

Economic considerations of *Pongamia pinnata* (Karanja) biodiesel

S.S. KARHALE, D.K.DAS AND R.G. NADRE

Accepted : January, 2009

See end of the article for authors' affiliations

Correspondence to:
S.S. KARHALE
Department of Farm
Machinery and Power,
College of Agriculture,
Badnapur, JALNA (M.S.)
INDIA

ABSTRACT

The cost of production of methyl ester of Karanja oil, came to Rs 31.54. The current market rate of diesel (September, 2005) was Rs 33.00. The cost of biodiesel is Rs 31.54 (less than diesel) will certainly attract its use, as competitive to diesel. To make it more competitive the cost of raw material involved in the production of biodiesel should be reduced but on a life cycle basis, considering the longer time between overhauls from biodiesel engines, environmental compliance, waste disposal/spillage issues, fuel security, biodiesel is almost competitive to diesel.

Key words : *Pongamia pinnata*, Karanja methyl ester, Biodiesel, Economics.

India in 2001, ranked sixth in the world in terms of energy consumption accounting for 3.5% of the global consumption of commercial energy. The energy demand is expected to grow to 4.8% in 2010 (Barsic and Humke, 2004). A large part of India's population, residing mostly in rural areas, does not have easy access to petroleum products. The per capita energy consumption of India at present is 479 kg of oil equivalent which is very low. In rural India many types of vegetative are grown with potential to be used as raw material for energy production and needs development of an effective programme (Satish, 2002).

With abundance of forest resources and plant based non-edible oils being available in our country, attempt is made to use esters of these oils as substitute for diesel. Karanja oil is one such non-edible oil. It is produced from karanja seeds (Fanguri, and Hanna, 1999). The annual production potential of karanja seed in our country is nearly 200 million tonnes from which 55 million tonnes of oil can be produced (Bringi, 1995). Hence, it was decided to use this non-edible oil for further investigation which could provide a suitable substitute for diesel to be used in diesel engines of tractors, power tillers and pump sets for agricultural work.

Thus, study undertaken on biodiesel is, therefore, a timely initiative from the Department of Farm Machinery and Power, College of Agricultural Engineering and Technology, Orissa University of Agricultural Technology to address technical, socio-economic and environmental concerns.

METHODOLOGY

Cultivation of karanja :

Pongamia pinnata or Karanja belongs to family

Fabaceae. It is a medium sized tree growing up to 40 feet with a large spreading canopy. It can tolerate all kinds of soil including those with high salinity and is fairly hardy and drought tolerant.

Propagation:

Propagation of Karanja was done using seeds. Seed require no special treatment like scarification before sowing. Direct sowing is usually unsuccessful, but seeds germinate within 1-5 weeks of planting. Seedlings developed are transplanted within 1-5 weeks of planting. Seedlings developed are transplanted easily from the nursery after 12 months. Root suckers on the other hand can be used to develop the plant.

Plantation:

Plantation of Karanja can be carried out at spacing of 15 m x 15 m or at spacing of 20 m x 20 m depending on the available land quality.

Fruiting:

The fruit generally matures by January-February after about 8-10 months beyond flowering and are harvested during February to April. The fruit starts yielding at the age of about 8 years and fruit yield is reported to be about 5 kg initially and gradually increases up to 30 kg per tree by 20 years. Tree often reaches adult height in 4-5 years, bearing fruits at the age around the same time. A single tree is said to yield 9-90 kg seeds per tree, indicating a yield potential of 900-9000 kg seed per hectare, 25% of which might be rendered for oil (assuming 100 tree/hectare).