

Acalypha indica Linn root extract improved hippocampal cell viability and increased Brain-derived Neurotrophic Factor (BDNF) in hypoxic condition

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Abstrak

Latar belakang: Penelitian ini dilakukan untuk mengetahui pengaruh pemberian ekstrak akar *Acalypha indica* Linn (akar kucing) dalam memproteksi neuron kultur jaringan hipokampus tikus pada keadaan hipoksia.

Metode: Ini merupakan penelitian eksperimental *in vitro* pada kultur primer sel hipokampus tikus Sprague Dowley dewasa. Selain kelompok kontrol, sel dipajan ekstrak *Acalypha indica* Linn dosis 10 mg/mL, 15 mg/mL, dan 20 mg/mL selama 72 jam. Kemudian seluruh kelompok sel diberi perlakuan hipoksia dengan gas-gas 5% O₂ 5% CO₂ N₂ balans selama 24 jam. Setelah itu viabilitas relatif sel diukur dengan 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide (MTT), 5-bromo2'-deoxy-uridine (BrdU) untuk proliferasi sel dan Brain-derived Neurotrophic Factor (BDNF) kit metode ELISA untuk kadar BDNF.

Hasil: Viabilitas sel hipokampus yang terpapar ekstrak akar *Acalypha indica* Linn pada pemeriksaan MTT (C: 99,7%, A *indica* L10: 326,3%, A *indica* L 15: 411,7%, A *indica* L 20: 445,9%), BrdU absorbansi (C: 0,07, A *indica* L 10: 0,10, A *indica* L 15: 0,12, A *indica* L 20: 0,13), meningkat secara bermakna dibandingkan kontrol ($p < 0,01$) disertai peningkatan kadar BDNF (C: 11,3 pg/mL, A *indica* L 10: 12,5 pg/mL, A *indica* L 15: 23,1 pg/mL, A *indica* L 20: 18,1 pg/mL).

Kesimpulan: Ekstrak akar *Acalypha indica* Linn mampu meningkatkan viabilitas sel hipokampus dan kadar BDNF endogen pada keadaan hipoksia.

Background: This study was done to determine the effect of root extract of *Acalypha indica* Linn (akar kucing) in protecting neuron viability of the rat hippocampus on tissue culture in hypoxic condition. **Methods:** This is an experimental study of *in vitro* primary cell culture of hippocampus of Sprague Dowley adult rat. The cultures were group into control (C) and exposure to root extract of *Acalypha indica* Linn with dose of 10 mg/mL, 15 mg/mL, and 20 mg/mL for 72 hours. The cultures were then exposed to hypoxic gas (5% oxygen, 5% carbon dioxide, nitrogen balance) for 24 hours. After that, relative cell viability was measured by 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide (MTT), cell proliferation by 5-bromo2'-deoxy-uridine (BrdU), and Brain-derived Neurotrophic Factor (BDNF) levels by BDNF ELISA kit.

Results: The result showed MTT viability (C: 99.7%, A *indica* L 10: 326.3%, A *indica* L 15: 411.7%, A *indica* L 20: 445.9%), BrdU absorbance (C: 0.07, A *indica* L 10: 0.10, A *indica* L 15: 0.12, A *indica* L 20: 0.13) of the exposed hippocampal cell were significantly higher than the control group ($p < 0.01$) accompany by increased level of BDNF (C: 11.3 pg/mL, A *indica* L 10: 12.5 pg/mL, A *indica* L 15: 23.1 pg/mL, A *indica* L 20: 18.1 pg/mL).

Conclusion: The root extract of *Acalypha indica* Linn is able to improve rat hippocampal cell viability and endogenous BDNF levels in hypoxic condition.