



राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला
NATIONAL INSTITUTE OF TECHNOLOGY AGARTALA
Department of Chemical Engineering
PO-NIT Agartala, West Tripura, Tripura-799046

Date: 20.02.2024

To

Director

Khadi and Village Industries Commission (KVIC)

Ministry of MSME, Govt. of India

3, Ira Road, Vile Parle (West), Mumbai - 400056

Subject: Re-submission of the modified research project proposal titled "Development of equipment and process of Jackfruit suitable for rural area" under S&T scheme to Khadi and Village Industries Commission (KVIC) for possible funding

Dear Sir,

We are thankful to the KVIC to present our research proposal in front of expert committee. As per email communication dated 14.02.2024, we have modified our research proposal as per constructive comments of the expert committee. We have also changed the title as "Development of equipment and process of Jackfruit suitable for rural area" as per comments.

We hope that our modified research proposal will be competitive for funding.

Look forward to positive hearing from you.

Thanking you

Best regards

(Dr. Kalyan Gayen)

Principal Investigator

Assistant Professor

Department of Chemical Engineering

National Institute of Technology Agartala

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Enclosure:

1. Modified Research Proposal

Web site: <http://www.nita.ac.in>

Project proposal
on
Development of equipment and process of Jackfruit suitable for rural
area



Under Scheme of
S&T Scheme of KVIC
Agro Based & Food Processing Industry
(Fruit & Vegetable processing Industry)

Submitted to
Director
Khadi and Village Industries Commission (KVIC)
Ministry of Micro and Medium Enterprises, Govt. of India
Directorate of Science & Technology
Gramodaya, 3, Iria Road, Vile Parle (W), Mumbai-400056

By
National Institute of Technology Agartala

Dr. Kalyan Gayen
Department of Chemical Engineering
&
Dr. Trdib Kumar Bhowmick
Department of Bioengineering

**DIRECTORATE OF SCIENCE & TECHNOLOGY
OFFICE OF THE COMMISSIONER KVI
Gramodaya, 3, Iria Road, Vile Parle (W),
Mumbai-400056**

Proforma for submission of new R&D project proposal (Year 20023)

I-Part A

1.	Name of the Institution / Individual National Institute of Technology Agartala (NIT Agartala)	
2.	Institutional Structure / Registration Details a) Agency Type (Statutory Bodies / Autonomous / NGO /Society etc.): Central Govt. Autonomous Bodies b) Hierarchy of Agency (Central/State/District/Block/Tahsil/Panchayat/ Village): Central c) Act/Registration No.: 5029 of 2006 d) Date of Registration: 28.04.2006 e) Registration Authority: Registrar, Govt. of Tripura f) State of Registration: Tripura	
2a.	Legal Status	Central Government Institute (MHRD)
2b.	Date of Registration	28.04.2006
2c.	Registered Address	National Institute of Technology Agartala (NIT Agartala) PO – NIT Agartala West Tripura, Tripura - 799046
2d.	Offline Address / Locations	National Institute of Technology Agartala (NIT Agartala) PO – NIT Agartala West Tripura, Tripura – 799046 Phone: 0381-2546630 Fax: 0381-2546630 Email: director@nita.ac.in; registrar@nita.ac.in
2e.	Affiliated to KVIC	Yes / No If yes, provide certificate No.: Not Applicable Validity of Certificate: Not Applicable

3. **Validity of Registration (in case of NGOs):** Not Applicable
4. **Name & Designation of the head of the organization:**
Prof. Sarat Kumar Patra, Director, National Institute of Technology, Agartala (NIT Agartala)

5. **Name, Designation & address of the project investigators:**

Investigator 1:

Dr. Kalyan Gayen

Assistant Professor

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Investigator 2:

Dr. Tridib Kumar Bhlowmick

Assistant Professor

Department of Bioengineering

National Institute of Technology Agartala

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Email: tbhowmick@gmail.com

6. **Background of the organization:**

- a) **Past experience in R&D work in the KVI sector and micro-enterprise and entrepreneurship development need to be given separate sheets (details of work done in other areas need not be given)**

Investigators worked on micro-enterprise and entrepreneurship development with Directorate of Biotechnology, Government of Tripura where investigators will develop one pilot scale unit at “Bio-village” for food processing and provided training to the stakeholders.

