AKTIVITAS PROTEOLITIK ENZIM PAPAIN DARI GETAH BUAH PEPAYA (*Carica papaya* L.) VARIETAS CALINA DAN PERANANNYA SEBAGAI ANTIBAKTERI

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INTISARI

Telah dilakukan pembuatan enzim papain kasar (*crude papain*) dengan pengeringan oven dan *freeze dryer*, pemurnian parsial enzim papain (*crystal papain*) metode Kimmel dan Smith, penentuan aktivitas proteolitik dan aktivitas antibakteri enzim papain dari getah buah pepaya (*Carica papaya* L.) varietas Calina. Penelitian ini bertujuan untuk mengetahui pengaruh metode pengeringan terhadap aktivitas proteolitik enzim papain kasar, perbedaan aktivitas proteolitik enzim papain kasar dan enzim papain hasil purifikasi parsial dan aktivitas antibakteri enzim papain.

Pembuatan enzim papain kasar dilakukan dengan mengeringkan getah pepaya yang telah dicampurkan zat pengaktif berupa larutan NaCl. Pemurnian parsial enzim papain dilakukan dengan metode Kimmel dan Smith sampai pada fraksi ke tiga. Penentuan aktivitas proteolitik enzim papain dilakukan dengan metode protokol Sigma SSCASE01.001 (1999). Substrat yang digunakan adalah kasein. Hidrolisis kasein oleh enzim papain dianalisis dengan penambahan reagen Folin Ciocalteu yang menghasilkan kompleks berwarna biru dan absorbansinya diukur menggunakan spektrofotometer UV-Vis. Pengujian aktivitas antibakteri enzim papain dilakukan dengan menggunakan metode difusi agar pada bakteri *Escherichia coli* dan metode *Most Probable Number* (MPN) pada bakteri *fecal coliform* dan *total coliform* pada sampel air Sungai Code.

Hasil penelitian menunjukkan bahwa pengeringan dengan *freeze dryer* menghasilkan enzim papain yang lebih tinggi aktivitas proteolitiknya dibandingkan dengan pengeringan oven. Aktivitas proteolitik enzim papain kasar lebih tinggi dibandingkan dengan hasil purifikasi parsial. Uji antibakteri metode difusi agar menunjukkan bahwa enzim papain kasar pengeringan oven membentuk zona hambatan terhadap bakteri *Escherichia coli* sedangkan enzim papain murni fraksi ke tiga tidak menunjukkan zona hambatan. Uji MPN menunjukkan bahwa enzim papain kasar *freeze dryer* mampu menghambat jumlah *fecal coliform* namun tidak menghambat *total coliform* pada sampel air Sungai Code.

Kata kunci: enzim papain, Kimmel dan Smith, aktivitas proteolitik, difusi agar, MPN

PROTEOLYTIC ACTIVITY OF PAPAIN ENZYME FROM PAPAYA FRUIT LATEX (Carica papaya L.*) CALINA VARIETY AND ITS ROLE AS ANTIBACTERIAL AGENT*

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ABSTRACT

Isolation of crude papain with both oven drying and freeze drying methods, and partial purification of crystal papain by Kimmel and Smith method was performed, followed by the determination of proteolytic activity and antibacterial activity of papain enzyme from papaya fruit latex (*Carica papaya* L.) Calina variety. The purpose of this research is to determine the effect of crude papain drying method for its proteolytic activity, the comparison of proteolytic activity of crude papain and crystal papain from partial purification and the determination of antibacterial activity of papain enzyme.

Crude papain was extracted by drying papaya latex that has been mixed with NaCl solution. Partial purification was carried out by Kimmel and Smith method until the third fraction. The proteolytic activity was determined by conducting Sigma SSCASE01.001 (1999) protocol with casein used as the substrate. Casein hydrolysis was analyzed with addition of Folin Ciocalteu reagent that produced blue complex whose absorbance measured by using UV-Vis spectrophotometer. Antibacterial activity assay of papain enzyme was performed by agar diffusion method for *Escherichia coli*, while Most Probable Number (MPN) method was used for *fecal coliform* and *total coliform* obtained from Code River water.

The result shows that drying method affects the quality of papain. Proteolytic activity of crude papain with freeze drying method is higher than oven drying. Proteolytic activity of crude papain is higher than crystal papain from partial purification. Antibacterial assay shows that crude papain from oven drying forms inhibition zone whereas the third fraction shows no inhibition zone. MPN test shows that crude papain from freeze drying method could inhibit the growth of *fecal coliform* but not to *total coliform*.

Keywords: Papain enzyme, Kimmel and Smith, proteolytic activity, agar diffusion, MPN