

## ABSTRACT

The damage to cell and tissue that is the main causal factor of most diseases caused by free radicals. The antioxidant is compound which has ability in inhibiting free radicals inside the human body so that the cell damage caused by free radicals can be prevented. The compound that can neutralize free radical is antioxidant. Fingerroot rhizome (*Boesenbergia pandurata* (Roxb). Schlecht) used for seasoning flavor has antioxidant activity.

Isolation of *pinostrobin* was conducted by recrystallization. *Pinocembrin* isolation was performed by vacuum liquid chromatography eluted with mobile phase of *washbensin*: ethyl acetate in gradient. The target fraction was separated by preparative TLC. The isolate purity was determined by analyzing of TLC, melting range and HPLC. Then the obtained isolates were analyzed to know the antioxidant activity using  $\beta$ -carotene bleaching method, FRAP (Ferric Reducing Antioxidant Power) and NO scavenging. Furthermore, the chemical structures were elucidated based on spectroscopic methods (UV-Vis, IR, GC-MS,  $^1\text{H-NMR}$  and  $^{13}\text{C-NMR}$ ).

The antioxidant activities of *pinostrobin* isolate by  $\beta$ -carotene bleaching method, FRAP (Ferric Reducing Antioxidant Power) and NO radical scavenging showed each  $179.29 \pm 12.01 \mu\text{M}$  ( $\text{IC}_{50}$ );  $3.68 \pm 0.43 \mu\text{M/g}$  and  $469.33 \pm 13.33 \mu\text{M}(\text{IC}_{50})$ . Meanwhile, the *pinocembrin* isolate had antioxidant activity of  $116.29 \pm 5.68 \mu\text{M}$  ( $\text{IC}_{50}$ );  $2.8 \pm 0.2 \mu\text{M/g}$  and  $474.03 \pm 13.54 \mu\text{M}(\text{IC}_{50})$ . The antioxidant activities of quercetin as a comparator showed each  $4.91 \pm 0.53 \mu\text{M} / \text{g}$  (Reducing power);  $57.25 \pm 30.34 \mu\text{M}$  ( $\text{IC}_{50}$ ) and  $286.54 \pm 10.78 \mu\text{M}$  ( $\text{IC}_{50}$ ). Meanwhile, the gallic acid had antioxidant activity of  $16.72 \pm 3.67 \mu\text{M} / \text{g}$  (Reducing power);  $86,85,29 \pm 8.81 \mu\text{M}$  ( $\text{IC}_{50}$ ) and  $18.40 \pm 0.91 \mu\text{M}$  ( $\text{IC}_{50}$ ). The antioxidant activity of *pinocembrin* was better than *pinostrobin*. The *pinostrobin* isolate had melting range numbered  $98-99^\circ\text{C}$  with the purity of 99.7% by HPLC. Then, the *pinocembrin* isolate had melting range numbered  $197-198^\circ\text{C}$  with the purity of 92.05% by HPLC. Based on the spectrum of UV-Vis, IR, LC-MS,  $^1\text{H-NMR}$  and  $^{13}\text{C-NMR}$ , the isolates were confirmed as *pinostrobin* and *pinocembrin*.

**Keywords:** *Boesenbergia pandurata* (Roxb) Schlect, isolation,  $\beta$ -carotene bleaching, FRAP (Ferric Reducing Antioxidant Power), NO scavenging

## INTISARI

Kerusakan pada sel dan jaringan yang merupakan akar dari sebagian besar penyakit disebabkan oleh radikal bebas. Antioksidan merupakan senyawa yang mampu menghambat radikal bebas dalam tubuh manusia, sehingga kerusakan sel yang disebabkan oleh radikal bebas dapat dicegah. Senyawa yang dapat menetralkan radikal bebas adalah antioksidan. Rimpang Temu Kunci [*Boesenbergia Pandurata* (Roxb). Schlecht] yang oleh masyarakat digunakan untuk bumbu penyedap masakan juga mempunyai aktivitas antioksidan.

Isolasi pinostrobin dilakukan dengan cara rekristalisasi. Pinocembrin diisolasi dengan kromatografi cair vakum menggunakan fase gerak etil asetat : washbensin secara gradient dan fraksi senyawa target dipisahkan dengan KLT preparatif. Kemurnian isolat ditentukan dengan KLT, pengukuran jarak lebur dan HPLC. Kemudian isolat yang diperoleh dilakukan uji aktivitas antioksidannya dengan metode FRAP (*Ferric Reducing Antioxidant Power*),  *$\beta$ -caroten bleaching*, dan *NO scavenging*. Selanjutnya struktur kimianya dielusidasi dengan spektroskopi UV-Vis, IR, GC-MS,  $^1\text{H-NMR}$  dan  $^{13}\text{C-NMR}$ .

Aktivitas antioksidan pinostrobin dengan metode FRAP (*Ferric Reducing Antioxidant Power*),  *$\beta$ -caroten bleaching*, dan *NO scavenging* berturut-turut sebesar  $3,68 \pm 0,43 \mu\text{M/g}$  (*Reducing power*) ;  $179,29 \pm 12,01 \mu\text{M}$  ( $\text{IC}_{50}$ ) dan  $469,33 \pm 13,33 \mu\text{M}$  ( $\text{IC}_{50}$ ). Sedangkan pinocembrin memiliki aktivitas antioksidan sebesar  $4,51 \pm 0,2 \mu\text{M/g}$  (*Reducing power*) ;  $116,29 \pm 5,68 \mu\text{M}$  ( $\text{IC}_{50}$ ) dan  $474,03 \pm 13,54 \mu\text{M}$ . Sedangkan aktivitas antioksidan kuersetin sebagai pembanding berturut-turut sebesar  $4,91 \pm 0,53 \mu\text{M/g}$  (*Reducing power*) ;  $57,25 \pm 30,34 \mu\text{M}$  ( $\text{IC}_{50}$ ) dan  $286,54 \pm 10,78 \mu\text{M}$  ( $\text{IC}_{50}$ ) serta asam galat sebesar  $16,72 \pm 3,67 \mu\text{M/g}$  (*Reducing power*) ;  $86,85,29 \pm 8,81 \mu\text{M}$  ( $\text{IC}_{50}$ ) dan  $18,40 \pm 0,91 \mu\text{M}$  ( $\text{IC}_{50}$ ). Pinocembrin memiliki aktivitas antioksidan lebih baik dari pada pinostrobin. Jarak lebur isolat pinostrobin  $98-99^\circ\text{C}$  dengan kemurnian sebesar 99,7% yang diukur dengan HPLC. Sedangkan isolat pinocembrin memiliki jarak lebur  $197-198^\circ\text{C}$  dengan kemurnian menggunakan HPLC sebesar 92,05%. Berdasarkan spektrum UV-Vis, IR, GC-MS,  $^1\text{H-NMR}$  dan  $^{13}\text{C-NMR}$  isolat terkonfirmasi sebagai pinostrobin dan pinocembrin.

**Kata kunci : *Boesenbergia pandurata* (Roxb) Schlecht, isolasi,  *$\beta$ -caroten bleaching*, FRAP (*Ferric Reducing Antioxidant Power*), *NO scavenging***