

Hello, I'm

# LEE TING HUN



## EDUCATION

Universiti Teknologi Malaysia  
Doctor of Philosophy, (Bioprocess  
Engineering), 2011



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NATIONALITY Malaysian



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leetinghun@utm.my



Co-authored the Malaysian SIRIM standards for Edible Bird's Nest and Swiftlet Raising Standards.



Malaysian Scientist Award and Geneva Invention and Innovation Award.



Pioneer and co-founder of Institute of Bioproduct Development (formally known as Chemical Engineering Pilot Plant) in Universiti Teknologi Malaysia.



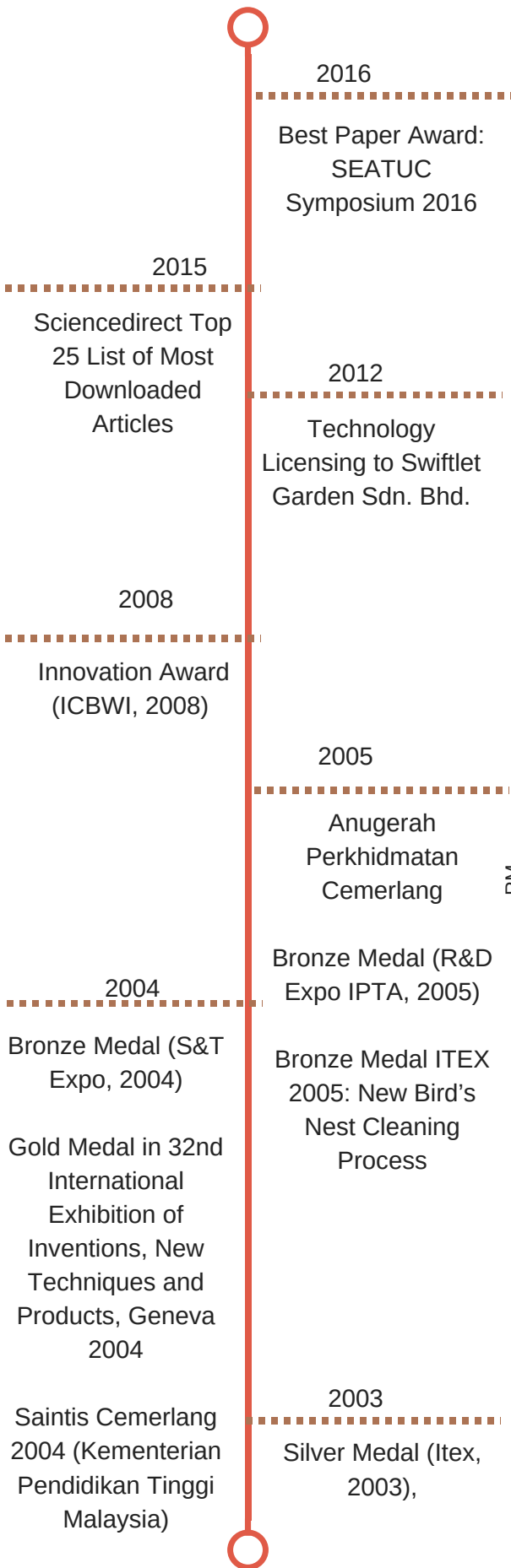
20 years experience in carrying out commercialization, productization, private and contract research and development in food processing and preservation.

Appointed as the Malaysian Subject Matter Expert for Edible Bird's Nest and works hand in hand with the Malaysian and China government in developing the export protocol and also the EBN standard for export and regulatory purposes.

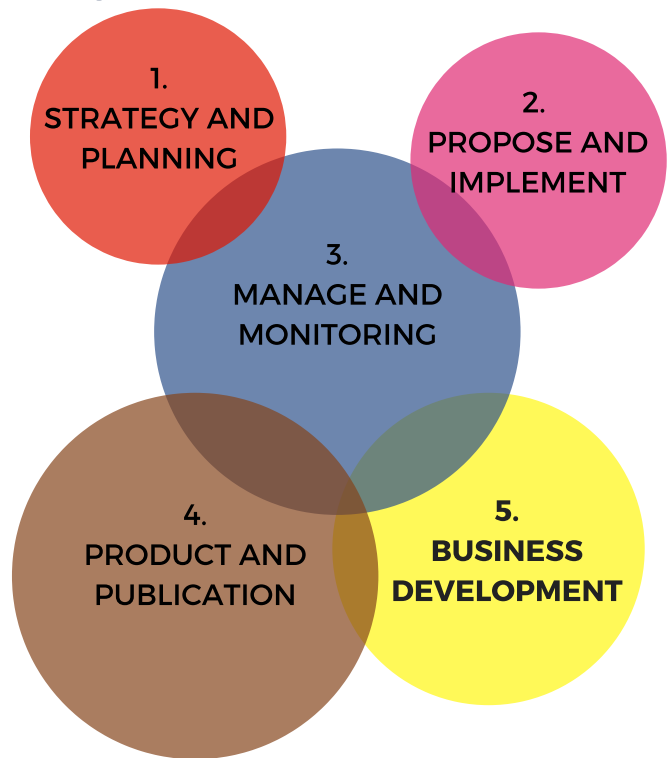
Invented numerous processes and innovated some novel products.



