

Title : Biological Activities of 2',4'-dihydroxy-6'-methoxy-3',5'-dimethyl-chalcone (DMC) Derivatives via PARP1 Inhibition in Human Colorectal Cancer HCT116 Cells

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Major : Biochemistry and Biochemical Innovation

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ABSTRACT

Currently, colorectal cancer ranks as the third most common cancer in Thailand. Colorectal cancer develops from atypical cells that proliferate and form tumors. Chemotherapeutic drugs are widely used for cancer treatment, such as Cisplatin, Osimertinib Doxorubicin. However, these drugs can cause side effects on normal human cells. Previous studies have reported phytochemical compound properties that inhibit cancer cell proliferation. This study focuses on a natural compound with anticancer activities, called 2',4'-dihydroxy-6'-methoxy-3',5'-dimethyl-chalcone (DMC), which is found in *Syzygium nervosum* A. Cunn. ex. DC. DMC is a chalcone compound, and its chemical structure has been modified to enhance its anticancer efficacy. This study aimed to evaluate the anticancer activity of DMC and its derivatives, including 4'-O-acryloyloxy (DMC1) and 2',4'-O-diacryloyloxy (DMC2), on the viability of human colorectal cancer HCT116 cells using the MTT assay. The half maximal inhibitory concentration (IC₅₀) values were determined and compared with Osimertinib. The results showed that DMC, DMC1, DMC2, and Osimertinib inhibited the growth of colorectal cancer cells, with IC₅₀ values of 22.94 ± 1.70, 2.54 ± 0.17, 0.86 ± 0.19, and 2.65 ± 0.09 μM, respectively. The findings indicated DMC1 and DMC2 exhibited approximately 10-fold and 26-fold greater inhibitory effects when compared with DMC. To confirm the mechanism of action related to apoptosis, the expression of apoptosis-related proteins such as poly (ADP-ribose) polymerase 1 (PARP1) in HCT116 colorectal cancer cells was analyzed using Western blotting. The results revealed

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a significant upregulation of cleaved PARP1 which is a marker of apoptotic cell death. In conclusion, DMC and its derivatives inhibit the proliferation of colorectal cancer cells through caspase-dependent apoptotic pathways.

Title name guide.

ADVISOR title name / แปลไทย	
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Professor	ศาสตราจารย์
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SCIENCE MAJOR name / แปล	
Biology	ชีววิทยา
Microbiology	จุลชีววิทยา
Zoology	สัตววิทยา
Biochemistry and Biochemical Technology or Biochemistry and Biochemical Innovation	ชีวเคมีและชีวเคมีเทคโนโลยี หรือ ชีวเคมีและชีวเคมีนวัตกรรม
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Industrial Chemistry	เคมีอุตสาหกรรม
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