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**List of publications/conferences:**

- **List of journal articles published:**

1. **Kumar, A.,** and Srivastava, B. (2024). Inactivation of polyphenol oxidase and peroxidase in pineapple juice during continuous ohmic heating and modeling of inactivation kinetics during isothermal holding. *Journal of Food Process Engineering*, 47(3), e14565. https://doi.org/10.1111/jfpe.14565
2. **Kumar, A.,** Kumar, M., Mahboob, M. R., and Srivastava, B. (2024). Influence of °Brix/Acid, and flow rate of pineapple juice and electric field strength on the performance of continuous ohmic heating system. *Journal of Food Science and Technology*, 61(6), 1188-1200. https://doi.org/10.1007/s13197-024-05961-x

- **List of journal articles communicated:**

1. **Kumar, A.,** Mahboob, M. R., and Srivastava, B. Continuous ohmic heating assisted isothermal treatment of standardized pineapple juice: Its effect on bromelain inactivation, vitamin C degradation, and their kinetic modelling. [JFPE-2024-Aug-0877]

**Participation in national / international conference:**

1. **Kumar, A.,** and Srivastava, B. Continuous ohmic heating of pineapple juice: microbial inactivation and vitamin C retention and its kinetic modelling (oral presentation). International Conference on Sustainable Approaches in Food Engineering and Technology (SAFETy 2022) organized by the Department of Food Engineering and Technology, Tezpur University, India and Department of Soils, Water & Agricultural Engineering, Sultan Qaboos University, Oman in association with AFST(I) Tezpur Chapter during 19$^{th}$ – 20$^{th}$ October, 2022.
2. **Kumar, A.,** Zimik, W., Mahboob, M. R., and Srivastava, B. Standardization of pineapple juice (°Brix/Acid) for ohmic heating performance (oral presentation). International Conference on Food Research, Development and Applications 2022 (InCoFReDA 2022) organized by the Department of Food Science and Technology, University of Sri Jayewardenepura, Sri Lanka on 15$^{th}$ February, 2022 (**Second position in thematic area of Food Engineering & Innovative Business Systems**).

3. **Kumar, A.,** Zimik, W., Mahboob, M. R., and Srivastava, B. Heating performance of fresh fruit juices during continuous ohmic heating (poster presentation). 28$^{th}$ Indian Convention of Food Scientists & Technologists (28$^{th}$ ICFoST) organized by Association of Food Scientists & Technologists (India) Headquarter in association with its Aurangabad & Mumbai Chapters during 20$^{th}$ – 22$^{nd}$ January, 2022.
4. **Kumar, A.,** Zimik, W., Begum, A., and Srivastava, B. Enzyme inactivation and physico-chemical changes in pineapple juice in batch type ohmic heating system (oral presentation). International Conference on Sustainable Approaches in Food Engineering and Technology (SAFETy 2021) organized by the Department of Food Engineering and Technology, Tezpur University, India and Department of Food Science and Technology, University of Georgia, US in association with AFST(I) Tezpur Chapter during 24$^{th}$ - 25$^{th}$ June, 2021 (**First position in the technical session on Engineering Aspects in Food Processing**).
5. **Kumar, A.,** Begum, A., Zimik, W., and Srivastava, B. Bromelain inactivation of pineapple juice by ohmic heating and its effect on quality attributes (oral presentation). International Conference on Emerging Techniques in Food Processing (ETFP) organized by Department of Food Processing Technology, Ghani Khan Choudhary Institute of Engineering and Technology, Malda, West Bengal during 25$^{th}$ - 26$^{th}$ March, 2021.

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सत्यमेव जयते

ज्ञान-विज्ञान विमुक्तये

**NATIONAL FELLOWSHIP FOR OTHER BACKWARD CLASSES**

*FELLOWSHIP AWARD LETTER*

**No. F. 82-44/2020 (SA-III)** **Date of Issue: 30.11.2020**

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Roll No.: AM0551800020
Subject: HOME SCIENCE
UGC-Ref. No.: 200510218872

Dear Candidate,

I am pleased to inform you that based on your qualifying for Eligibility for Assistant Professor in the **June 2020 National Eligibility Test (UGC–NET),** you have been selected for award of fellowship under the scheme of 'National Fellowship for Other Backward Classes' for the year 2020-21 (June Cycle).

The tenure of the Fellowship is five years and it commences from the date of declaration of result for NFOBC i.e. **30.11.2020** (or) from the date of admission under M.Phil/Ph.D (or) from the date of joining M.Phil/Ph.D programme, whichever is later.

As per information provided by you while applying online for UGC-NET, you had already taken admission for M.Phil/Ph.D through regular and full time mode in a UGC recognized University / Institution. Accordingly, you are required to apply for fellowship not later than three months from the date of issue of this award letter. The University/Institution is requested to process for award of fellowship based upon this letter, in accordance with the Guidelines of the Scheme and Notification dated **17.12.2020**. The same can be accessed at https://www.ugc.ac.in/ugc_notices.aspx.

