Justicia gendarussa (Acanthaceae) or commonly known as Gendarussa has traditionally been used to treat bone fractures. Bone fracture is a clinical condition that need bone repair and new bone formation. To date, the mechanism of Justicia gendarussa acting in enhancing the bone mineralization has not been proven scientifically. The present study aimed to investigate the cytotoxicity and alkaline phosphatase (ALP) activity on osteoblast cells when treated with Justicia gendarussa ethanolic leaves extract. For cell viability, the result showed that IC₅₀ value of the osteoblast cells was 89.1 μg/ml. While, ALP assay is used as a biochemical marker for early detection of osteoblast mineralization. The highest amount of ALP activity was at the 37.5 μg/ml when compared to the control. From this study, it shows that Justicia gendarussa has potential in enhancing bone mineralization during the bone repair process.

OBJECTIVE
To investigate the cytotoxicity and alkaline phosphatase (ALP) activity of osteoblast cells when treated with ethanolic leaves extract of J. gendarussa.

RESULTS

<table>
<thead>
<tr>
<th>Concentration (μg/ml)</th>
<th>Control</th>
<th>7.5</th>
<th>15.63</th>
<th>31.25</th>
<th>62.5</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of cell viability</td>
<td>100</td>
<td>72.71</td>
<td>70.94</td>
<td>64.00</td>
<td>61.29</td>
<td>40.96</td>
<td>28.34</td>
<td>16.02</td>
<td>8.68</td>
</tr>
<tr>
<td>IC₅₀(μg/ml)</td>
<td>89.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 1: Percentage of cell viability of MC3T3-E1 cells treated with different concentrations of J. gendarussa ethanolic extract.

Figure 1: Morphology of MC3T3-E1 cells in MTT assay after 72 hours treated with different concentration of J. gendarussa ethanolic extract (200× magnification).

Figure 2: ALP activity of MC3T3-E1 cell treated with different concentrations of J. gendarussa ethanolic extract. Values are expressed as the mean±SD for three replications. *p<0.05 compared with control.

DISCUSSION
The IC₅₀ value showed the J. gendarussa ethanolic extract is not toxic towards MC3T3-E1 cells. At the highest concentration (1000 μg/ml), morphology of the MC3T3-E1 cells changed into a rounded shape when compared to the control. Based on the result, it is suggested that at lower concentration (below than 100 μg/ml), this plant extract could stimulate the ALP activity in osteoblast cell. ALP is an early marker which used to detect osteoblast cell differentiation and the ALP activity is elevated when there is increased in osteoblast cell differentiation. Differentiation of osteoblast cell to become osteocyte is the final phase of differentiation, where the osteocyte cells embedded in the mineralized bone matrix and forms bone. From this, we can suggest that J. gendarussa can increase osteoblastic differentiation into osteocyte at a specific concentration. Since early stage is a necessary step in bone mineralization, the enhancing effect of J. gendarussa may stimulate the bone fracture healing.

CONCLUSION
As a conclusion, this study showed that J. gendarussa has potential in increasing the ALP activity in osteoblast cells. Therefore, J. gendarussa treatment may be favorable for the bone fracture healing, with a potential mechanism of stimulating the ALP activity in osteoblast cell.

REFERENCES