Antiangiogenesis Activity Test of Bromo Chalcone Derivatives by In Vivo and In Silico

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ABSTRACT

Cancer is a chronic disease for which no proper treatment has yet been found. Cancer is an abnormal cell and is malignant because it experiences continuous (immortal) growth. Cancer cells have several characteristics, including the ability to undergo angiogenesis so they can invade and spread to other body tissues. Angiogenesis is the process of forming new blood vessels. Angiogenesis has an important role in the development of cancer cells because the movement and spread of cancer cells require a supply of oxygen and nutrients in new blood vessels. Therefore, one of the treatment methods that can be used to prevent the spread of cancer is to inhibit the process of forming new blood vessels. Previous research results showed that the bromo chalcone derivative 1-(4'-bromophenyl)-3-(4-hydroxy-3-methoxyphenyl)-2-propen-1-one (BHM) is cytotoxic and stimulates cell death (apoptosis) in breast cancer and cervical cancer cells. So far, its activity in inhibiting the process of forming new blood vessels (antiangiogenesis) has not been studied. This study aimed to examine the antiangiogenesis activity of BHM in vivo and in silico.

The in vivo antiangiogenesis activity test was carried out using the chorio allantois membrane (MKA) method using Elba chicken eggs induced with bFGF. In silico tests were carried out by looking at the effect of BHM on the target protein VEGF which plays a role in angiogenesis, using molecular docking. Data analysis was carried out by looking at the docking score and the amino acids involved in the interaction between BHM and the VEGF protein.

The results showed that BHM with concentrations of 15, 30 and 60 µg/mL could inhibit the formation of new blood. The results of the in silico test showed that there were similarities in the amino acids involved in the interaction between BHM and VEGFR and the native ligand with VEGFR, as well as the positive control. The similarity of these amino acids causes inhibition of VEGFR activation, which results in inhibition of new blood vessels. The research results show that BHM has the potential to act as an antiangiogenesis agent.

Kata Kunci: *Bromo chalcone derivative, anti-angiogenesis, in vivo and in silico*