

INTISARI

Bakteri *Xanthomonas campestris* pv. *campestris* (*Xcc*) merupakan penyebab penyakit busuk hitam pada tanaman famili *Brassicaceae* yang menghasilkan gum xanthan. Gum xanthan merupakan polisakarida ekstraseluler yang berfungsi sebagai pengental, penstabil emulsi, pengendap, pelindung koloid serta membantu proses dalam berbagai industri pangan, kimia dan farmasi. Mutagenesis dengan transposon merupakan salah satu metode untuk membuat mutan dengan cara menyisipkan segmen DNA (transposon) ke dalam genom bakteri. Penelitian ini bertujuan melakukan transposon mutagenesis pada isolat bakteri *Xcc* sehingga meningkat kemampuan menghasilkan gum xanthannya. Isolat bakteri diisolasi dari daun tanaman kubis yang terinfeksi penyakit busuk hitam. Isolat yang didapat dikarakterisasi dengan pengecatan gram, uji hypersensitivitas, uji hidrolisis pati dan pengamatan morfologi koloni kemudian dikonfirmasi dengan PCR menggunakan primer spesifik. Isolat diseleksi berdasarkan kemampuan menghasilkan gum xanthan pada medium *yeast malt* dan patogenisitasnya. Isolat terpilih dimutasi menggunakan transposon. Mutan terpilih diseleksi berdasarkan patogenisitasnya, mutan yang memiliki patogenisitas terendah dan tertinggi diuji kemampuan menghasilkan gum xanthannya dan dikarakterisasi gum xanthannya. Keberhasilan penyisipan elemen transposon dikonfirmasi dengan metode *single-primer random amplification of transposon ends* (RATE) PCR, selanjutnya dilakukan sekuensing kemudian dicocokkan dengan basis data *blastN* NCBI. Transposon mutagenesis dapat meningkatkan kemampuan menghasilkan gum xanthan isolat *Xcc* sebesar 42,69%. M7 adalah mutan terpilih yang meningkat kemampuan menghasilkan gum xanthannya. Mutan M7 mampu menghasilkan 15,17 g/L gum xanthan dengan yield (gum xanthan/sel) 60,26 dan viskositas 15,42 cP serta hasil sekuensing penyisipan transposonnya memiliki kesamaan dengan *Xcc* str. ATCC 33913.

Kata kunci : *Xanthomonas campestris* pv. *campestris*, gum xanthan, patogenisitas, transposon, mutagenesis

ABSTRACT

Xanthomonas campestris pv. *campestris* (*Xcc*), a black rot-causing bacteria especially for Brassicaceae family plant, is considered as harmful pathogen for agriculture yet plays important role for industry due to its capability to produce xanthan gum. Xanthan gum is extracellular polysaccharide that functions as the thickener, emulsion stabilizer, sedimentation agent, as well as colloid protector and also helps important process in food, chemical and pharmaceutical industries. Transposon-mediated mutagenesis is one method for generating mutant by inserting DNA (transposon) segment into the bacterial genome causing gene expression modification. This modification may affect the important genes for certain physiological processes. This study aims to increase xanthan gum production ability of *Xcc* through transposon-mediated mutagenesis. Bacterial isolates were isolated from black rot-infected cabbage leaf. The obtained bacteria isolates then being characterized using gram staining, hypersensitivity test, starch hydrolysis test and their colony morphology then PCR confirmation using spesific primer. The obtained isolates then being selected based on their ability to produce xanthan gum in the yeast malt medium and pathogenicity. The selected isolates were mutated using transposon. The selected mutants then being selected based on their pathogenicity, mutants with lowest and highest pathogenicity being tested their capability to produce xanthan gum. The obtained xanthan gum then also being characterized. Confirmation of the success insertion process were done by using single primer random amplification of transposon ends (RATE) PCR method and sequencing followed by blastN analyis. Xanthan gum production ability of *Xcc* increased 42,69% by transposon-mediated mutagenesis. M7 was selected as potential mutant since it showed high yield of xanthan gum production by 15,17 g/L with yield (xanthan gum/cell) 60,26 and the viscosity of 15,42 cP. The RATE PCR analysis indicated that transposon was inserted into the location which was similar to the *Xcc* str. ATCC 33913.

Keywords: *Xanthomonas campestris* pv *campestris*, xanthan gum, pathogenicity, transposon, mutagenesis