- b) **Infrastructure facilities and expertise available (give details)**

Laboratory:

1. Workshop
2. Water and Electricity
3. Standby power supply
4. Laboratory Space and furniture

5. Air-conditioned room of equipment
6. Telecommunication
7. Transportation
8. Administration and social support
9. Library facilities
10. Library facilities
11. Computational facilities

Manpower: NIL

Equipment's:

1. Fermenter
2. Photobioreactor
3. Biosafety Cabinet
4. Autoclaves
5. FTIR
6. HPLC
7. GC
8. UV Spectrophotometer
9. Optical Microscope with image capture software
10. Water purification systems
11. pH meter
12. Refrigerated Centrifuge
13. Mini Centrifuge
14. Balances
15. BOD Incubator
16. Forced convection oven

Investigators have expertise in food processing and training to the beneficiaries.

c) Details of completed and ongoing projects during last 3 years

Sr. No.	Title of the project	Start date – completion date	Name and full address of funding agency	Amount sanctioned	Amount received
1.	Edible coating from waste biomass increasing shelf - life periods of	26.07.2022 - 25.07.2025	Defense Research & Development Organisation (DRDO),	65,43,000	40,56,000

	fruits and vegetables		India		
2.	Technology development for the production of natural colorant (chlorophyll) from isolated microalgae	28.03.2019 - 27.03.2023	Science and Engineering Research Board (SERB), India	32,23,000	31,40,906
3.	Entrepreneurship Development through Setting up of Pilot Scale Unit on Production and Packaging of Tender Jackfruit Ready to Cook at Biovillage	27.03.2023 - 26.09.2024	Directorate of Biotechnology Tripura (DBT Tripura), Tripura, India	5,50,000	5,50,000

7. **District / Area to be taken up for the project:** West Tripura, Tripura

8. **Location of projects implementation and details thereon:**

NIT Agartala, West Tripura, Tripura - 799046

9. **If any developmental activity has been done in the proposed location prior to submission of this proposal by the project coordinator or the organization, the details may be given in brief:**

Investigators are in the process of providing training in the proposed location (Bio-village at West-Tripura District, Tripura).

10. **Details of infrastructure of the organization in the proposed location:**

Laboratory at NIT Agartala:

1. Workshop
2. Water and Electricity
3. Standby power supply
4. Laboratory Space and furniture
5. Air conditioned room of equipment
6. Telecommunication
7. Transportation
8. Administration and social support
9. Library facilities

10. Library facilities
11. Computational facilities

Manpower: NIL

Equipments:

1. Fermentor
2. Photobioreactor
3. Biosafety Cabinet
4. Autoclaves
5. FTIR
6. HPLC
7. GC
8. UV Spectrophotometer
9. Optical Microscope with image capture software
10. Water purification systems
11. pH meter
12. Refrigerated Centrifuge
13. Mini Centrifuge
14. Balances
15. BOD Incubator
16. Forced convection oven

Location at implementation of the project: NIL

II-Part B

1. **Title of the R & D proposed:** Development of equipment and process of Jackfruit suitable for rural area
2. **Objectives of the proposed study:** Followings are the objectives of the proposed study:
 - a) Process development for removing browning effect of fresh cut tender-jackfruit
 - b) Development of cheap process and packaging toolkit for long term preservation of tender-jackfruits as per FASSI guideline
 - c) Estimation of nutritional values of processed and tender-jackfruits
 - d) Training to the stakeholders (rural village) on processing and packaging of tender-jackfruits
3. **Justification of the project based on the assessment of the existing resources and infrastructure**

