

## BAB XII

### DISKUSI DAN KESIMPULAN

#### XII.1. Diskusi

Pabrik *polylactic acid* (PLA) dari tongkol jagung didirikan atas dasar kebutuhan pasar terhadap PLA yang terus meningkat, baik dalam negeri maupun luar negeri. Kebutuhan PLA dalam negeri selama ini dipenuhi melalui kegiatan impor karena belum terdapat industri penghasil PLA di Indonesia. Untuk pasar luar negeri, beberapa negara penghasil PLA juga masih melakukan kegiatan impor PLA dalam jumlah besar. Hal tersebut mengindikasikan bahwa negara tersebut belum dapat memenuhi kebutuhan PLA dalam negerinya meskipun telah memiliki pabrik penghasil PLA. Berdirinya pabrik PLA dari tongkol jagung di Indonesia diharapkan dapat memenuhi kebutuhan PLA dalam negeri maupun luar negeri, menghemat devisa negara dalam mengimpor PLA, meningkatkan pendapatan negara melalui ekspor PLA, membuka lapangan kerja baru bagi masyarakat, serta mendorong berdirinya pabrik baru yang menggunakan PLA sebagai bahan baku.

Kelayakan pabrik *polylactic acid* (PLA) dari tongkol jagung dapat ditinjau melalui beberapa faktor sebagai berikut:

- Bahan Baku

Bahan baku utama yang digunakan dalam pembuatan *polylactic acid* (PLA) adalah tongkol jagung. Tongkol jagung dipilih karena jumlahnya yang melimpah di Indonesia. Selain itu, tongkol jagung juga selama ini kurang dimanfaatkan, dimana hanya digunakan sebagai pakan ternak atau langsung dibuang menjadi limbah. Penggunaan tongkol jagung sebagai bahan baku utama dapat mengurangi limbah tongkol jagung di lingkungan dan menekan biaya bahan baku produksi. Tongkol jagung yang digunakan diperoleh dari daerah sekitar Kabupaten Mojokerto (lokasi didirikannya pabrik) dengan angka produksi jagung yang tinggi, yaitu Kediri, Malang, Jombang, Nganjuk, Tuban, dan Lamongan.

- Proses dan Produk yang Dihasilkan

Dalam pembuatan *polylactic acid* (PLA) dari tongkol jagung, bahan baku utama berupa tongkol jagung diproses terlebih dahulu menjadi asam laktat melalui proses delignifikasi, hidrolisis, netralisasi, dan fermentasi. Asam laktat yang terbentuk kemudian digunakan untuk menghasilkan PLA melalui metode *ring-opening polymerization*. Metode *ring-opening polymerization* dipilih karena dapat menghasilkan PLA dengan kemurnian yang tinggi dan berat molekul yang besar sehingga memiliki nilai jual yang tinggi serta dapat bersaing dengan kompetitor.

Pabrik *polylactic acid* (PLA) dari tongkol jagung memiliki produk utama berupa PLA serta produk samping berupa natrium sulfat dan larutan natrium fenolat. PLA yang dihasilkan memiliki kemurnian 98,5% dengan berat molekul 46.120,3 g/mol. Natrium sulfat yang dihasilkan memiliki kemurnian sebesar 90%, sedangkan larutan natrium fenolat yang dihasilkan memiliki kemurnian mendekati 30%. Seluruh produk utama maupun produk samping yang dihasilkan memiliki kemurnian yang dapat bersaing dengan kompetitor dan aplikatif dalam berbagai bidang sehingga memiliki nilai jual.

- Lokasi

Pabrik *polylactic acid* (PLA) dari tongkol jagung akan didirikan di Dusun Banjar Melati, Desa Lengkong, Kecamatan Mojoanyar, Kabupaten Mojokerto, Provinsi Jawa Timur. Lokasi tersebut dipilih dengan mempertimbangkan faktor bahan baku, daerah pemasaran, utilitas, iklim, tenaga kerja, dan pengembangan area pabrik seperti yang telah dijabarkan pada Bab VI.

- Ekonomi

Kelayakan pabrik *polylactic acid* (PLA) dari tongkol jagung secara ekonomi ditinjau dengan metode *discounted cash flow*. Analisis ekonomi dengan metode *discounted cash flow* memiliki hasil sebagai berikut:

- a) Laju pengembalian modal (*Rate of Return Investment*) sesudah pajak memiliki nilai di atas bunga bank (>10%), yaitu 18,31%.
- b) Waktu pengembalian modal (*Pay Out Time*) sesudah pajak berada diantara 2 sampai 5 tahun, yaitu 4 tahun 11 bulan 14 hari.

- c) Titik impas (*Break Even Point*) mendekati BEP ideal antara 40% sampai 60%, yaitu 39,78%.
- d) MARR (*Minimum Acceptable Rate of Return*) berada diantara 8% sampai 16% untuk pabrik yang baru berdiri, yaitu 15,41%.

Berdasarkan penjelasan di atas, dapat disimpulkan bahwa Prarencana Pabrik *Polylactic Acid* (PLA) dari Tongkol Jagung ini layak untuk dilanjutkan ke tahap perencanaan, baik dari segi teknis maupun ekonomis.

### **XII.2. Kesimpulan**

Nama Perusahaan : Polylateral Alamindo

Bentuk Perusahaan: Perseroan Terbatas (PT)

Produk Utama : *Polylactic acid* (PLA)

Kapasitas : 4.000 ton PLA/tahun

Bahan baku utama : Tongkol jagung

Tipe operasi : Semi *batch*

Utilitas :

- Air : Air sanitasi = 5,5 m<sup>3</sup>/hari  
Air proses = 1.225,1 m<sup>3</sup>/hari  
Air pendingin = 784,5 m<sup>3</sup>/hari  
Air umpan boiler = 816,3 m<sup>3</sup>/hari
- *Saturated steam* : Suhu 135°C = 625.413,1 kg/hari  
Suhu 210°C = 117.827,9 kg/hari
- Listrik : 2.370,83 kW
- Bahan bakar : Solar = 57,45 m<sup>3</sup>/hari

Jumlah tenaga kerja : 165 orang

Lokasi pabrik : Dusun Banjar Melati, Desa Lengkong, Kecamatan Mojoanyar,  
Kabupaten Mojokerto, Provinsi Jawa Timur

Analisis ekonomi dengan metode *discounted cash flow*:

- *Rate of Return Investment* (ROR) sebelum pajak : 25,41%
- *Rate of Return Investment* (ROR) sesudah pajak : 18,31%
- *Rate of Equity Investment* (ROE) sebelum pajak : 35,71%
- *Rate of Equity Investment* (ROE) sesudah pajak : 23,00%

- *Pay Out Time* (POT) sebelum pajak : 4 tahun 3 hari
- *Pay Out Time* (POT) sesudah pajak : 4 tahun 11 bulan 14 hari
- *Break Even Point* (BEP) : 39,78%
- *Minimum Acceptable Rate of Return* (MARR) : 15,41%

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