

# Optimasi Ekstraksi senyawa Fenolik dan Kafein dari biji kopi hijau Arabika (*Coffea Arabica* L.) menggunakan pelarut NADES Asam Laktat Gluksosa = Optimization of phenolic and caffeine extraction from the arabica green coffee bean (*Coffea Arabica* L.) using NADES Lactic Acid Glucose

Kembaren, Yulietta Heryani, author

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## Abstrak

### <b>ABSTRAK</b><br>

Biji kopi hijau arabika *Coffea arabica* L. banyak mengandung senyawa kimia aktif seperti senyawa fenolik dan kafein. Senyawa fenolik telah diteliti memiliki berbagai aktivitas biologis seperti pengontrol berat badan. Pada penelitian ini, Natural Deep Eutectic Solvent NADES digunakan sebagai pelarut ekstraksi untuk memperoleh kadar fenolik total dan kafein yang optimum dari biji kopi hijau arabika. NADES yang digunakan asam laktat dan glukosa dalam berbagai rasio. Ekstraksi dilakukan dengan metode Ultrasound Assisted Extraction UAE. Kondisi ekstraksi dilakukan dengan tiga parameter yaitu rasio NADES, rasio pelarut dan sampel, dan waktu ekstraksi. Hasil ekstraksi cair dilakukan penetapan kadar fenolik menggunakan microplate reader dan penetapan kadar kafein menggunakan Kromatografi Cair Kinerja Tinggi KCKT. Analisis dilakukan menggunakan Response Surface Methodology RSM. Senyawa fenolik dan kafein berhasil diekstraksi menggunakan NADES dan metode UAE. Kondisi optimum untuk memperoleh kadar optimum keduanya berbeda. Kondisi optimum ekstraksi senyawa fenolik yaitu rasio NADES 5:1, rasio pelarut-sampel 15:1 mL/g, dan waktu ekstraksi 15 menit run 8 dengan kadar 314,55 mg GAE/g indeks desirability 0,594. Kondisi optimum ekstraksi senyawa fenolik yaitu rasio NADES 5:1, rasio pelarut-sampel 75:1 mL/g, dan waktu ekstraksi 60 menit run 11. Kondisi optimum ekstraksi kafein yaitu rasio NADES 5:1, rasio pelarut-sampel 75:1, dan waktu ekstraksi 60 menit dengan kadar kafein 1,019 mg/g indeks desirability 1,000. Berdasarkan penelitian ini, dapat disimpulkan bahwa asam laktat-glukosa dapat menarik senyawa fenolik dan kafein dari biji kopi Arabika.

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### <b>ABSTRACT</b><br>

The Arabica green coffee bean *Coffea arabica* L. contains many active chemical compounds such as phenolics and caffeine. Phenolics have been studied to have various biological activities such as weight control. In this study, Natural Deep Eutectic Solvent NADES is used as an extraction solvent to obtain the optimum total phenolic and caffeine content of arabica green coffee beans. NADES used are lactic acid and glucose in various ratios by using method of Ultrasound Assisted Extraction UAE method. Extraction conditions were carried out with three parameters the ratio concentration of NADES, solvent solid ratios, and extraction time. Determining the phenolic content used microplate reader and the determination of caffeine content used High Performance Liquid Chromatography HPLC. The analysis was performed by using Response Surface Methodology RSM. Phenolic compounds and caffeine were successfully extracted by using NADES and UAE methods. The optimum conditions to obtain optimum levels of both are different. The optimum conditions of extraction of phenolic compound were NADES in ratio 5 1, solvent ratio 15 1 mL g, and extraction time 15 min run 8 with 314.55 mg GAE g desirability index 0.594. The

optimum conditions of extraction of phenolic compounds were NADES 5:1 ratio, solvent sample ratio of 75:1 mL/g, and extraction time of 60 min run 11. The optimum conditions of caffeine extraction were NADES 5:1 ratio, 75:1 solvent sample ratio, and 60 min extraction time with caffeine content of 1.019 mg/g and desirability index 1.000. Based on this research, it can be concluded that lactic acid glucose can attract phenolic compounds and caffeine from Arabica beans.