Mirabilis jalapa belongs to the family Nyctaginaceae. Four O'clock are leafy, shrub like, multibranched perennials that produce flowers all summer long. The plant is a tall herbaceous climbing plant with opposite leaves, large showy flowers, curvaceous obovoid fruits and prominent tuberous roots and is planted as ornamental plant throughout the country. The flowers are used in food coloring. The leaves may be eaten cooked as well, but only as an emergency food. An edible crimson dye is obtained from the flowers to colour cakes and jellies. In herbal medicine, parts of the plant may be used as a diuretic, purgative and for vulnerary purposes. The root is believed to be an aphrodisiac as well as diuretic and purgative. It is used in the treatment of dropsy. Mirabilis jalapa is used in traditional medicine by the people from different countries for the treatment of diarrhea, dysentery, conjunctivitis, edema, inflammation, swellings and muscular pain. Mirabilis jalapa is widely used to treat dyssentery, diarrhea, muscular pain, and abdominal colics in many countries and its extract has antibacterial, antiviral and antifungal functions. People prefer to use herbal products because synthetic drugs can cause different side effects, so that about 80% of the world's population uses medicinal plants.

**MATERIAL AND METHODS**

**Extraction of compound:** Petroleum ether and distilled water were used as solvent system for extraction of crude compounds. For extraction 10gm of leaf powder was used. Extract with petroleum ether and distilled water (100 drops/min) for 68 hours without interruption and crude powder obtained. Powder of dried material was used for the extraction of crude compound using Soxhlet continuous extraction method (quantified in gm.) using following formula:

\[
\text{Weight of extract (g)} = \frac{\text{Extract in leaf or root powder}}{\text{Weight of sample (g)}} \times 100
\]

**Mitotic index and Active mitotic index:** Mitotic index frequency and active mitotic index frequency was calculated using following formula:

\[
\text{Mitotic index (%)} = \frac{\text{No. of dividing stages}}{\text{Total No. of cells observed}} \times 100
\]

Microscopic examination allows assessment of chromosome damage and cell division disturbances, thus providing additional information as to the severity or mechanism of the toxic effect or potential cytotoxicity.

**Method of Treatment:** Allium test is a standard test system for cytogenotoxicity monitoring. We used Allium cepa as a test system. For cytological study, the germinated root tips of 1.0-1.5 cm length, treated with 2mg, 4mg, 6mg and per 100ml concentrations of leaf extract of Mirabilis jalapa in petroleum ether as solvent for 3 hours and fixed in Carnoy’s fluid for 24 hours and transferred to 70% alcohol for preservation. After hydrolyzing in 1N HCl at 60°C for 8min and stained with 2% aceto-carmine. Deeply stained tips were squashed under cover ship and mounted in 2% aceto-carmine stain and wax ringed. Observations were taken from semi permanent preparations...
RESULTS AND DISCUSSION

In this study, a toxic effect of *Mirabilis* leaf extract was evaluated by analyzing root growth and root morphology. The higher *Mirabilis* extracts caused an inhibition of root growth and there was a statistically significant difference between control groups. In addition, the *Mirabilis* extracts induced slightly yellow, slightly brown and brownish in coloration in roots. Chromosome clumping and fragments and Chromatids Bridge were observed. Workers showed that the presence of cytotoxic substance in *Phyllanthus niruri* L. whole plant extract caused the inhibition of mitotic activities. The other studies have been showed; a high concentration of any chemical may have an inhibitory or stimulatory effect on the cell cycle, as has been shown for caffeine in *Drosophila prosaltans* and for *Alpinea mutans* and *Pogostemun heyeanus* extracts on *Allium* root tip cell. Cytotoxicity was estimated by observing cytological parameters such as the mitotic index and number of chromosome abnormalities, including chromosome breaks, stickiness and polar deviations.

The mitotic index (MI) of *A. cepa* meristematic cells treated with the EMS was significantly decreased. Significant inhibition in the onion roots treated with the *Mirabilis* extracts (3.200%, 1.984% and 0.088% compared to the negative control). A positive correlation was found between inhibitions of root growth. In petroleum ether leaf extract of *C. procera* at 5mg, 10mg, 15mg and 20mg/100ml concentration, mitotic index (4.45%, 3.92%, 2.96% and 5.88%) was significantly lowered up to the half as compared to mitotic index of control (11.26%) and petroleum ether and aqueous extract of *Achyranthus aspera* have recorded cytotoxic and genotoxic effects.

Table 1. Effect of Distilled water leaf extract of *Mirabilis* on mitosis in *A. cepa*.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of cells observed</th>
<th>No. of dividing cells(P)</th>
<th>No. of dividing cells(M)</th>
<th>No. of dividing cells(A)</th>
<th>No. of dividing cells(T)</th>
<th>Total no. Dividing cells</th>
<th>Mitotic index Frequency (%)</th>
<th>Active mitotic Index frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2240</td>
<td>123</td>
<td>33</td>
<td>13</td>
<td>15</td>
<td>196</td>
<td>7.73</td>
<td>2.34</td>
</tr>
<tr>
<td>2mg</td>
<td>2543</td>
<td>76</td>
<td>12</td>
<td>96</td>
<td>08</td>
<td>98</td>
<td>2.15</td>
<td>0.87</td>
</tr>
<tr>
<td>4mg</td>
<td>3215</td>
<td>57</td>
<td>23</td>
<td>08</td>
<td>11</td>
<td>94</td>
<td>3.09</td>
<td>1.12</td>
</tr>
<tr>
<td>8mg</td>
<td>3211</td>
<td>66</td>
<td>14</td>
<td>19</td>
<td>09</td>
<td>99</td>
<td>3.21</td>
<td>0.84</td>
</tr>
</tbody>
</table>

P- Prophase, M- Metaphase, A- Anaphase, T- Telophase

and photographs were taken with camera. The mitotic index and cytological abnormalities were scored in mitotic cells.

The decreased MI in *A. cepa* roots treated with *Mirabilis* leaf extracts is probably due to either disturbances in the cell cycle or chromatin dysfunction induced by an external factor, in this case, *Mirabilis* extracts DNA interactions. This study indicate that the cytotoxic effect of *Mirabilis* extracts depend on their concentration rather than the time period, with even the low doses demonstrating a considerable rate of inhibition in root growth rate. Moreover, the detractive effect of *Mirabilis* extracts on mitotic index of *A. cepa* show that it has a cytotoxic effect on root tip cells.

The results here in suggest that the tested *Mirabilis* leaf extracts concentrations have inhibitory, mitodepressive effects on root growth and cell division of *A. cepa* and it can prevent DNA synthesis and the reduction in number of the dividing cells in roots produced by the cytotoxic effects of compounds found in *Mirabilis* leaf extracts. Finally, we conclude that when applied in high doses, *Mirabilis* leaf extract shows cytotoxic and genotoxic activity. We used in this study crude extracts of *Mirabilis* leaves. Studying with crude extracts is appropriate because traditional medicinal herbs are generally used as crude extracts. However, working with crude extracts also means working with complex mixtures of biologically active compounds. Some of these compounds can be cytotoxic and/or genotoxic; others can be cytoprotective.

In view of the cytotoxic data gathered in this study the use of the plant for herbal medicinal purposes should be with caution. The results showed a decrease in mitotic and active mitotic index values differed significantly between the control and concentration of 2mg, 4mg and 6mg/100ml leaf extract Chromosomal aberrations recorded from 2mg and 4mg leaves extracts were more clumped metaphases > Bridges > fragments. This suggests that low cytotoxic nature of the leaf extract of *Mirabilis*.
REFERENCES


