Oil from [the] Soil
Biodiesel Produced from *Jatropha Curcas* Seed Oil

**The Goal**
To design and optimize a scalable chemical process to produce biodiesel from the oil found in the seeds of the *Jatropha Curcas* plant.

**The Solution**
A chemical process that extracts and converts the oil found in *Jatropha Curcas* seeds into purified biodiesel. This chemical process was simulated using UniSim® design software, and scaled to produce 2 million gallons of biodiesel annually.

**The Process**
The production of *Jatropha Curcas* based biodiesel has been broken down into 3 main steps:
1. **Extraction**
   - Hexane is introduced to crushed seeds, extracting the oil from the seed husks
2. **Treatment**
   - Acid-catalyzed transesterification using a sulfuric acid catalyst and methanol reduces the free fatty acid content of the oil, giving a greater biodiesel yield
3. **Conversion to Biodiesel**
   - Base-catalyzed transesterification using a sodium hydroxide catalyst and methanol converts the treated seed oil into the final biodiesel product

Lab experiments and data analysis confirmed the effectiveness of the process.

**The Jatropha Curcas Plant**

**Benefits**
- A non-food plant
- Grows in harsh, arid conditions, making it suitable for growth in otherwise un-farmable soil
- Can yield up to 4x as much fuel per hectare as soybeans, and more than 10x that of corn
- *Jatropha* plantations and biodiesel production provide entrepreneurial opportunities for lesser-developed nations