SINTESIS TIGA TURUNAN 4-NITROINDOLA-3-KARBOKSALDEHIDA

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Abstrak

Kanker merupakan penyakit yang disebabkan pertumbuhan sel-sel jaringan tubuh yang tidak normal dan merupakan salah satu penyebab kematian utama di seluruh dunia. Indola-3-karbinol adalah senyawa hasil hidrolisis glukobrassisin yang terdapat dalam sayuran golongan *Cruciferae* (*Brassica)* yang memiliki aktivitas antikanker. 1-[(4-Klorofenil)metil]-indola-3-karboksaldehida (oncrasin-1) yang memiliki kemiripan struktur dengan indola-3-karbinol juga diketahui memiliki aktivitas antikanker. Gugus *m*-klorobenzil dan nitro pada turunan indola diketahui dapat meningkatkan bioaktivitas sebagai anti kanker, begitu pula dengan gugus formil dan hidroksimetil. Penelitian yang dilakukan bertujuan untuk mendapatkan senyawa antikanker baru turunan 4-nitroindola-3-karboksaldehida, dengan kemiripan struktur seperti indola-3-karbinol dan oncrasin-1 berupa 1-(3-klorobenzil)-4-nitroindola-3-karbaldehida, [1-(3-klorobenzil)-4-nitroindola-3-il]metanol dan bis(1-(3-klorobenzil)-4-nitroindola-3-il)metana. Reaksi 4-nitroindola-3-karboksaldehida, natrium hidroksida, dan 3-klorobenzil bromida dalam asetonitril pada suhu kamar diperoleh 1-(3-klorobenzil)-4-nitroindola-3-karbaldehida dengan rendemen 95%. Reduksi 1-(3-klorobenzil)-4-nitroindola-3-karbaldehida dengan natrium borohidrida dalam etanol pada suhu kamar diperoleh [1-(3-klorobenzil)-4-nitroindola-3-il]metanol dengan rendemen 96%, yang selanjutnya pada kondisi asam mengalami kondensasi sehingga diperoleh bis(1-(3-klorobenzil)-4-nitroindola-3-il)metana dengan rendemen 40%.

Kata Kunci: *analog oncrasin-1, antikanker, indola-3-karbinol*

SYNTHESIS OF THREE 4-NITROINDOLE-3-CARBOXALDEHYDE DERIVATIVES

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Abstract

Cancer is a disease caused by the abnormal growth of body tissue cells and is one of the leading causes of death worldwide. Indole-3-carbinol is compound from hydrolysis of glucobrassicin which contained in the vegetable of *Cruciferae (Brassica)* group which has anticancer activity. 1-[(4-Chlorophenyl)methyl]-indole-3-carboxaldehyde (oncrasin-1) which has similar structure with indole-3-carbinol also known to has anticancer activity. The *m*-chlorobenzyl and nitro group in the indole derivatives can increase bioactivity as anticancer, as well as formyl and hydroxymethyl groups. The research carried out by aiming to get new anticancer compounds, derivatives of 4-nitroindole-3-carboxaldehyde, with structural similarities with oncrasin-1, such as 1-(3-chlorobenzyl)-4-nitroindole-3-carbaldehide, [1-(3-chlorobenzyl)-4-nitroindole-3-yl]methanol and bis(1-(3-chlorobenzyl)-4-nitroindole-3-yl)methane. Reaction 4-nitroindole-3-carboxaldehyde, sodium hydroxide, and 3-chlorobenzyl bromide in acetonitrile at room temperature was obtained 1-(3-chlorobenzyl)-4-nitroindole-3-carbaldehide with a yield of 95%. Reduction of 1-(3-chlorobenzyl)-4-nitroindole-3-carbaldehide with sodium borohydride in ethanol at room temperature was obtained [1-(3-chlorobenzyl)-4-nitroindole-3-yl] methanol with a yield of 96% which after ward under acidic conditions condenses thus was obtained bis (1-(3-chlorobenzyl) -4-nitroindole-3-yl) methane with a yield of 40%.

Keyword: *analogue oncrasin-1, anticancer, indole-3-carbinol*