

## **SINTESIS C-ARILKALIKS[4]PIROGALOLARENA DAN UJI AKTIVITASNYA SEBAGAI SENYAWA ANTIOKSIDAN**

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### **INTISARI**

Telah dilakukan sintesis senyawa turunan kaliks[4]pirogalolarena, yaitu C-fenilkaliks[4] pirogalolarena (PgPh), C-2,4-diklorofenilkaliks[4]pirogalolarena (Pg24ClPh), C-4-fluorofenilkaliks[4]pirogalolarena (Pg4FPh), C-3,4-dimetoksi-fenilkaliks[4]pirogalolarena (Pg34OMe), C-4-nitrofenilkaliks[4]pirogalolarena (Pg4NO<sub>2</sub>Ph), C-2-klorofenilkaliks[4]pirogalolarena (Pg2ClPh), C-*N,N*-dimetilaminofenilkaliks[4]pirogalolarena (PgN(Me)<sub>2</sub>Ph) serta uji aktivitasnya sebagai senyawa antioksidan.

Senyawa C-arilkaliks[4]pirogalolarena disintesis dengan mereaksikan pirogalol dengan variasi aldehida aromatik, yaitu benzaldehida, 2,4-diklorobenzaldehida, 4-fluorobenzaldehida, 3,4-dimetoksibenzaldehida, 4-nitrobenzaldehida, 2-klorobenzaldehida dan *N,N*-dimetilaminobenzaldehida dalam satu tahap reaksi. Reaksi pembentukan senyawa tersebut dilakukan dengan metode refluks selama 24 jam menggunakan katalis asam dan pelarut etanol. Produk hasil sintesis dikarakterisasi menggunakan FTIR untuk mengidentifikasi keberadaan gugus fungsinya, spectrometer LC-MS untuk mengetahui massa ion suatu senyawa, spectrometer <sup>1</sup>H-NMR dan <sup>13</sup>C-NMR untuk mengetahui jenis dan jumlah atom, serta lingkungan kimia dari proton dan karbon. Metode DPPH digunakan untuk melakukan uji aktivitas senyawa antioksidan.

Sintesis senyawa PgPh, Pg24ClPh, Pg4FPh, Pg34OMe, Pg4NO<sub>2</sub>Ph, Pg2ClPh, PgN(Me)<sub>2</sub>Ph menghasilkan persen hasil sebesar 98; 98,94; 96,55; 89; 87,16; 96,57; 86,38%. Berdasarkan hasil uji antioksidan, ketujuh senyawa tersebut dapat dikategorikan termasuk dalam antioksidan yang sangat kuat.

Kata kunci: antioksidan, kaliksarena, metode DPPH, pirogalol

## **SYNTHESIS AND ACTIVITY TEST OF C-4-ARYLCALIX[4]PYROGALLOLARENES AS ANTIOXIDANT**

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### **ABSTRACT**

Synthesis of C-phenylcalix[4] pyrogallolarene (PgPh), C-2,4-dichlorophenylcalix[4]pyrogallolarene (Pg24ClPh), C-4-fluorophenyl calix[4]pyrogallolarene (Pg4FPh), C-3,4-dimethoxyphenylcalix[4]pyrogallolarene (Pg34OMePh), C-4-nitrophenylcalix[4]pyrogallolarene (Pg4NO<sub>2</sub>Ph), C-2-chlorophenyl calix[4]-pyrogallolarene (Pg2ClPh), C-*N,N*-dimethylaminophenyl calix[4]-pyrogallolarene (PgN(Me)<sub>2</sub>Ph) and investigation of their activities as antioxidant have been conducted.

The C-arylcalix[4]pyrogallolarenes was synthesized by acid-catalyzed-condensation of pyrogallol and various kinds of aromatic aldehyde, i.e. benzaldehyde, 2,4-dichlorobenzaldehyde, 4-fluorobenzaldehyde, 3,4-dimethoxybenzaldehyde, 4-nitrobenzaldehyde, 2-chlorobenzaldehyde and *N,N*-dimethylaminobenzaldehyde with reflux method within 24 hours. The characterization of the synthesized products was done by FTIR to identify the presence of functional groups, LC-MS spectrometer to determine mass to charge ration of ion molecule, <sup>1</sup>H-NMR and <sup>13</sup>C-NMR to determine species, total atom and chemical environment of each type of proton and carbon. The antioxidant activity test was performed using DPPH method by UV-Vis spectrophotometer.

The percent yields of PgPh, Pg24ClPh, Pg4FPh, Pg34OMe, Pg4NO<sub>2</sub>Ph, Pg2ClPh and PgN(Me)<sub>2</sub>Ph compounds were 98; 98.94; 96.55; 89; 87.16; 96.57; 86,38% respectively. Based on the result of the antioxidant activity test, all of the synthesized products can be categorized as very strong antioxidant.

Keywords: antioxidant, calixarenes, DPPH method, pyrogallol