

The PhD student's Supervisor's Opinion of PhD Thesis:

The dissertation PhD thesis entitled “**Kombucha Leather: Preparation and Characterization**” is prepared by **Mr. Hau Trung Nguyen**, M.Sc. under my supervision and consultation of prof. Ing. Petr Sába, CSc. He joined in doctoral study in September 2018 and accomplished his doctoral study at Centre of Polymer Systems, Tomas Bata University in Zlin, Czech Republic under the degree course: *Biomaterials and Biocomposites* and degree program: *Material Sciences and Engineering*. Before joining in doctoral study, he acquired his *bachelor* and *master's degree in Biotechnology from Ho Chi Minh City National University, Vietnam*.

In this doctoral thesis, focus has been given in preparation of Kombucha leather, which was prepared in combination synthetic polymers and biopolymer (i.e., Bacterial Cellulose) harvested from kombucha fermentation using bio-wastes. In Kombucha-derived bacterial cellulose (KBC) production step, three bio-wastes (sour whey waste, waste apple juice, brewer's spent grains etc.) were investigated, where all displayed the brilliant efficiency in cellulose biosynthesis by *Komagataeibacter xylinus* compared to traditional kombucha and HS standard media.

In **KBC membrane production**, *five* main impact factors were involved which are as follows: amount of sour whey waste, cane sugar, black tea content, volume of bacteria and incubation period. Hau carefully designed the experiment and obtained the optimization conditions to enhance the large-scale KBC production using the microorganism *Komagataeibacter xylinus*.

Not but least, using this biosynthesized KBC, finally “**Kombucha Leather**” was prepared using other synthetic & biopolymer and successfully characterized considering the leather market's *current requirements, ethical consumption, responsible fashion design, cleaner production, and sustainable development*.

The work reported in this **Doctoral Thesis** is consisted with based on **four (4) articles** and **one (1) utility model**. Among them *three* (3) article already published (with Jimp, available in Scopus and WoS) and *one* (1) is still under review. Beside this, during his doctoral study period, he successfully completed three projects funded by Internal Grant Agency in 2019, 2020 and 2021 respectively. As per requirement of doctoral study, he fruitfully completed all the assigned **course work and research study stay** in abroad (2nd May 2022- 2nd July 2022= 61 days) at Nicolaus Copernicus University in Torun, Poland under supervision of Prof. Alina Sionkowska.

Mr. Hau Trung Nguyen is very down to earth, sincere, hardworking person, have keen interest in research. He can think about the *problem of work* and *design the plan of work* accordingly to reach to his goal. It is assumed that after positively completing his final Doctoral Examination, he will be an individual researcher.

I wish his every success in life and recommending for PhD degree.



doc. Nabanita Saha, M.Sc. Ph.D.
(Supervisor)