

PD-AAW-323
52164

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

DATE: 7/29/87

MEMORANDUM

TO: AID/PPC/CDIE/DI, room 209 SI-18
FROM: AID/SCI, Victoria Ose *VO*
SUBJECT: Transmittal of AID/SCI Progress Report(s)

Attached for permanent retention/proper disposition is the following:

AID/SCI Progress Report No. 4 555

Attachment

2 ep



DEPARTMENT OF MECHANICAL ENGINEERING
UNIVERSITY OF PERADENIYA
PERADENIYA

1987.06.17

Our Ref No.....

Your Ref No.....

The Director General,
NARESA,
Colombo



4555

RG/AID/05

Dear Sir,

Enclosed please find

- i. Progress report requested you.
- ii. Salary vouchers for month of May.
- iii. A comprehensive list of engine driven generators.
- iv. Quotation for Petter 2 KVA Generator (diesel).

It is necessary that we purchase this engine to enable the next phase of the project namely the engine testing. Thus please obtain the approval of Colombo USAID Office for the purchase on the following justification.

- a. The purchase could be done "off the shelf".
- b. This is the only single phase diesel drivers generator of this size available locally.
- c. The suppliers (Hayleys) are a reputed Company and have a reliable after sales service.

Thanking you,
Yours faithfully,

S.K.Seneviratne

Rec'd in SCI: JUL 28 1987

Rec'd in SCI: JUL 29 1987

INTERIM PROGRESS REPORT

Research Project on the feasibility of promoting *Jatropha Curcas* as a substitute for diesel fuel.

PROJECT NO: RG/AID/05

AWARD DATE: 2nd October 1984

PROGRESS TO DATE:

- 1.0 AVAILABILITY AND COLLECTJCN OF SEED: A firm network was established and ample stocks of seed necessary were purchased and stored. If necessary, more seed may be obtained at short notice.
- 2.0 EXTRACTION OF JATROPHA OIL: Three methods have been explored so far. They are:
- a) Mechanical methods
 - b) Chemical solvent methods
 - c) Traditional village methods

2.1 MECHANICAL METHODS:

For this purpose, a mechanical press incorporating a hydraulic jack was designed and fabricated. Various modifications were made on the original unit, in order to achieve the maximum quality of oil from a given sample with the shortest time period. The unit is now undergoing a final modification-viz (a) the incorporation of a smaller diameter cylinder (4 inches) as opposed to the earlier (6 inches) and, (b) modifications to ensure that the piston and hydraulic jack act along the same line of action. This is to ensure that eccentric forces do not distort the piston and machine supports.

Efforts are also being taken now to use a load cell with the press, to monitor forces associated with an extraction rate of *Jatropha* oil. A load cell, with appropriate attachments, is being calibrated.

At present, at extraction of rate of 310 CC has been obtained, from 1 kg of de-hulled, sun-dried seed. Moisture content associated with this rate is about 30 gms/kg of seed. This amount of oil constitutes approx: 34% of the weight of dry seed.

2.2. CHEMICAL EXTRACTION ANALYSIS

Tests were conducted to establish the quantity of oil that can be extracted from a given quantity of seed. This is purely intended for research and education purposes. A very high (nearly 100%) extraction could be obtained using this method. Therefore results will indicate the efficiency of mechanical extraction and other methods. Solvent used is Petroleum Ether, and method used is soxhlet extraction.

2.3 TRADITIONAL VILLAGE METHODS:

Experiments were conducted to blend *Jatropha* seed thoroughly with hot water, to obtain first a milky extract. This was then filtered and separated, and boiled to evaporate the water. However, various methods so tried were not totally successful. (Please see Progress Report for the second half of 1986). A similar method is used to extract oil from coconut-milk.

An alternate method now being explored is to use a tapered -arrangement press turned by using draught power. This promises to be an economical means of extracting a large quantity of oil in relatively a short time period. Extraction by this means will be tried out in the near future. An analysis on the efficiency of this type extraction will be made, for comparison with other methods.

3. TESTING OF JATROPHA OIL

Oil extracted so far has been subjected to chemical analysis. The ultimate objective would be to test the oil as fuel in a diesel-engine. The results were reported previously.

3.2. ENGINE TESTING

Efforts taken to find a suitable Test-bed manufactured in the U.S.A. has now been abandoned. (See report for the second half of 1986) Instead, quotations have been called for and received for the purchase of diesel-engine generator, available ex-stock. The required modifications will be made to facilitate engine testing as soon as the generator is purchased.

4. FUTURE WORK:

Various technical and operational problems that existed have now been identified. With the potential for extracting large quantities of oil using mechanical means and by draught power, all that is required now is a quick purchase of the diesel generator. Modifications to enable engine testing can be then done finally. Further research on solvent extraction and analyses of *Jatropha* oil can be carried out in parallel with engine testing.