



तेजपुर विश्वविद्यालय

(केंद्रीय विश्वविद्यालय)

नपाम, तेजपुर - 784028, असम, भारत

TEZPUR UNIVERSITY

(A Central University)

Napaam, Tezpur - 784028, Assam, India

(सर्वोत्तम विश्वविद्यालय के लिए कुलाध्यक्ष पुरस्कार, 2016, भारत के 100 श्रेष्ठ उच्च शिक्षण संस्थानों में पंचम स्थान और 'नाक' द्वारा 'ए' ग्रेड प्राप्त विश्वविद्यालय)
(Awardee of Visitor's Best University Award, 2016, 5th among India's Top 100 Universities, MHRD-NIRF-Ranking, 2016 and NAAC Accredited with "A" Grade)

A REPORT ON

Electric Field Based Novel Technologies for Pilot Scale Processing of Juice and Pulp from Potential Fruits of NE Region”

1. Name of the Collaborative Activity: Joint Research on “ Electric Field Based Novel Technologies for Pilot Scale Processing of Juice and Pulp from Potential Fruits of NE Region”
2. Nature of Activity: Research activity
3. Name of the Collaborating Agency/ Individual with affiliation, and contact details:
Dr. Brijesh Srivastava, Dept. of FET; Tezpur University, Tezpur Assam (Principal Investigator)

Dr. Prem Prakash Srivastav, IIT Kharagpur, West Bengal (Co- Principal Investigator)
Dr. Ruth Assumi, NEH-ICAR, Barapani, Shilong (Co- Principal Investigator)

4. Summary of collaboration:

The project started in 1/08/2018 and completed in January 2022. During the duration of the project all three collaborative partners works together and exchanged idea, to execute the project successfully. Total Rs. 291.47447 (NASF/AE-7010/2018-19 dated 29.07.2021) is sanctioned to execute the following objectives:

- Objective #1 (at FET, TU)
To develop a pilot scale set-up of Ohmic heating system for aseptic processing of fruit juice and pulp
- Objective #2 (at FET, TU)
To fabricate a laboratory set-up for Cold Plasma assisted processing for fruit juice and pulp
- Objective #3 (at AgFE, IIT Kgp)
To standardize the processing conditions for fruit juice and pulp processing by Atmospheric Cold Plasma (ACP) and its effect on self-life enhancement and nutritional benefits
- Objective #4 (at ICAR-RC for NEH Region; Meghalaya)
To disseminate the developed technology of fruit juice and pulp processing among prospective entrepreneur of NE region

Major studies carried out under the project is given in section 5.

5. List of year-wise activities under the collaboration:

2018-2019 FY:

- Tender, procurement, and installation of lab equipments.

2019-2020 FY:

- Studied heating performances, enzyme inactivation and physico-chemical changes in fresh pineapple juice in batch type ohmic heating system
- Developed a lab scale continuous type ohmic heating set up with data acquisition system
- Effect of cold plasma (CP) treatment on the physico-chemical parameters and enzyme activity of pineapple pulp
- Studied the effect of atmospheric cold plasma (ACP) treatment on enzyme inactivation in orange juice
- Studied the effect of cold plasma micro-flora of pomegranate juice
- Studied the effect of cold plasma on the physico-chemical properties of kiwi fruit

2020-2021 FY:

- Studied the effects of cold plasma (CP) treatment on the physico-chemical parameters and enzyme activity of pineapple juice

2021-2022 FY:

- Studied the effects of cold plasma (CP) treatment on the physico-chemical parameters and enzyme activity of orange juice
- Fabricated continuous type set up for Cold Plasma assisted processing for fruit juice
- Studied the effect of cold plasma parameters on enzyme inactivation and nutritional properties of kiwifruit juice and its optimization
- Studied Heating performances, enzyme inactivation, and physico-chemical changes in fresh pineapple juice in a continuous ohmic heating system.

Publications:

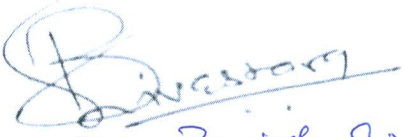

Conferences

1. Amardeep Kumar, Wungshim Zimik, Arjuara Begum and Brijesh Srivastava. Enzyme inactivation and physico-chemical changes in pineapple juice in batch type ohmic heating system. *International Conference on Sustainable Approaches in Food Engineering and Technology (SAFETY-2021)*, 24th – 25th June, 2021.
2. Amardeep Kumar, Arjuara Begum, Wungshim Zimik and Brijesh Srivastava. Bromelain inactivation of pineapple juice by ohmic heating and its effect on quality attributes. *International Conference on Emerging Techniques in Food Processing (ETFP)*, March 25th – 26th March, 2021.
3. Amardeep Kumar, Saddam Hussain, Monjurul Hoque and Brijesh Srivastava. Drying kinetics modeling of ohmic blanched pineapple cubes. *27th Indian Convention of Food Scientists and Technologists*, 30th Jan – 01stFeb, 2020.

