

**Validation of Developed/ Released/ Adopted Processing Technologies/
Innovations**

1. Title of the sub-project: A VALUE CHAIN ON CASHEW FOR DOMESTIC AND EXPORT MARKET

2. Name of CPI/CCPI: Dr. V.P.Potty

3. Title of the technology: **Production of cellulase from cashew shell**

4. Information on existing farming systems, practices, productivity levels and income in the target area:

5. Key Intervention(s) introduced: Cellulase enzyme was produced from cashew industry by product, cashew nut shells

6. Results

Status of dissemination/commercialization; and, extent of adoption and success, if applicable; with supporting data (with tables and photographs as annexure): Technology under progression

7. Brief description of technology for release:

Cashew shell contains a good amount of cellulose which is difficult to separate. By applying microbes the cellulose is converted into cellulase. The cellulase is widely used in food industry and textile industry. The recycling of the waste is being effected.

7. Expected Outcome/Impact of the technology:
 - (8.1) Expected increase in area, production and net income
Various industries
 - (8.2) Others
8. Whether findings have been published? If so, give the citation and enclose copy of the publication.

Submitted paper for 21st swadeshi science congress (details in publication list)

Proforma -2

**Validation of Developed/ Released/ Adopted Processing Technologies/
Innovations**

1. Title of the sub-project: A VALUE CHAIN ON CASHEW FOR DOMESTIC AND EXPORT MARKET
2. Name of CPI/CCPI: Dr. V.P.Potty
3. Title of the technology: **Production of pectinase from cashew nut shell**
4. Information on existing farming systems, practices, productivity levels and income in the target area:
5. Key Intervention(s) introduced: Pectinase enzyme was produced from cashew industry by product, cashew nut shells

6. Results

Status of dissemination/commercialization; and, extent of adoption and success, if applicable; with supporting data (with tables and photographs as annexure): Technology under progression

7. Brief description of technology for release:

It is estimated that about 8.5 lakh tone of cashew shell is being generated annually. A very small quantity is being used for extraction of cashew shell liquid. Another very insignificant quantity is used for hardboard making and similar applications. Remaining shell is totally used for fuel. The pectin content of the cashew shell is to the tune of 2.3-3.4% w/w. By the fermentation of microbes using cashew shell as substrate, can produce the enzyme pectinase. They are one of the important functional food ingredients in jams, jellies, fruit juices, confectionery products, bakery fillings and are used for stabilization of acidified milk drinks and yoghurts. Thus the utilization and conversion of cashew industry waste to a highly useful enzyme production can be possible.

7. Expected Outcome/Impact of the technology:

(8.1) Expected increase in area, production and net income

Various industries

(8.2) Others

8. Whether findings have been published? If so, give the citation and enclose copy of the publication.

Submitted paper for 21st swadeshi science congress (details in publication list)

**Validation of Developed/ Released/ Adopted Processing Technologies/
Innovations**

1. Title of the sub-project: A VALUE CHAIN ON CASHEW FOR DOMESTIC AND EXPORT MARKET

2. Name of CPI/CCPI: Dr. V.P.Potty

3. Title of the technology: **Production of Tannase from cashew nut shell**

4. Information on existing farming systems, practices, productivity levels and income in the target area:

5. Key Intervention(s) introduced: Tannase enzyme was produced from cashew industry by product, cashew nut shells

6. Results

Status of dissemination/commercialization; and, extent of adoption and success, if applicable; with supporting data (with tables and photographs as annexure): Technology under progression

7. Brief description of technology for release:

The cashew shell is about 0.3 cm thick, having a soft feathery outer skin and a thin hard inner skin. Between these skins is the honeycomb structure containing the phenolic material known as CNSL. Inside the shell is the kernel wrapped in a thin skin known as the testa. Testa is the good source of tannins. Tannins act as the sole source of carbon and to degrade the tannins, microbes have been introduced and the microbes produce tannase. Tannase is extensively used in

the food, feed, beverage, brewing and pharmaceutical industries. The major applications of tannase are in the manufacturing of instant tea and the production of gallic acid. Gallic acid is the key intermediate required for the synthesis of the antibacterial drug trimethoprim used in the pharmaceutical industries. In food industries, tannase is utilized as a clarifying agent of various beverages like wine, fruit juice, and coffee flavoured drinks.

7. Expected Outcome/Impact of the technology:

(8.1) Expected increase in area, production and net income

Various industries

(8.2) Others

8. Whether findings have been published? If so, give the citation and enclose copy of the publication.

Submitted paper for 21st swadeshi science congress (details in publication list)

Proforma -2

**Validation of Developed/ Released/ Adopted Processing Technologies/
Innovations**

1. Title of the sub-project: A Value Chain on Cashew for Domestic and Export market
2. Name of CPI/CCPI: Dr. V. P. Potty
3. Title of the technology: **Development of high performance cashew processing system (12 numbers installed)**

4. Information on existing farming systems, practices, productivity levels and income in the target area:

Capacity of the produce raw cashew nut processing handled – 8-10 bags (80Kg) /day

