**AIM:** Develop natural ingredients from cactus pear and evaluate their potential use as natural chemotherapeutic agents on colon cancer

**Introduction**

Colorectal cancer is the second most frequent malignant disease in Europe. Epidemiological data suggests that the ingestion of phytochemicals from fruits and vegetables may contribute to reduce the incidence of cancer in humans. Cactus (*Opuntia spp.*) fruits and cladodes have been widely used as food and in folk medicine. The aim of this project is to evaluate the anticancer properties of Opuntia bioactive extracts in order to develop a promising natural chemotherapeutic or chemopreventive agent.

**Opuntia products**

- **Fruits:** Cactus fruits were collected in six different regions of Portugal, named Tramagal, Serpa, Marvão, Sines, Sesimbra and Quarteira.
- **Juices:** Fruits were processed to obtain juices.
- **Extracts:** The most promising juices were submitted to an adsorption separation process using a microporous resin Amberlit® XAD-16 in order to obtain bioactive ingredients from Opuntia (Bio).

**Opuntia Juices**

<table>
<thead>
<tr>
<th>Total phenolic compounds</th>
<th>Antioxidant activity</th>
<th>Antiproliferative effect on HT29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tramagal</td>
<td>Serpa</td>
<td>Marvão</td>
</tr>
<tr>
<td>Sines</td>
<td>Sesimbra</td>
<td>Quarteira</td>
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</table>

- **Opuntia juices from Tramagal and Sines** had the highest values of polyphenols and antioxidant activity (ORAC and HORAC).
- Higher correlations were obtained between the total phenolic content of fruit juices and ORAC values (r = 0.992) than with HORAC results (r = 0.652).
- Only juices from Tramagal, Sines and Quarteira demonstrated antiproliferative effect on human colon cancer cells, being Tramagal the most effective in inhibiting cancer cell growth.

**Opuntia bioactive ingredients**

**Polyphenolic content and antioxidant activity**

The extract with the highest values of polyphenols and antioxidant capacity was **Bio**.

**Antiproliferative effect on HT29** (t= 96h)

**Cell cycle arrest**

HT29 cells incubated with 5mg/ml of Bio and BioQ

- Extracts Bio and BioQ showed higher antiproliferative effect on HT29 cell growth after 72h of incubation time.
- None bioactive ingredients induced citotoxicity on Caco2 cell model

**Conclusion**

- Cactus pear fruits contain bioactive compounds with antiproliferative properties that can be used as sources of high added-value ingredients.
- Bio and BioQ are promising natural agents to be included in cancer therapy as these extracts induce cell cycle arrest in a different checkpoint than a common chemotherapeutic drug (doxorubicin).

**References:**