Cytotoxicity of Plant Extracts on MCF-7 and Hs578T Breast Cancer Cell Lines

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Overview
Current chemotherapy protocols have limitations in that healthy cells are damaged along with the cancerous cells, and these cancer cells can develop mutations to become resistant to the treatments. Many tropical plants, or their components, are being studied to be used in drug therapies. In this project, extracts were obtained from plants suspected to have medical implications and tested for cytotoxicity in two breast cancer cell lines, MCF-7 and Hs578T.

Methodology
Cell culture was performed using standard procedures. A MTT assay was used to determine the cytotoxicity of the samples tested. The MTT assay relies on a living cell’s ability to reduce a water-soluble yellow dye (MTT) to water-insoluble purple formazan crystals. These crystals are then dissolved, and absorption measurements are taken before and after incubation with MTT to determine cytotoxicity.

Key Findings

<table>
<thead>
<tr>
<th>Overview</th>
<th>MCF-7 is a cell line of estrogen positive breast cancer cells.</th>
<th>Hs578T is a cell line of triple negative breast cancer cells.</th>
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</thead>
<tbody>
<tr>
<td>LC50 Analysis of Teca 2C for MCF-7</td>
<td><img src="image1" alt="Graph" /></td>
<td>The calculated LC\textsubscript{50} value was 32.4 +/- 1.5 (\mu)g/mL. For Hs578T cells, fraction 3 of Ipomoea tricolor (IT) had the most efficient toxic effects, with a percent kill of 93.53 at a concentration of 0.003% (w/v). The calculated LC\textsubscript{50} value was &lt;&lt;30 (\mu)g/mL. Therefore, IT 3 should be further tested to find the lowest concentration at which 50% of the cells are still killed.</td>
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<tr>
<td>LC50 Analysis of IT 3 for Hs578T</td>
<td><img src="image2" alt="Graph" /></td>
<td>Impact</td>
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Acknowledgements
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Explanation
For MCF-7 cells, the fraction 2C of Terminalia catappa (Teca) was the most efficient for cytotoxicity, with a percent kill of 80.56 at a concentration of 0.004% (w/v). The calculated LC\textsubscript{50} value was 32.4 +/- 1.5 \(\mu\)g/mL. For Hs578T cells, fraction 3 of Ipomoea tricolor (IT) had the most efficient toxic effects, with a percent kill of 93.53 at a concentration of 0.003% (w/v). The calculated LC\textsubscript{50} value was <<30 \(\mu\)g/mL. Therefore, IT 3 should be further tested to find the lowest concentration at which 50% of the cells are still killed.

Impact
This type of research can be used to isolate potential new drugs for chemotherapy treatments. It is especially important for triple-negative type breast cancers that are much more aggressive and difficult to treat.