Jackfruit (*Artocarpus heterophyllus*) is a delicious fruit and is widely used both in tender state (as cooked vegetable) and ripe state (directly edible). There are number of health benefits of jackfruit such as strengthen immune system and bone, lower high blood pressure, boost energy etc. [1]. As per report, the total jackfruit cultivation has been 1877 tonnes in India in the year 2021-2022. Tripura is the seventh producer of jackfruit and cultivation of 1.34 million tonnes which contribute 7.15 % of the share to India. Although, Tripura is in 7th position but this state is highest producer of jackfruit per hector [2]. Tender jackfruit is used as vegetables in different traditional recipes by the peoples of Asian community including India. Fresh cut tender jackfruit is most preferable to the consumers due the avoidance of the cutting hassles and reduction of cooking time in the kitchen. Texture and appearance of the fresh cut tender jackfruit is a determinant factor for the consumers. The quality and commercial value of the fresh cut tender jackfruit largely depend on color, texture, appearance, nutritional value, and other factors that degrade the appearance of the product. Browning of the fresh cut tender jackfruit is the limiting factor for successful commercialization of the product. This tender jackfruit is seasonal and need to preserve for longer period so that it can be available to the buyer throughout the year. As jackfruit production in Tripura is high, therefore, to broaden the jackfruit market and to increase the awareness on the health benefit effects of jackfruits, there is a need to develop a process which can prevent the browning effect of the fresh cut tender jackfruit and preserve it for longer period of time. Jackfruit processing and preservation for longer period of time would benefit the farmers as well as the buyers economically. Further, development of process to prevent the browning effect in jackfruit will ensure the health benefit affects which certainly attract the attentions of the customers.

National Institute of Technology Agartala is a reputed Central Government institute for quality teaching and research to meet the societal needs. In this project, proposals have

been made to develop a process which can avoid the browning effect in fresh cut jackfruit during long term storage and benefit the jackfruit cultivators in rural village. All required infrastructures and resources are available at NIT Agartala to execute the proposed project.

4. The availability of proposed technology / intervention in the field / market etc:

Jackfruits are grown profusely in Asian countries including in India. One of the major drawbacks to buy the fresh cut tender jackfruit is the browning appearance of the jackfruit. However, healthy packaged jackfruit with no browning effect is still unavailable in the market due to the absence of suitable technology for proper packaging and processing. Here, we proposed to develop the cheap processing and packaging technology to restore the health benefit effects of jackfruits with no browning effect. This technology would enable jackfruit cultivators in rural village to increase the earnings, produce good quality products and increase their skills. This project also proposes to train the beneficiaries in rural area in Tripura to utilize the local jackfruit resources more efficiently, which certainly generate employment opportunities in Tripura.

5. Level of work done so far (Review of literature of the proposed R&D):

National

Health benefit effects of the jackfruit (*Artocarpus heterophyllus*) are well known and considered as one of the major consumed fruits in different tropical countries. Health benefit effects and nutritional qualities of the jackfruits have been reviewed by Gupta et al. [3]. In a clinical trial study, Rao et al., had shown that consumption of green jackfruit flower can reduce the blood glucose level in type 2 diabetes mellitus patients [4]. *In vivo* study had shown the reduction in the blood glucose level in induced gestational diabetic rats [5]. Jackfruit processing (e.g. drying parameters) and biochemical composition were analyzed by Priyadarshini et al. and shown the efficient drying process to produce powder from the jackfruit pulp [6]. The amount of browning in the appearance of fresh cut tender jackfruit was estimated using image analysis technology by Rana et al. [7].

