

## **Investigating the cytotoxicity of Black Mustard, Yellow Helila and Agargarha plant extracts in gingival fibroblast cells**

### **Abstract**

**Introduction:** Tooth decay is one of the most common chronic infectious diseases in the world and its main cause is biofilm. The caries process occurs with bacterial activity along the surface between the biofilm and tooth enamel. Today, many efforts have been made to develop antifungal and antibacterial drugs with less toxicity, more effectiveness and a new mechanism of action, among which the use of drugs of plant origin has received much attention. Medicinal plants are used in the treatment of a wide range of infections and diseases. Herbal medicines are safe and without side effects. For this reason, their use has increased in recent years. Finally, the aim of this research is to investigate the cytotoxicity of extracts of black mustard, yellow hellelah and agargarha plants in gingival fibroblast cells.

**Materials and methods:** In this study, fibroblast cells were cultured in the number of  $1 \times 10^5$  in each of the wells of the 96-well plate. Different dilutions of plant extracts were prepared and cultured cells were treated with these dilutions. In this study, different concentrations were prepared from the whole plant extract (5 concentrations for each extract). The control group was culture medium without extract. The considered concentrations were tested three times. At first, MTT test was performed for each of the plant extracts and IC<sub>50</sub> was calculated. In the next step, the cells were treated with a combination of three extracts (according to the IC<sub>50</sub> value) simultaneously for 48 hours. Finally, the synergistic effect of drugs was evaluated.

**Findings:** The research findings indicated that IC<sub>50</sub> for Brassica nigra extract was 4.5 in 48 hours. The IC<sub>50</sub> value was 2.2 for Terminalia chebula and 5.8 for Anacyclus Pyrethrum. Also, for the combination of these extracts, the results showed that the combination of Brassica nigra and Terminalia chebula synergistically causes cytotoxicity, while no synergism effect was observed for the rest of the groups. ( $p < 0.05$ )

**Conclusion:** The results showed that Brassica nigra, Terminalia chebula, Anacyclus Pyrethrum plants and their combination in concentrations lower than 2 have no cytotoxicity and can be used in the production of mouthwash (except for the combination of Brassica nigra, Terminalia chebula).

**Keywords:** Cytotoxicity, Brassica nigra, Terminalia chebula, Anacyclus Pyrethrum, gingival fibroblast cells