4. Arjuara Begum, Amardeep Kumar and Brijesh Srivastava. Cold Plasma assisted inhibition of Enzymatic Browning in pineapple pulp and Modelling inactivation kinetics. *International Conference on Sustainable Approaches in Food Engineering and Technology (SAFETY-2021)*, 24th – 25th June, 2021.
5. Arjuara Begum, Azmirul Hoque and Brijesh Srivastava. Foam characterization of cold plasma treated pineapple pulp and its drying behaviour. *27th Indian Convention of Food Scientists and Technologists*, 30th Jan – 01st Feb, 2020.
6. Wungshim Zimik, Amardeep Kumar, Arjuara Begum, Arup Das and Brijesh Srivastava. Non-thermal cold plasma treatment for shelf-life enhancement of fresh strawberries (Sweet Charlie) for improving commerciality. *International Conference on Sustainable Approaches in Food Engineering and Technology (SAFETY-2021)*, 24th – 25th June, 2021.

Research Article

1. Kumar, A., Begum, A., Hoque, M., Hussain, S., & Srivastava, B. (2021). Textural degradation, drying and rehydration behaviour of ohmically treated pineapple cubes. *LWT – Food Science and Technology*, 142, 110988

Signature of Faculty	Signature and Seal of Head of Department/ Centre/ Cell
 Name: Prof. Brijesh Srivastava Designation: Professor	 Name: Designation: Head

Department of Food Engg. & Technology,
 Tezpur University
 Napaam, Tezpur- 784028, Assam



TEZPUR UNIVERSITY

REPORT OF EXAMINERS OF ORAL DEFENCE EVALUATION COMMITTEE

The examiners of Oral Defense Evaluation Committee (ODEC) certify that the thesis entitled "Foam Mat Drying Characteristics of Wild (*Musa balbisiana*) and Hybrid (*Musa nana* Lour) Banana Pulp in Relation to Process Development" submitted by Mr. Ritesh Balaso Watharkar to the Tezpur University in partial fulfillment of requirement of the Ph.D. degree in the discipline of Food Engineering and Technology under the School of Engineering has been examined on 19.12.2019 and recommend that:

a. that the degree be awarded

b. that the candidate be further examined on an another date not later than.....*

(Note: Please delete the clause not applicable)

In our opinion the candidate has not performed to our satisfaction and does not deserve the degree of Ph.D. (in case the Board does not recommend the award of the degree)

Signature of


Supervisor


Co-Supervisor


External Examiner

Name: Dr. B. Srivastava
Date: 19.12.2019

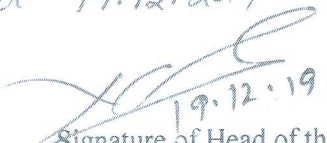
Name: Dr. Prem Prakash Srivastava
Date: 19.12.2019

Name: Dr. Sukumar Debnath
Date: 19/12/2019

Forwarded to Controller of Examination

Memo No.: TU/FET/2019-20/70 dt 19.12.2019




19.12.19.
Signature of Head of the Department
Department of Food Engineering & Technology



TEZPUR UNIVERSITY

REPORT OF EXAMINERS OF ORAL DEFENCE EVALUATION COMMITTEE

The examiners of Oral Defense Evaluation Committee (ODEC) certify that the thesis entitled "Ohmic Heating as an Alternative Thermal Processing Method of Mango Puree" submitted by Mr Hilal Ahmad Makroo to the Tezpur University in partial fulfillment of requirement of the Ph.D. degree in the discipline of Food Engineering and Technology under the School of Engineering has been examined on 27.03.2019 and recommend that:

- a. that the degree be awarded
- b. that the candidate be further examined on an another date not later than*
- (Note: Please delete the clause not applicable)

In our opinion the candidate has not performed to our satisfaction and does not deserve the degree of Ph.D. (in case the Board does not recommend the award of the degree)