International

Nutritional composition of the cooked jackfruit was analyzed by Hettiaratchi et al. and showed that the jackfruit seeds are good source of starch (~22%) and contain dietary fibre [8]. Available starch from the jackfruit can be used as a natural bioflocculant for the harvesting of the microalgae (*Chlorella* sp.) [9]. Fernandes et al. had studied the aqueous extract of jackfruit seed to show the reactive nitrogen species scavenging activity of the seed [10]. Hao et al. had shown that the oligopeptides isolated from the jackfruit regulate immune functions through cellular stimulation, cytokine release and antibody production [11]. Rivera-Aguilar et al. had shown that the encapsulation of jackfruits extract provide

the anti-proliferative activity, useful for the spreading of cancer [12]. Trejo Rodriguez had shown the anti-oxidant, anti-cancer and pre-biotic activity of the jackfruit seed flower can be useful for developing functional food products [13]. Zhu et al. had shown in mice model the polysaccharide isolated from the jackfruit pulp can change the microbial composition in gut and improve the short chain fatty acid production [14]. Zheng et al. had shown the tyrosinase inhibitors isolated from wood can reduce the browning effect in jackfruit [15].

All these above mention works suggest nutritional values of jackfruits, specific health benefit effects of the Jackfruit and use of jackfruits to prevent diseases. However, not much work is available on the long-term preservation and restoration of the functional components in the jackfruits. Therefore, work and effort is needed in this direction to preserve the jackfruit for longer period of time to make the jackfruit as an economically valuable product.

References:

- [1] M.H.H. Khan, M.M. Molla, A.A. Sabuz, M.G.F. Chowdhury, M. Alam, M. Biswas, Effect of Processing and Drying on Quality Evaluation of Ready-To-Cook Jackfruit, (2021).
- [2] <https://theindianblog.in/top-10-states-india/top-10-jackfruit-producing-states-in-india/>. (Accessed 2022.05.17).
- [3] A. Gupta, A.R. Marquess, A.K. Pandey, A. Bishayee, Jackfruit (*Artocarpus heterophyllus* Lam.) in health and disease: a critical review, *Critical reviews in food science and nutrition* 63(23) (2022) 6344-6378.
- [4] A.G. Rao, K.S. Naik, A.G. Unnikrishnan, J. Joseph, Efficacy of green jackfruit flour as a medical nutrition therapy replacing rice or wheat in patients with type 2 diabetes mellitus: a randomized, double-blind, placebo-controlled study, *Nutrition & diabetes* 11(1) (2021) 18.
- [5] D. Dwitianti, R.A. Rachmania, K. Efendi, R. Septiani, P. Jihadudin, In Vivo Activities and In Silico Study of Jackfruit Seeds (*Artocarpus heterophyllus* Lam.) on the Reduction of Blood Sugar Levels of Gestational Diabetes Rate Induced by Streptozotocin, *Open access Macedonian journal of medical sciences* 7(22) (2020) 3819-3826.
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- [7] S.S. Rana, R.C. Pradhan, S. Mishra, Image analysis to quantify the browning in fresh cut tender jackfruit slices, *Food Chem* 278 (2018) 185-189.
- [8] U.P. Hettiaratchi, S. Ekanayake, J. Welihinda, Nutritional assessment of a jackfruit (*Artocarpus heterophyllus*) meal, *The Ceylon medical journal* 56(2) (2011) 54-8.
- [9] S.Y. Choy, K.M. Prasad, T.Y. Wu, M.E. Raghunandan, B. Yang, S.M. Phang, R.N. Ramanan, Isolation, characterization and the potential use of starch from jackfruit seed wastes as a coagulant aid for treatment of turbid water, *Environmental science and pollution research international* 24(3) (2016) 2876-2889.
- [10] F. Fernandes, F. Ferreres, A. Gil-Izquierdo, A.P. Oliveira, P. Valentao, P.B. Andrade, Accumulation of primary and secondary metabolites in edible jackfruit seed tissues and scavenging of reactive nitrogen species, *Food chemistry* 233 (2017) 85-95.
- [11] Y.T. Hao, X.R. Liu, N. Zhu, R.X. Mao, R. Liu, L. Wu, J.W. Kang, J.N. Hu, Y. Li, Jackfruit (*Artocarpus heterophyllus* Lam.) oligopeptides regulate immune responses via Th cell stimulation, cytokine secretion and antibody production, *Food & function* 11(11) (2020) 9810-9819.