It may be noted that the fellowship amount shall be disbursed through Canara Bank to bank account of the awardee (any bank) directly. UGC has developed a dedicated web portal (https://scholarship.canarabank.in) for capturing data of the awardee. The Universities/Institutions will link the data of the awardee with the master data on the UGC web portal with unique Maker and Checker IDs which have already been provided to them along with the passwords. The Universities/Institutions shall update the information on the master data (regarding monthly payment confirmation, HRA, up-gradation, resignation etc.) of the beneficiaries on monthly basis. Based on the data updated on UGC web portal by the concerned Universities/Institutions, the payment of the fellowship will be made to the beneficiaries (Detailed process available at https://www.ugc.ac.in/ugc_notices.aspx?id=2153).

The e-Certificate of Eligibility for Assistant Professor has already been uploaded on https://ugcnet.nta.nic.in. The eligibility of the candidate for availing the fellowship is to be ensured by the University/Institution.

With best wishes,

Surender Singh

**(Dr. Surender Singh)**

Joint Secretary

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ORIGINAL ARTICLE

# Influence of °Brix/Acid, and flow rate of pineapple juice and electric field strength on the performance of continuous ohmic heating system

Amardeep Kumar[1] · Manibhushan Kumar[1] · Md. Rahat Mahboob[2] · Brijesh Srivastava[1]

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**Abstract** A lab-scale continuous ohmic heating (COH) system was developed, and its performance was studied for pineapple juice heating as a model sample. The effect of independent parameters [°Brix/Acid (unstandardized, 18, 22, 26) and flow rate (80–120 mL/min) of juice and electric field strength (EFS: 25–45 V/cm)] were analysed for responses viz. come-up-time, heating rate (HR) and system performance coefficient (SPC). The full factorial experimental design was used for this study. The results showed that with an increase in °Brix/Acid, the % acidity and electrical conductivity decreased significantly ($p < 0.05$); thus, the come-up-time to reach 90 °C increased significantly. The HR was significantly ($p < 0.05$) influenced by °Brix/Acid and EFS but less so by flow rates at higher EFS. The SPC was more than 0.90 and reduced significantly ($p < 0.05$) with an increase in °Brix/Acid and flow rate. The HR was modeled using a feed-forward back-propagation artificial neural network (ANN) with the best topology of 3, 5, and 1 neurons in the input (independent), hidden, and output (response) layers, respectively. The model performed efficiently, which is evident from the high $R^2$ (0.998) and low RMSE (1.255). Thus, the COH, with its high efficiency and HR, can effectively be used to process fruit juice.

**Supplementary Information** The online version contains supplementary material available at https://doi.org/10.1007/s13197-024-05961-x.

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ORIGINAL ARTICLE

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# Inactivation of polyphenol oxidase and peroxidase in pineapple juice during continuous ohmic heating and modeling of inactivation kinetics during isothermal holding

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## Abstract

Continuous ohmic heating (COH) is a novel thermal technology for fruit juice processing and preservation. The present work demonstrated the effect of COH parameters like electric field strength (EFS: 30–40 V/cm), isothermal holding (0–60 s), and temperature (70–90°C) on the inactivation of polyphenol oxidase (PPO) and peroxidase (POD) in standardized pineapple juice. Statistical parameters and Akaike information criteria were used to compare kinetic models like the first order, distinct isozymes, Weibull distribution, sigmoidal logistic, and fractional conversion for PPO and POD inactivation. The findings revealed that the COH parameters significantly affected the activities of both enzymes. A maximum inactivation of 68.2% of PPO and 82.2% of POD was observed at 90°C, 60 s, and 40 V/cm. The Weibull distribution model, compared to other models, was found to describe the inactivation kinetics better for both PPO ($R^2$ > 0.99; RMSE < 0.0101) and POD ($R^2$ > 0.98; RMSE < 0.042). The accuracy factor ($A_f$) and bias factor ($B_f$) for both PPO ($A_f = 1.003$–$1.010$; $B_f = 1.000$–$1.004$) and POD ($A_f = 1.007$–$1.072$; $B_f = 0.992$–$1.009$) were closer to simulation line suggesting the accuracy of the Weibull model in predicting the enzyme inactivation. Also, Akaike increment ($\Delta_i$ < 2) substantially supported the Weibull model. The shape factor ($n$ < 1) explained the tailing phenomenon of the enzymes. The PPO's scale factor ($\delta$ values) was higher than POD, suggesting higher thermal stability of PPO than POD. Thus, the Weibull model is a good tool for predicting the enzyme inactivation in COH-treated standardized pineapple juice.

## Practical Applications

Continuous ohmic heating (COH) is a novel electro-thermal technology that heats the fruit juice quickly, uniformly, and volumetrically. Generally, for inactivating spoilage enzymes like polyphenol oxidase and peroxidase during pineapple juice processing in an industrial set-up, a conventional method of conduction and convection mode of heat transfer is used. This results in a high-temperature gradient within the juice matrix, causing a problem of over- and under-processing of juice. Ohmic heating is a potential and efficient way of inactivating these spoilage enzymes to a desired level in a shorter processing time. It can be used to preserve juice by extending its shelf life. COH can reduce the total heat damage to the juice by maintaining its flavor and

  