

## INTISARI

Kanker kolon merupakan kanker dengan jumlah diagnosis paling tinggi ketiga di dunia. Metastasis menjadi penyebab kematian pada sebagian besar pasien kanker kolon. Matriks metaloproteinase (MMP) merupakan enzim pemotong matriks ekstraseluler yang penting dalam metastasis kanker. *Inhibitor kappa B kinase* (IKK) merupakan protein yang berperan dalam ekspresi MMP. Penelitian ini bertujuan untuk mengeksplorasi potensi senyawa dalam kulit jeruk (*Citrus sp.*) sebagai agen kemopreventif kanker kolon menarget MMP dan IKK.

Penelitian dilakukan dengan analisis bioinformatika dan studi literatur untuk mengetahui profil protein teroverekspresi pada kanker kolon dan korelasinya terhadap *survival rate* penderita kanker kolon, identifikasi potensi senyawa dalam kulit jeruk sebagai agen kemopreventif, prediksi inhibisi senyawa kulit jeruk terhadap IKK, dan analisis prediksi target senyawa kulit jeruk.

Hasil menunjukkan bahwa overekspresi MMP9 dan 11 berkorelasi dengan perburukan *survival rate* penderita kanker kolon. IKK sebagai aktivator NF-kB teroverekspresi di kanker kolon. Senyawa asam ferulat, hesperidin, limonin, nobiletin, dan tangeretin memiliki potensi aktivitas kemopreventif kanker kolon. Hasil menunjukkan lima senyawa tersebut mampu menghambat IKK dengan nilai *prediction confidence* >0,6. Analisis prediksi menunjukkan TYMS, MET, CDK1, NEK2, PLK1, AURKB dan MMP1, 3, 7, 9, 12 merupakan target senyawa kulit jeruk. Hasil penelitian menunjukkan bahwa hesperidin, asam ferulat, limonin, nobiletin, dan tangeretin berpotensi sebagai agen kemopreventif kanker kolon menarget MMP dan IKK.

**Kata kunci:** *Citrus sp.*, kanker kolon, MMP, IKK, dan bioinformatika

## **ABSTRACT**

*Colon cancer is cancer with the third-highest number of diagnoses in the world. Metastasis is the cause of death in the majority of colon cancer patients. Matrix metalloproteinase (MMP) is an extracellular matrix cutting enzyme that is important in cancer metastasis. Kappa B kinase inhibitor (IKK) is a protein that plays a role in MMP expression. This study aims to explore the potential of compounds in orange peel (*Citrus sp.*) as chemopreventive agents for colon cancer targeting MMP and IKK.*

*The research was conducted using bioinformatics analysis and literature study to determine the profile of overexpressed protein in colon cancer and its correlation to the survival rate of colon cancer patients, identification of potential compounds in the orange peel as a chemopreventive agent, prediction of inhibition of orange peel compounds on IKK, and predictive analysis of orange peel compounds target.*

*The results showed that overexpression of MMP9 and 11 correlated with worsening survival rates of colon cancer patients. IKK as an activator of NF- $\kappa$ B is overexpressed in colon cancer. Ferulic acid, hesperidin, limonin, nobiletin, and tangeretin compounds have potential chemopreventive activity for colon cancer. The results showed that these five compounds were able to inhibit IKK with prediction confidence values  $>0.6$ . Predictive analysis showed that TYMS, MET, CDK1, NEK2, PLK1, AURKB, and MMP1, 3, 7, 9, 12 were the targets of citrus peel compounds. The results showed that hesperidin, ferulic acid, limonin, nobiletin, and tangeretin had potential as chemopreventive agents for colon cancer targeting MMP and IKK.*

**Key word:** *Citrus sp., colon cancer, MMP, IKK, and Bioinformatics.*