- [12] J.O. Rivera-Aguilar, M. Calderon-Santoyo, E.M. Gonzalez-Cruz, J.A. Ramos-Hernandez, J.A. Ragazzo-Sanchez, Encapsulation by Electrospraying of Anticancer Compounds from Jackfruit Extract (*Artocarpus heterophyllus* Lam): Identification, Characterization and Antiproliferative Properties, Anti-cancer agents in medicinal chemistry 21(4) (2020) 523-531.
- [13] I.S. Trejo Rodriguez, L.E. Alcantara Quintana, P. Algara Suarez, M.A. Ruiz Cabrera, A. Grajales Lagunes, Physicochemical Properties, Antioxidant Capacity, Prebiotic Activity and Anticancer Potential in Human Cells of Jackfruit (*Artocarpus heterophyllus*) Seed Flour, Molecules 26(16) (2021).
- [14] K. Zhu, H. Fan, S. Zeng, S. Nie, Y. Zhang, L. Tan, C. Li, F. Xu, Q. Liu, G. Wu, Polysaccharide from *Artocarpus heterophyllus* Lam. (jackfruit) pulp modulates gut microbiota composition and improves short-chain fatty acids production, Food chemistry 364 (2021) 130434.
- [15] Z.P. Zheng, K.W. Cheng, J.T. To, H. Li, M. Wang, Isolation of tyrosinase inhibitors from *Artocarpus heterophyllus* and use of its extract as antibrowning agent, Molecular nutrition & food research 52(12) (2008) 1530-8.

6. Relevance, usefulness and justifications of the proposed work to KVI sector terms of economy, efficiency, productivity, quality, raw material utilization, etc:

Outcome of this project is one developed technology which would help the farmers of the rural village to start their own business to produce the tender jackfruit packaged product. Farmers of the rural village will be directly benefited economically after successful execution of this project. Farmers can open their own business as outcome of this project is packaged tender jackfruit. Further, successful execution of this project will boost the small-scale industry to make their business. Therefore, income generation and financial benefit to the stakeholders will be outcome of this project.

7. Time schedule (month wise action plan) for implementing the project:

SL. No	Task	Months					
		0-6	7-12	13-18	19-24	25-30	31-36
1	Procurement of equipment's and recruitment of Project Assistant (PA)						
2	Process development and packaging of jackfruits						
3	Estimation of nutritional values						

4	Preservation study of processed jackfruits						
6	Training to the farmers / stakeholders						
7	Final report to funding agency						

8. Implementation methodology in brief (step wise):

Objective 1: Process development for removing browning effect of fresh cut tender-jackfruit

Work Plan 1:

Processing will be developed by maintaining the FASSI guideline.

Pre-treatment: Tender jackfruits will be washed in 0.1% potassium metabisulphite (KMS), peeled and cut into pieces of uniform size. Next, for removal of browning effect samples will be dipped into 1% organic acid for ~ 10 min at room temperature.

Blanching: Thereafter, samples will be blanched at 100°C for about ~1 minute in a solution with ~0.3% citric acid as preservative for better retention of color and texture. After blanching, the samples will be cooled in water-bath at room temperature to avoid over cooking and discoloration.

Work Plan 1 will be executed adhering the guideline of Food Safety and Standard Authority of India (FSSAI).

Objective 2: Development of cheap process and packaging toolkit for long term preservation of tender-jackfruits as per FASSI guideline

Work Plan 2:

In this work plan, three jackfruit products will be done: (i) Tender Jackfruit chunk (ii) Tender jackfruit flour (iii) Packing technique for dry/flour jackfruit iv) Tender wet jackfruit in brine and Packaging technique

- (i) **Tender jackfruit chunk:** Processed tender jackfruit obtained from objective 1, will be dried around 70 °C for about 48 h. Here, drying temperature and drying time will be optimized.

