

ABSTRAK

Introduction: Breast cancer is a worldwide problem that cause high mortality and a large burden internationally. Cancer is known to be difficult to treat, as relapse frequently occur after remission. The cause of these challenge were postulated to be caused by the recent found Cancer Stem Cell, cells which cancer derived from. These cells were proven harder to kill using chemotherapy and radiotherapy. This new finding reveal a new target for cancer treatment. Indonesia natural resource is abundant and diverse, thus proposing many opportunity of developing new treatment for cancer. *Cosmos caudatus* Kunth. is a plant frequently used in ethnomedicine and has been proven to possess anticancer effect. The purpose of this research is to assess the effect of *Cosmos caudatus* Kunth. extract toward breast cancer stem cells.

Methods: Breast cancer cell subtype luminal A MCF-7 were dedifferentiated into CSC using serum starvation and treatment with EGF, bFGF, and B27 supplement medium for 18 days. The differentiation was confirmed using double staining immunocytochemistry technique with CD44/CD24 and CD44/ALDH1 antibody. *Cosmos caudatus* Kunth. were extracted with methanol. The dedifferentiated cell were treated with extract with 5, 10, 20, 40, 80, 160, 320 and 640 µg/ml dose and were incubated for 24 hours. The viability were tested using MTT and trypan blue exclusion assay. Apoptosis reaction were assessed with AO/EB staining and were observed under fluorescent microscope.

Result: The dedifferentiation treated cell showed higher expression of CD44 and lower expression of CD24 compared with the non treated cell ($p < 0.05$). Confirmation using CD44/ALDH1 also showed higher expression of CD44 and lower expression of ALDH1 ($p < 0.05$) suggesting the cell culture contains higher number of CSC. The incubation with *Cosmos caudatus* Kunth. extract showed lower viability with both MTT ($p < 0.05$) and trypan blue exclusion assay ($p < 0.05$). The result suggest optimal dose between 80-160 µg/ml. AO/EB staining with fluorescent observation suggest apoptosis reaction as the cell death mechanism.

Conclusion: The result suggest *Cosmos caudatus* Kunth. extract have effect toward the viability of CSC. The exact mechanism of the reaction and the optimal dose needs further research.

Keywords: apoptosis, breast cancer, cancer stem cells, *Cosmos caudatus* Kunth, extract