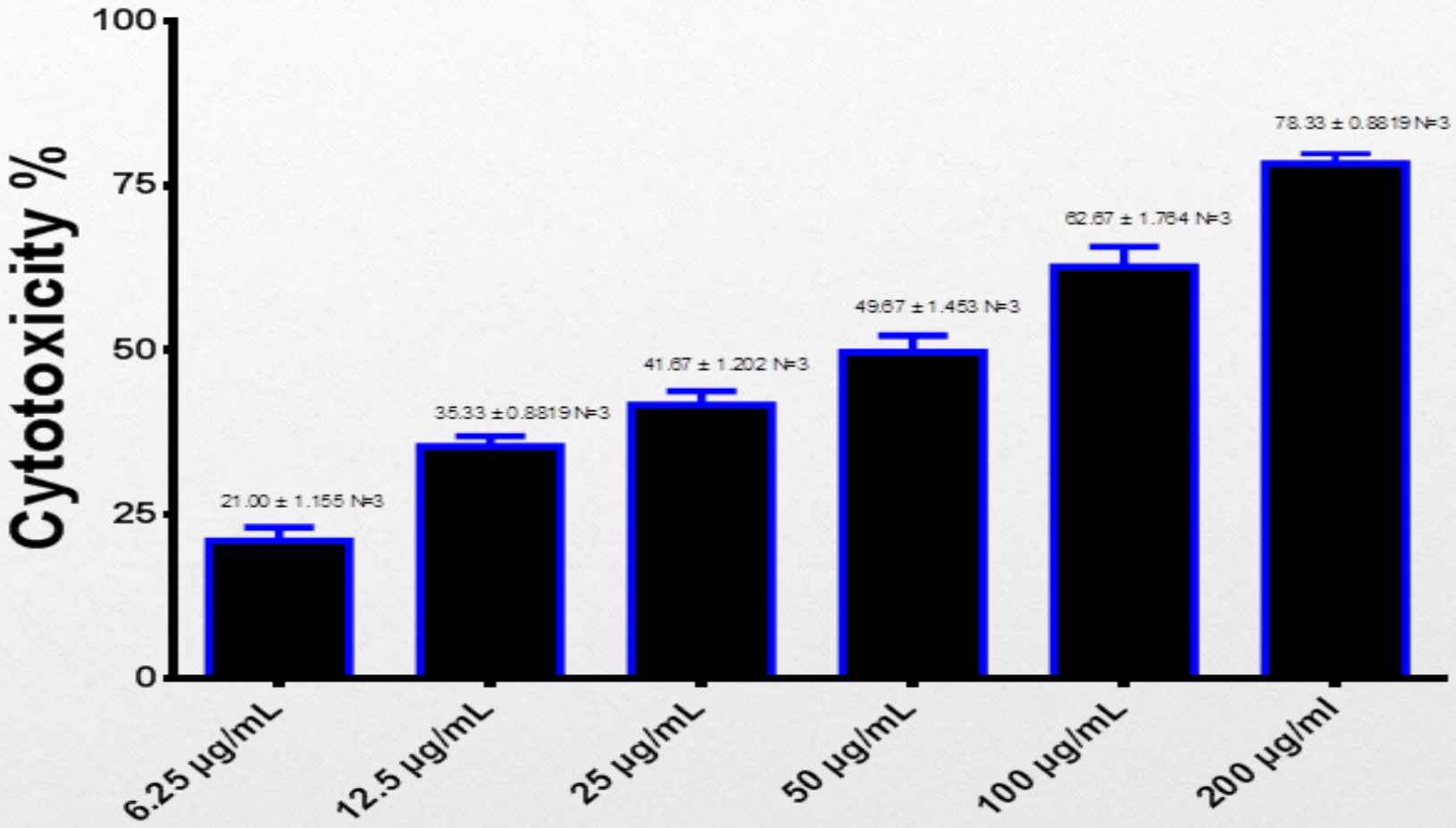


Fig 6: Cytotoxic effect of fruit extract in SK-GT-4 cells