- (ii) ***Tender jackfruit flour:*** Processed tender jackfruit obtained from objective 1, will be dried followed by grinding to make jackfruit flour. Cheap grinding machine will be selected from market survey.
- (iii) ***Packing technique for chunk/flour jackfruit:*** After obtaining dry / flour jackfruit (point i & ii of objective 2), different packing techniques (e.g., only pouch, vacuum pouching, nitrogen filling pouching and vacuum followed by nitrogen filling) will be tested for the better preservation of the tender jackfruit.
- (iv) ***Tender wet jackfruit in brine and Packaging technique:*** Here, filling solution will be prepared by adding around 3 % NaCl with suitable organic acids and will be boiled for 30 minutes. About 250 mL of hot filling solution will be poured in to the sterile cans placed in boiling water bath. Thereafter, about 250 g of blanched sample (obtained from objective 1) will be poured into the can (leading to 7 mm headspace) followed by immediate sealing with sterile lids. The cans will be cooled quickly by putting in cold water. Here, aluminum pouch will be tested as a cheap source of packaging techniques.

Work Plan 2 will be executed by adhering to the guideline of Food Safety and Standard Authority of India (FSSAI). The suitable packaging toolkit will be implemented in this project for maintaining the nutritional quality of the tendered jackfruit during long term storage.

Objective 3: Estimation of nutritional values of processed and tender-jackfruits

Work Plan 3:

Nutritional values of the jackfruit products obtained from objective 2, will be evaluated with preservation time. Nutritional values (carbohydrate, protein, fat) of processed jackfruits and raw jackfruit will be evaluated to test the quality of the processed jackfruit). Also, microbial load of the pouched jackfruit will be tested after every three months. Other quality attributes namely colour (browning index), vitamin C, titrable acidity using standard methods (as per FSSAI).

Objective 4: Training to the stakeholders (rural village) on processing and packaging of jackfruits

Work Plan 3:

Developed technology will be demonstrated and training will be given to selected beneficiaries at Tripura (from rural village) to produce packaged jackfruit.

9. Potential areas identified for promotion of micro-enterprise:

Fruit & Vegetable processing Industry

10. Scientific and Technical interventions envisaged:

Optimum jackfruit processing and packaging technology will be developed suitable for preventing the browning effect during long term storage. Training will be given to Tripura based farmers.

11. Training programme envisaged:

Training will be provided to the stakeholders (rural people) willing to adopt this technology for startup business purpose.

12. Linkage envisaged:

In this proposal, academic institute will be linked to the micro-scale business by providing training to the stakeholders in rural area to promote their own startup business.

13. Follow-up mechanism envisaged to tap fullest benefit of R&D:

Advancement of process and toolkit development of packaged jackfruit will be carried out to provide support to the stakeholders (from rural village) and periodic interactions will be done with the beneficiaries to update their better business.

14. Expected outcome of the project:

Good quality jackfruits are naturally grown at Tripura which is renewable. Tripura is in 7th position but this state is highest producer of jackfruit per hector. Therefore, availability of jackfruits is abundant in Tripura. Further, this project may increase the jackfruit plantation in Tripura once it will be profitable business. Overall, this product will be sustainable since renewable raw material (jack fruit) is available in Tripura.

Specific expected outcome of this projects are as follows.

1. Agro based product development utilizing the local resources.
2. Economic development of the local people
3. Employment generation locally
4. Generation of micro-scale business/ startup business.

15. Exit strategy (Plan after completion of the project):

Developed processing technology of the tender jackfruit would provide direct economic benefit to the farmers/workers. Improvement of the quality of life is the key of the sustainable development in this project. Therefore, monitoring of the economic conditions at ground level is absolute requirement after completion of the project.