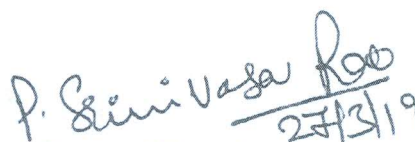
Signature of


Supervisor

Name: B. Srivastava
Date: 27/03/19


Co-Supervisor

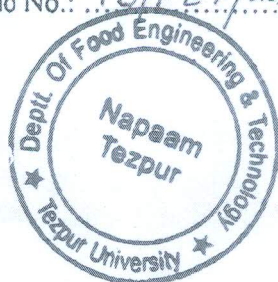
Name: N. K. Rastogi
Date: 27/03/19

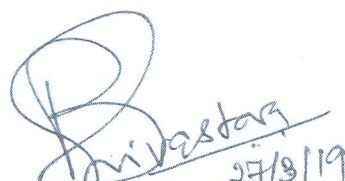

External Examiner

Name: P. SRINIVASA RAO
Date: 27/03/2019

Forwarded to Controller of Examination

Memo No.: TU/FET/2018-19/946 dt 27/03/19




Signature of Head of the Department
Head
Department of Food Engg. & Technology
Tezpur University
Napaam, Tezpur- 784026, Assam



NATIONAL AGRICULTURAL SCIENCE FUND
(Indian Council of Agricultural Research)
Room No. 707, KAB -I, Pusa, New Delhi - 110012

F. No. NASF/AE-7010/2018-19 / 229

Dated: 27.07.2018

To,

The Vice Chancellor,
Tezpur University, Napam-784028, Assam

Subject: Sanction letter for the Research project entitled, "Electric Field Based Novel Technologies for Pilot Scale Processing of Juice and Pulp from Potential Fruits of NE Region" under the National Agricultural Science Fund (NASF)

Sir,

The Empowered Committee (EC) of the NASF, considered the proposal on "Electric Field Based Novel Technologies for Pilot Scale Processing of Juice and Pulp from Potential Fruits of NE Region" in its thirty third meeting held on 6th June, 2018 and approved the proposal for implementation under the NASF. The total cost of this project is ₹ 168.84450 Lakh (Rupees one crore sixty eight lakh eighty four thousand four hundred and fifty only) for a period of three years (August 2018 to July 2021). The financial sanction of the competent authority for the project is now being accorded for the period from 1st August 2018 to 31st March 2020. The sanction for the period from 1st April 2020 till the end of the project i.e. 31st July 2021 will be conveyed later. **The release of fund will be through PFMS/FMS-MIS and the funded centre need to comply accordingly.**

1. Name of the Lead Centre and address

Department of Food Engineering & Technology, Tezpur University, Napam-784028, Assam

2. Name & Designation of the Principal Investigator

Dr. Brijesh Srivastava, Associate Professor and Head, Department of Food Engineering & Technology Tezpur University, Napam-784028, Assam

3. Names of Cooperating Centre and addresses

- i. Agricultural and Food Engineering Department, IIT, Kharagpur- 721302, West Bengal
- ii. ICAR Research Complex for N.E.H Region, Umiam-793103, Meghalaya


4. Name & Designation of the Cooperating Centre Principal Investigators

- i. Dr. Prem Prakash Srivastav, Associate Professor, Agricultural and Food Engineering Department, Indian Institute of Technology, Kharagpur, West Bengal
- ii. Dr. S. Ruth Assumi, Scientist, Division of Horticulture, ICAR Research Complex for N.E.H Region, Umiam-793103, Meghalaya

- (v) Whereas a minimum price for the intellectual properties is to be evaluated, it may not be rigidly adhered to; and the offers made by different parties shall be given due consideration in consultation with the Empowered Committee on the basis of recommendations of ICAR. The spirit behind this should be to commercialize the intellectual properties in the best interest of the investment.
- (vi) If one or more of the partners (i.e., the Lead or Cooperating Centre) of the Project is (are) interested to commercialize the intellectual properties, it may be given preference over other parties at mutually agreed terms and conditions between the interested partner and the ICAR.
- (vii) The ICAR will hold the right to use the intellectual property for non-commercial purposes in public interest.
- (viii) The services of the inventor(s) rendered subsequent to the transfer of intellectual property may entail earning of charges/fees etc., distribution of which will be as per the clause stated in para 4(ii) above.
- (ix) It will not be incumbent upon the ICAR to protect every Intellectual Property (IP) generated from the Project. On refusal by the ICAR to own the IP, the inventor(s) shall be free to protect it at their own cost provided ICAR has no objection to it in public interest.
6. The PI and the CCPI will not be removed/ transferred from the project without the prior consent of the Empowered Committee of the NASF.
- 7 The decision of the Empowered Committee of the NASF will be final in all matters of the project.

Receipt of this letter may please be acknowledged. The PI is requested to make copies of the sanction letter along with all the Annexures and distribute the same to the CCPI(s) and the heads of the Lead and Cooperating Centres.

Yours faithfully,


27.7.18
(P.K. Agrawal)
ADG (NASF)

Copy for information and necessary action to:

- (i) PI/CCPIs of the project.
- (ii) Heads of Cooperating Centres
- (iii) F&AO, NASF Secretariat
- (iv) Office copy