

## ABSTRAK

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**Program Studi** Teknik Kimia

**Judul** Pra-Rancangan Pabrik Metil Antranilat Dengan Kapasitas  
750 Ton/Tahun

*Methyl Anthranilate* adalah senyawa organik dari kelompok gugus fungsi ester dan termasuk sebagai *flavouring agent* dari rasa anggur. Aroma anggur dapat digunakan sebagai penyedap makanan atau minuman dan dapat digunakan sebagai komposisi parfum. Metil Antranilat tidak mudah diperoleh dari sumber alami seperti dimetil antranilat atau asam antranilat. Dimetil antranilat mudah diperoleh dari minyak daun petitgrain mandarin (*petitgrain mandarin leaf oil*) atau *Citrus reticulata*. Metil antranilat dari dimetil antranilat diperoleh dengan proses demetilasi cukup langka dan proses fermentasi, sehingga waktu untuk menghasilkan metil antranilat cukup lama. Proses pembuatan metil antranilat lainnya dengan proses esterifikasi asam antranilat. Proses esterifikasi yang melibatkan asam antranilat dan metanol dengan katalis asam pada suhu tinggi.

Pembuatan metil antranilat yang ramah lingkungan menggunakan asam antranilat, metanol dan katalis asam seperti Amberlyst-15, Indion-130, Bayer-K24, Amberlyst-18, dan Dowex M-32. Katalis yang digunakan adalah Indion-130, pemilihan katalis resin ini sesuai dengan ketersediaan pasar lokal dan harga yang lebih murah dari Amberlyst-15. Proses esterifikasi menghasilkan konversi asam antranilat hampir 99%. Untuk menghasilkan metil antranilat, asam antranilat dan metanol bereaksi selama 5 jam menggunakan katalis Indion-130 dengan suhu operasi 120°C dan tekanan operasi 6,12 atm. Selanjutnya sisa metanol dipisahkan dari produk pada tekanan 1 atm, suhu 64,7°C dan sisa metanol dikembalikan ke tangki penyimpanan metanol. Kemudian metil antranilat dimurnikan dengan penambahan heksana untuk memisahkan produk dari sisa asam antranilat dan produk samping (H<sub>2</sub>O). Dan

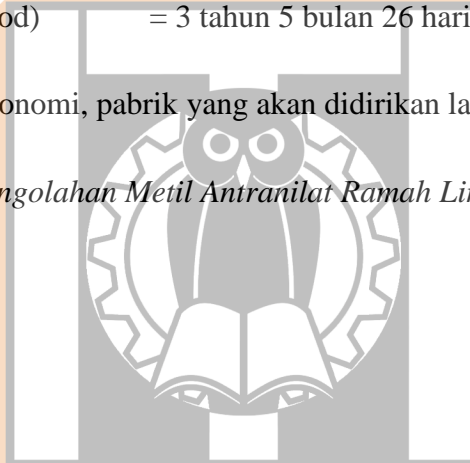
heksana dipisahkan dari produk menggunakan *charcoal* yang akan menyerap heksana dan terpisah dari produk.

Hasil analisa ekonomi yang dilakukan, sebagai berikut :

- a. Total Modal Investasi = Rp 1.060.384.760.822
  - Modal Sendiri (84,16%) = Rp 892.384.760.822
  - Pinjaman Bank (15,84%) = Rp 168.000.000.000
- b. Suku Bunga Pertahun = 9,8%
- c. Jangka Waktu Pinjaman = 5 tahun
- d. BEP (*Break Even Point*) = 37,55%
- e. NCFPV (*Net Cash Flow at Present Value*) = Rp 331.542.377.726
- f. IRR (*Internal Rate of Return*) = 39,04%
- g. MPP (*Minimum Payback Period*) = 3 tahun 5 bulan 26 hari

Jadi, berdasarkan hasil analisa ekonomi, pabrik yang akan didirikan layak (*feasible*).

*Kata kunci : Metil Antranilat, Pengolahan Metil Antranilat Ramah Lingkungan.*



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**Title** Pre-Designed Plant of Methyl Anthranilate With Capacity 750 Tonnes/year

Methyl Anthranilate is an organic compound from the ester functional group and is included as a flavoring agent for the taste of wine. The flavor of wine can be used as a flavoring for food or drinks and can be used as a perfume composition. Methyl Anthranilate is not easily obtained from natural sources such as dimethyl anthranilate or anthranilic acid. Dimethyl anthranilate is easily obtained from petitgrain mandarin leaf oil (petitgrain mandarin leaf oil) or *Citrus reticulata*. Methyl anthranilate from dimethyl anthranilate obtained by demethylation process is quite rare and fermentation process, so that the time to produce methyl anthranilate is quite long. Another process of production methyl anthranilate is by esterification process of anthranilic acid. The esterification process involving anthranilic acid and methanol with an acid catalyst at high temperature.

Preparation of eco-friendly methyl anthranilate using anthranilic acid, methanol and acid catalysts such as Amberlyst-15, Indion-130, Bayer-K24, Amberlyst-18, and Dowex M-32. The catalyst used is Indion-130, the selection of a resin catalyst in accordance with local market estimates and a lower price than Amberlyst-15. The esterification process resulted in nearly 99% conversion of anthranilic acid. To produce methyl anthranilate, anthranilic acid and methanol react for 5 hours using Indion-130 catalyst with an operating temperature of 120°C and an operating pressure of 6,12 atm. Then the remaining methanol is taken from the product at a pressure of 1 atm, a temperature of 64,7°C and the remaining methanol is returned to the methanol storage tank. Then the methyl anthranilate is purified with the addition of hexane to separate it from the remaining anthranilic acid and by-products (H<sub>2</sub>O).

And the hexane is separated from the product uses charcoal which will absorb the hexane and separate from the product.

The results of the economic analysis that have been carried out are as follows :

- a. Total Investment Capital = Rp 1.060.384.760.822
  - Own Capital (84,16%) = Rp 892.384.760.822
  - Bank Loan (15,84%) = Rp 168.000.000.000
- b. Annual Interest Rate = 9,8%
- c. Loan Term = 5 Years
- d. BEP (*Break Even Point*) = 37,55%
- e. NCFPV (*Net Cash Flow at Present Value*) = Rp 331.542.377.726
- f. IRR (Internal Rate of Return) = 39,04%
- g. MPP (Minimum Payback Period) = 3 year 5 month 26 dayw23

So, based on the results of economic analysis, the factory to be established is feasible.

*Key words: Methyl Anthranilate, Eco-Friendly Methyl Anthranilate Processing.*