5. Key Intervention(s) introduced: Developed pollution preventing system in cashew processing unit

6. Results

Status of dissemination/commercialization; and, extent of adoption and success, if applicable; with supporting data (with tables and photographs as annexure):

Pollution preventing system was commercialized in following cashew processing units and number of installation

1. m/s india food exports, kanyakumari, tamilnadu (1)
2. vijayalakshmi, paloor, tamilnadu (1)
3. india food, colachel, tamilnadu (1)
4. k.p.p, muzhankuvila, tamilnadu (1)
5. nirmal krishna, maruthan para, tamilnadu (1)
6. rajan cashew, chavara, thekkum bhagam, kollam (1)
7. prashanthi, tamilnadu (1)
8. prashanthi, kilimanoor, thiruvananthapuram (5)

7. Brief description of technology for release:

The processing system consists of conditioning of raw nuts, drum/steam roasting, cooling, cutting, peeling grading, borma and packing. The existing technologies for conditioning the raw nuts, drum/steam roasting, cooling, cutting, peeling, grading and packing is century old and some of the technologies needs improvement. Drum roasting of raw nuts releases CO₂, nitrate and sulphate along with particulate matter leading to atmospheric pollution. Under the project developed a pollution preventing system for

cashew drum roasting units. The system consists of removing the particulate matter leaving only steam outside.

8. Expected Outcome/Impact of the technology:

Approved by kerala pollution control board

(8.1) Expected increase in area, production and net income

Cashew processing units

(8.2) Others

9. Whether findings have been published? If so, give the citation and enclose copy of the publication.

Patent application was filed in India (NRDC): Pollution controlling drum roasting cashew processing units (Regd. #IPR/ FA/ 10064)

News paper items appended separately

Proforma -2

Validation of Developed/ Released/ Adopted Processing Technologies/ Innovations

1. Title of the sub-project: A VALUE CHAIN ON CASHEW FOR DOMESTIC AND EXPORT MARKET
2. Name of CPI/CCPI: Dr. V.P.Potty
3. Title of the technology: **Production of anacardic acid from cashew shell**
4. Information on existing farming systems, practices, productivity levels and income in the target area: Anacardic acid is a costly compound and

it was being produced by existing supercritical CO₂ extraction method.

This method very costly and production was very less.

5. Key Intervention(s) introduced: Simple, easy, non thermal and low cost extraction of anacardic acid was invented from cashew industry waste of cashew nut shell

6. Results

Status of dissemination/commercialization; and, extent of adoption and success, if applicable; with supporting data (with tables and photographs as annexure): Adopted by one Industry and the final processing is under progression

7. Brief description of technology for release:

Anacardic acid is a phenolic compound and it is a major component of cashew nut shell liquid. During thermal processing it gets converted into cardanol. The cashew nut shell liquid if obtained by low temperature treatment contains only anacardic acid and cardol with anacardic acid as the major component. Anacardic acids do have many industrial and medicinal applications with established anticancer activity and the cost of which falls on a higher side. It is very much demand in the international market. New extraction process for anacardic acid was developed without thermal application in salt form and can be stored as anacardate. The existing method for the extraction of anacardic acid was very costly and time consuming. But the newly developed method could overcome that problem. Moreover by using cashew shell as a raw material, the utilization of cashew industry by product into a very good foreign exchange earner compound conversion is possible. Since cashew nut shell is used as fuel in cashew processing system.

8. Expected Outcome/Impact of the technology:

(8.1) Expected increase in area, production and net income

Drug industry and chemical industry (8.2) Others

9. Whether findings have been published? If so, give the citation and enclose copy of the publication.

Patent application was filed through NRDC: Low cost method for the extraction of anacardic acid from cashew nut shell (Regd. #IPR/ FA/ 10076)

Proforma -2

Validation of Developed/ Released/ Adopted Processing Technologies/ Innovations

1. Title of the sub-project: **A VALUE CHAIN ON CASHEW FOR DOMESTIC AND EXPORT MARKET**
2. Name of CPI/CCPI: **Dr. V.P.Potty**
3. Title of the technology: **Development of new processing technology for cashew cutting and peeling**
4. Information on existing farming systems, practices, productivity levels and income in the target area: Drum roasting and steam roasting of raw cashew nut was followed in cashew processing industries. It will decarboxylate the costly compound anacardic acid to cardanol as well as a large number of women folks were involved in the cutting and peeling of raw cashew nuts after processing. It will overcome by the newly invented processing technologies

5. Key Intervention(s) introduced: New technology for cutting and peeling of raw cashew nut

6. Results

Status of dissemination/commercialization; and, extent of adoption and success, if applicable; with supporting data (with tables and photographs as annexure): Technology for commercialization under progression

7. Brief description of technology for release:

Incubating with warm water for a period of time found feasible for cutting the cashew shell as well as peeling the testa. The pre and post treated samples of cashew kernels did not show any significant change in the chemical and nutritional quality.

7. Expected Outcome/Impact of the technology:

(8.1) Expected increase in area, production and net income

Various industries

(8.2) Others