

## AKTIVITAS ANTIBAKTERI MINYAK BEKATUL BERAS HITAM *Oryza sativa* L. 'Sembada Hitam' TERHADAP BAKTERI *Escherichia coli* dan *Staphylococcus aureus*

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### INTISARI

Varietas beras di Indonesia sangat beragam mulai dari varietas unggul, varietas lokal, hingga varietas beras berpigmen. Sembada Hitam merupakan contoh varietas beras berpigmen lokal asal Sleman, DIY. Proses pengolahan padi hingga menjadi beras menghasilkan produk sampingan (*by-product*) salah satunya bekatul. Bekatul memiliki nilai protein, vitamin, lipid, serat, dan senyawa bioaktif terutama yang berasal dari beras berpigmen. Penelitian bertujuan mempelajari aktivitas antibakteri minyak bekatul (*rice bran oil*) Sembada Hitam terhadap dua jenis bakteri *Escherichia coli* dan *Staphylococcus aureus*, *profiling* senyawa organik, serta deteksi kandungan golongan senyawa metabolit sekunder berupa alkaloid, fenolik, flavonoid, dan terpenoid. Ekstraksi bekatul dilakukan dengan metode sokletasi dengan dua macam pelarut yakni n-heksana dan metanol. *Profiling* senyawa organik menggunakan spektrofotometer UV-VIS dengan metode *scanning* pada panjang gelombang 200-800nm dianalisis menggunakan *Principal Component Analysis* (PCA). Uji antibakteri menggunakan metode sumuran (*well-diffusion*) dengan kontrol positif *chloramphenicol*, kontrol negatif DMSO 10%, dan variasi konsentrasi 5%, 10%, 20%, 40%, 80%. Kandungan golongan senyawa metabolit sekunder minyak bekatul diidentifikasi dengan Kromatografi Lapis Tipis (KLT). Fase diam berupa plat silika gel F<sub>254</sub> dan fase gerak berupa butanol: asam asetat: akuades (4:1:2). Rendemen ekstrak minyak pelarut n-heksana diperoleh sebesar 11,91% dengan warna ekstrak hijau pekat dan kental. Rendemen ekstrak minyak pelarut metanol lebih besar yakni 28,83% dengan warna ekstrak ungu kecoklatan dan lebih cair. Senyawa organik ekstrak minyak pelarut n-heksana dan metanol memiliki karakteristik berbeda terlihat dari persebarannya pada *scores plot*. Ekstrak n-heksana memiliki kandungan senyawa alkaloid, klorofil, antosianin, dan antosianidin (650-800nm). Ekstrak metanol memiliki kandungan senyawa antosianin, flavonoid, terpenoid, dan fenol (495-590nm). Aktivitas antibakteri positif pada minyak bekatul pelarut metanol dengan diameter zona hambat tertinggi pada konsentrasi 80% yang tergolong antibakteri sedang. Fenolik, flavonoid, dan terpenoid ditemukan terkandung dalam minyak bekatul pelarut metanol melalui KLT, dengan kandungan senyawa terpenoid paling tinggi.

Kata Kunci: Sembada Hitam, *rice bran oil*, sokletasi, n-heksana, metanol, antibakteri, KLT, *Principal Component Analysis* (PCA)

**ANTIBACTERIAL ACTIVITY OF  
BLACK RICE BRAN OIL *Oryza sativa* L. 'Sembada Hitam'  
AGAINST *Escherichia coli* AND *Staphylococcus aureus***

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***ABSTRACT***

Rice varieties in Indonesia are very diverse ranging from superior varieties, local varieties, to pigmented rice varieties. Sembada Hitam is an example of a local pigmented rice variety from Sleman, DIY. The milling process of rice produces a high amount of by-product, one of which is rice bran. Rice bran has the value of proteins, vitamins, lipids, fiber, and bioactive compounds especially those derived from pigmented rice. This research aims to study the antibacterial activity of Sembada Hitam rice bran oil against *Escherichia coli* and *Staphylococcus aureus* bacteria, profiling of organic compounds, and detection of the content of secondary metabolite compounds in the form of alkaloids, phenolics, flavonoids, and terpenoids. Rice bran extraction is carried out by soxhletation method with two kinds of solvents, n-hexane and methanol. Profiling of organic compounds using a UV-VIS spectrophotometer with scanning methods at wavelengths of 200-800nm was analyzed using Principal Component Analysis (PCA). Antibacterial activity was tested using well-diffusion method with chloramphenicol as positive control, DMSO 10% as negative control, and concentration variations of 5%, 10%, 20%, 40%, 80%. The content of the secondary metabolite compound group of rice bran oil was identified by Thin Layer Chromatography (TLC). The stationary phase is silica gel plate F<sub>254</sub> and the mobile phase is butanol: acetic acid: aqueous (4:1:2). The yield of n-hexane solvent oil extract was obtained by 11.91% with a thick green and viscous extract color. The yield of methanol solvent oil extract is greater at 28.83% with brownish-purple extract color and more liquid. Organic compounds of oil extracts, n-hexane solvents, and methanol have different characteristics, as seen from their distribution in the score plot. n-Hexane extract contains alkaloids, chlorophyll, anthocyanins, and anthocyanidins (650-800nm). Methanol extract contains anthocyanin, flavonoid, terpenoid, and phenol compounds (495-590nm). Positive antibacterial activity in methanol solvent bran oil with the highest inhibitory zone diameter at 80% concentration which is classified as medium antibacterial. Phenolics, flavonoids, and terpenoids are found in methanol solvent bran oil through TLC, with the highest content of terpenoid compounds.

**Key Words:** Sembada Hitam, *rice bran oil*, soxhletation, n-hexane, methanol, antibacterial, TLC, *Principal Component Analysis* (PCA)