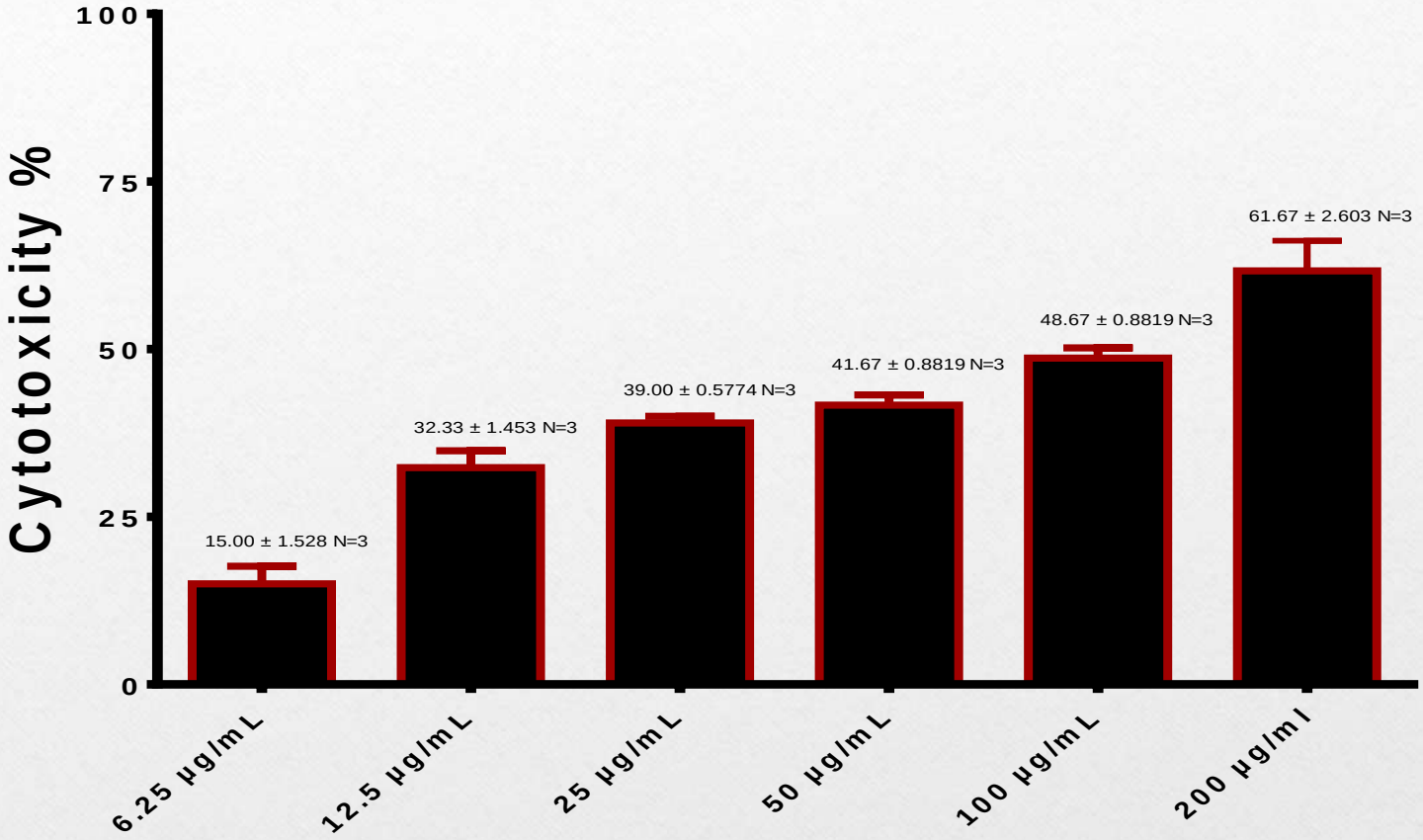


Fig 7: Cytotoxic effect of Leaves extract in SK-GT-4 cells.