16. Any other information / remarks:

None


17. Budget:

Sr. No.	Item of Expenditure	1 st year	2 nd year	3 rd year	Total
A.	Non-recurring Items				

1	Dryer with accessories	9,25,000	0	0	9,25,000
2	Packaging Machines with accessories				
3	Homoziniger with accessories				
B	Recurring Items				
1.	Manpower	2,64,000	2,64,000	3,03,600	8,31,600
2.	Consumables	2,50,000	2,00,000	1,50,000	6,00,000
3.	Travel	10,000	10,000	10,000	30,000
4.	Training Programme	0	25,000	50,000	75,000
5.	Contingency	50,000	50,000	50,000	1,50,000
6.	Institute Overhead	74,950	27,450	28,180	1,30,580
	Total	15,73,950	5,76,450	5,91,780	27,42,180

Justification of budget:

- a) **Non-recurring items (Dryer, packaging machines, Homoziniger):** To execute this project one dryer, packaging machines with accessories and homoziniger with accessories are essential for experimental and training purpose with estimated cost is Rs. 9,25,000/-
 - b) **Manpower:** One Project assistant (PA) is required for the experiments, data analysis and conduct training programme. Salary of PA Rs. 20,000/- + 10% HRA per month for 1st year & 2nd year and Rs. 23,000/- + HRA per month for 3rd year.
 - c) **Consumables:** Specific chemicals, reagents, glasswares, plasticwares, out sourcing of sample analysis, 3rd party testing and repairing of the equipments are required for the execution of the project. Estimated cost under consumable head is Rs. 6,00,000/-
 - d) **Travel:** Desired for travel to attend the project review meeting, training of project staffs and symposia/ seminars within the country.
 - e) **Training programme:** Training programme will be conducted in nearby villages at NIT Agartala in 2nd and 3rd year of the project with total estimated cost Rs. 75000/-
 - f) **Contingency:** Needed to meet out all the unforeseen expenditures for the smooth running of the research activities. Total estimated contingency cost is kept Rs. 1,50,000/-.
- 18. Certificate of Endorsement from the head of the institution should be in the prescribed format (Annexure III):** Attached
- 19. Submission of Progress report:** A write up on various activities carried out under this project is required to be submitted quarterly and also annually along with the data, summary etc in the prescribe format (Annexure IV)


Name & Signature of the Head of the
Institution / Agency

Date:

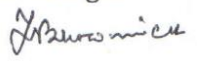
Place:

प्रो. सरत कुमार पात्रा
Prof. S. K. Patra
निदेशक / Director
National Institute of Technology
Agartala.

Recommendation of

State Director / Divisional Director:

Date 3/10/2023
Dr. Kalyan Gayen
Name & Signature of the Project
Investigator 1

 3/10/23
Dr. TRIDIB KUMAR BHOWMICK.
Name & Signature of the Project
Investigator 1

Signature

State Director / Divisional Director



ANNEXURE-III

CERTIFICATE

ENDORSEMENT FROM THE HEAD OF THE INSTITUTION

Project Title: Jackfruit with health benefits: Production and packaging for economic development of Tripura

1. We have gone through the terms and conditions of the S&T grant agreed to abide by and enter into an Agreement/MOU with OCKVI for implementing the S&T scheme.
2. We have neither obtained nor intended to obtain financial assistance from any other agencies, amounting to double funding.
3. We undertake to submit progress reports, statement(s) of accounts, utilization certificates, etc. as required.
4. Certified that Dr. Kalyan Gayen and Dr. Tridib Kumar Bhowmick are the project investigators of the proposed S&T project. Project Investigators will assume the responsibility of completion of the project.
 - a) Certified that the hardware, other basic facilities and such other administrative support required as per terms and conditions of the grant, will be extended to the Coordinator(s) throughout the duration of the project.
 - b) Our agency assumes to undertake the complete financial and other management responsibilities of the project, and will ensure compliance with the terms and conditions laid down.
5. Certified that the Society/Organization will extend benefits of the said S&T projects to the targeted beneficiaries of KVI activities only.
6. If any of the above statements found to be incorrect by OCKVI at any point of time, the organization takes responsibility to refund the entire amount released by OCKVI along with 10 % interest as per GFR norms.

Date:

Place: NIT Agartala

Name and Signature of the
Head of Agency

प्रो. सरत कुमार पात्रा
Prof. S. K. Patra
निदेशक / Director
National Institute of Technology
Agartala.