Sintesis karakterisasi dan uji aktivitas antiarthritis hasil prenilasi senyawa derivat asam sinamat = Synthesis characterization and anti arthritic activity of prenylated cinnamic acid derivative

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Abstrak

Senyawa asam sinamat dan derivatnya merupakan senyawa yang terdapat secara alami di berbagai tumbuhan yang digunakan sebagai obat herbal. Pada penelitian ini, dilakukan sintesis asam sinamat dan asam 4-hidroksi sinamat serta reaksi prenilasi pada kedua senyawa tersebut untuk kemudian diuji aktivitas antiarthritis secara in vitro. Sintesis asam sinamat dan asam 4-hidroksi sinamat dilakukan melalui metode Perkin menggunakan reagen benzaldehida, 4-hidroksi benzaldehida, anhidrida asetat dan katalis natrium asetat. Persen yield yang diperoleh yaitu 10,67% untuk asam sinamat dengan waktu refluks selama 3,5 jam dan 21,47% untuk asam 4-hidroksi sinamat dengan waktu refluks selama 12 jam. Kedua senyawa hasil sintesis tersebut dilakukan reaksi prenilasi menggunakan prenil bromida sebagai sumber gugus prenil dengan katalis superbasa -Alumina/NaOH/Na. Persen yield untuk senyawa asam sinamat terprenilasi yaitu 34% dan asam 4-hidroksi sinamat terprenilasi 36%. Karakterisasi keempat senyawa hasil sintesis dilakukan menggunakan spektrofotometer UV-Visible, spektrometer FT-IR dan GC-MS. Pada konsentrasi 250 ppm, asam sinamat memiliki aktivitas antiarthritis sebesar 89,21%, asam sinamat terprenilasi memiliki aktivitas antiarthritis sebesar 93,13%, asam 4-hidroksi sinamat terprenilasi aktivitas antiarthritis sebesar 91,67%, dan asam 4-hidroksi sinamat terprenilasi memiliki aktivitas antiarthritis sebesar 93,45%.
.....Cinnamic acid and its derivatives are natural compounds present in plants and have been used as herbal medicine. In this research, cinnamic acid and 4-hydroxy cinnamic acid was synthesized dan then prenylated. Cinnamic acid, 4-hydroxy cinnamic acid and the prenylated compounds were tested for their in vitro antiarthritic activity. Cinnamic acid was synthesized via Perkin method using benzaldehyde, sodium acetate and acetic anhydride, while 4-hydroxy cinnamic acid was synthesized using 4-hydroxy benzaldehyde, sodium acetate and acetic anhydride. The resulting cinnamic acid gave % yield of 10,67% with 3,5 hours reflux and for the 4-hydroxy cinnamic acid, it yields 21,74% with 12 hours reflux. Both the synthesized compounds were reacted with prenyl bromide to give prenylated cinnamic acid and prenylated 4-hydroxy cinnamic acid. The catalyst used in this prenylation is -Alumina/NaOH/Na superbase. Prenylated cinnamic acid yields 34% while prenylated 4-hydroxy cinnamic acid yields 36%. The four products were characterized with UV-Visible spectrophotometer, FT-IR spectrophotometer and mass spectrometer. Prenylated cinnamic acid and 4-hydroxy cinnamic acid have higher antiarthritic activities than cinnamic acid and 4-hydroxy cinnamic acid. At maximum concentration of 250 ppm, the antiarthritic activity of cinnamic acid was 89,21%, prenylated cinnamic acid was 93,13%, 4-hydroxycinnamic acid was 91,67%, and prenylated 4-hydroxycinnamic acid was 93,45%.