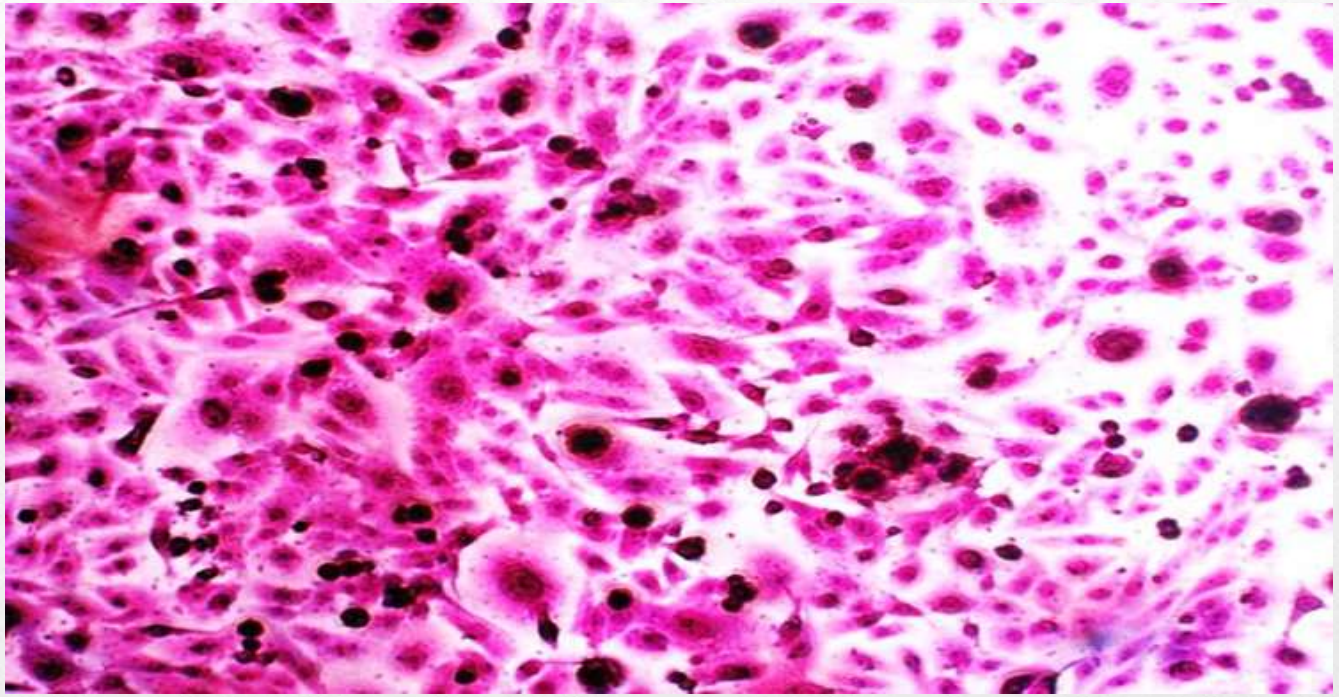


Fig 8: Control untreated SK-GT-4 cells

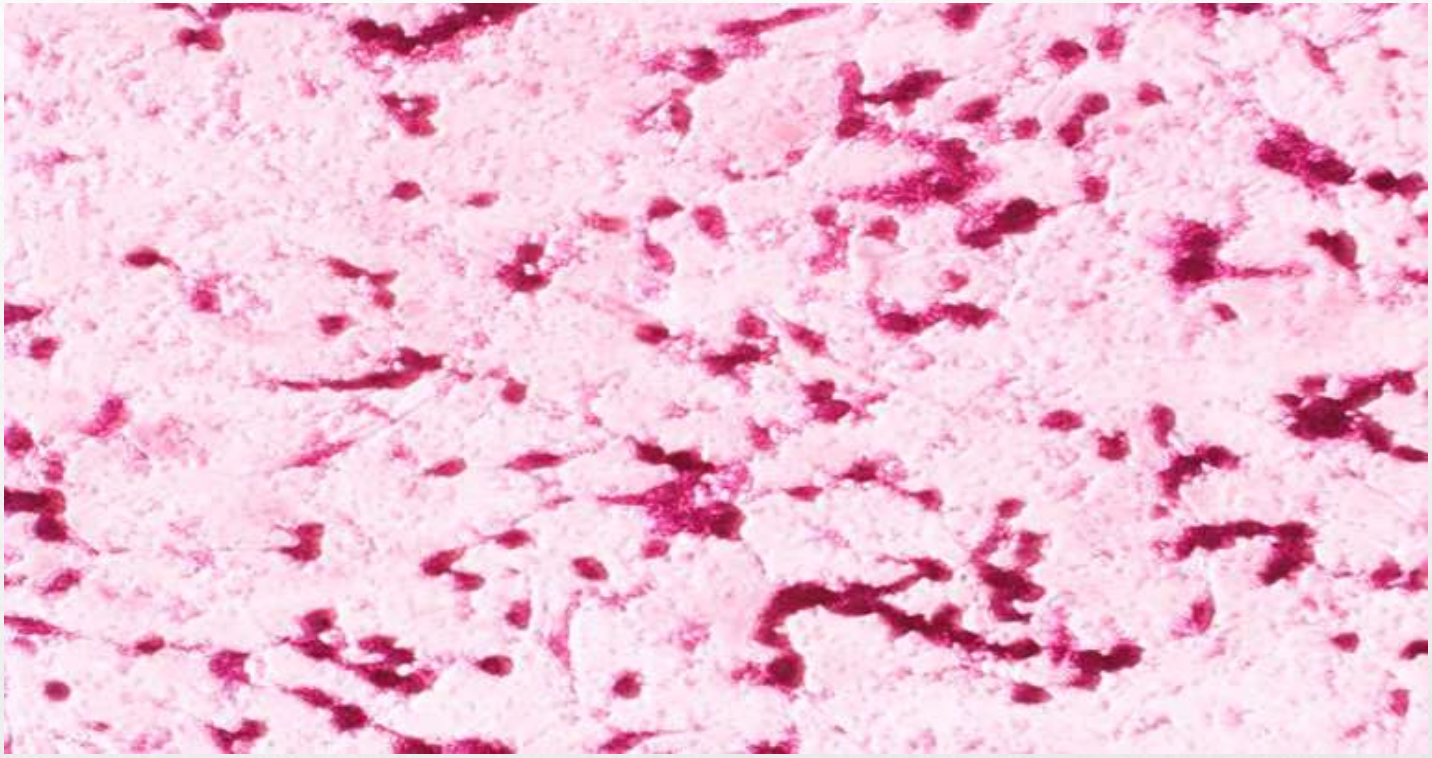


Fig 9: Morphology of SK-GT-4 cells after treated with fruits extract

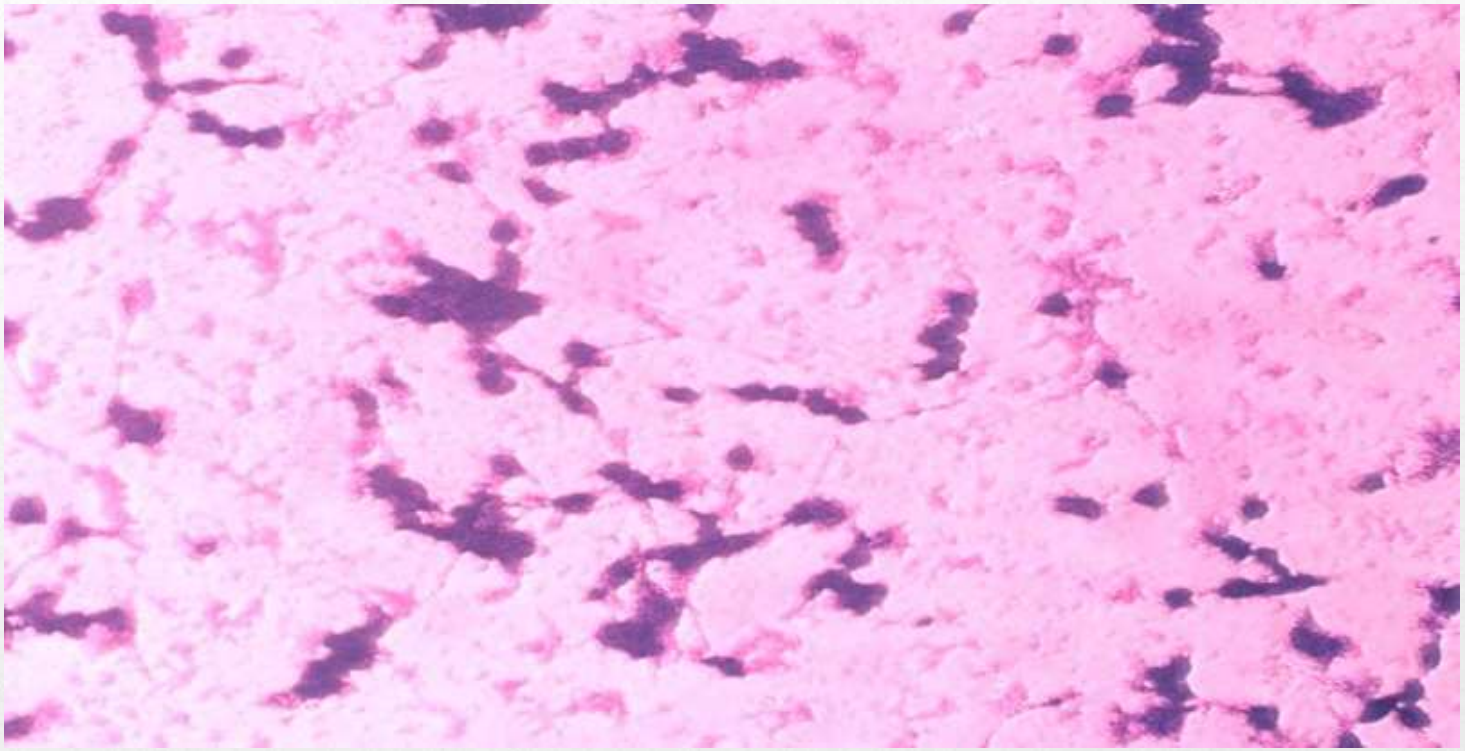


Fig10: Morphology of SK-GT-4 cells after treated with leaves extract

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