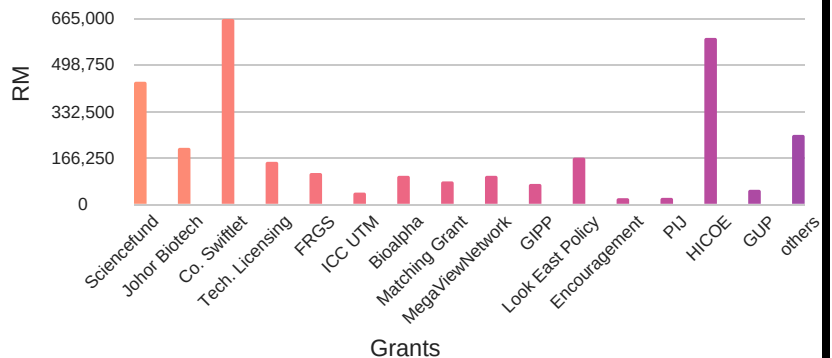
## ★ AWARDS AND ACHIEVEMENT



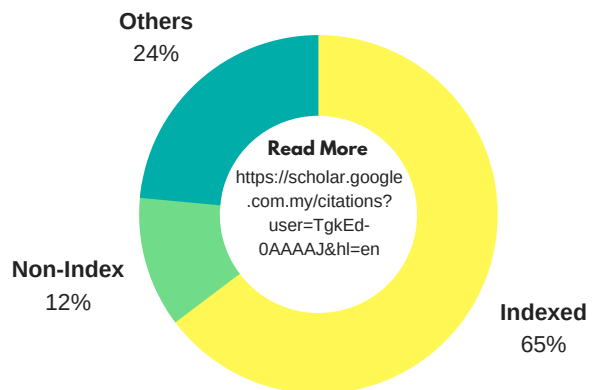
## 💡 23 RESEARCH PROJECT'S HEAD



## 🔍 CUMULATIVE RESEARCH GRANT RECEIVED: 30 MILLION



## 📄 PUBLICATION



## CURRICULUM VITAE

### PERSONAL PARTICULARS

**Name** : LEE TING HUN  
**Identity card** : 720619-01-5659  
**Date of Birth** : 19 June 1972  
**Sex** : Male  
**Contact number** : 019-7539346  
**Marital status** : Married  
**Nationality** : Malaysian  
**Email** : lee@ibd.utm.my



### EDUCATION

2011           Universiti Teknologi Malaysia  
*Doctor of Philosophy, (Bioprocess Engineering)*  
Research title: Thermal Inactivation Kinetics of Crude Peroxidase and Polyphenol Oxidase from Pineapple and Long Bean

### AWARDS AND ACHIEVEMENT

2003           Silver Medal (Itex, 2003),  
2004           Bronze Medal (S&T Expo, 2004)  
2004           Gold Medal in 32<sup>nd</sup> International Exhibition of Inventions, New  
Techniques and Products, Geneva 2004  
2004           Saintis Cemerlang 2004 (Kementerian Pendidikan Tinggi  
Malaysia)  
2005           Anugerah Perkhidmatan Cemerlang  
2005           Bronze Medal (R&D Expo IPTA, 2005)  
2005           Bronze Medal ITEX 2005: New Bird's Nest Cleaning Process  
2008           Innovation Award (ICBWI, 2008)  
2012           Technology Licensing to Swiftlet Garden Sdn. Bhd.  
2015           Scienedirect Top 25 List of Most Downloaded Articles  
2016           Best Paper Awaard: SEATUC Symposium 2016

## RESEARCH ACTIVITY

- |           |   |
|-----------|---|
| 2003-2004 | -Development of Blanching Diagnostic Kit or Detection Instrument for Vegetables - ( Principle Invsetigator) Sciencefund (RM181 000)   |
| 2004      | -Bird's Nest Extraction Process - (Principle Investigator)  |
| 2004-2007 | -Bird's Nest Physicochemical Profiling and Purification Process Development - (Key Researcher for Biosatellite Project Grant)   |
| 2005-2007 | -Development of Standard Procedure and Method for Genuine Edible Bird's Nest Identification - (Principle Investigator)  |
| 2007-2009 | -The Effect of Edible Bird's Nest on Chondrocytes Isolated from - Osteoarthritic Articular Cartilage – MOSTI (Principle Investigator) Science Fund (RM255 250)  |
| 2010-2011 | -The Effects of Edible Bird's Nest (EBN) on cultured rabbit corneal keratocytes (Key Researcher) - Sciencefund (RM255 250)  |
| 2011-2012 | -Commercialisation of Edible Bird's Nest products. Technology licensing to Swiftlet Garden Sdn. Bhd. (As an Inventor)   |
| 2014-2016 | -The Correlation Mechanism between Polyphenol Oxidase (PPO) Activity and Browning Index of the Selected Local Fruits and Vegetables - Fundamental Research Grant Scheme. Principle Investigator. FRGS (RM110 000)<br><br>-Nutriphyto Confectionery: EBN Chocolate - Research Project under the Innovation Commercialization Centre (ICC) Universiti Teknologi Malaysia. (Principle Investigator). |
| 2014-2017 | Preliminary Development of Functional Beverage and/or Nutraceutical Product from Standardized Roselle (Hibiscus Sabdariffa) Extract - Contract Research with Industry. (Principle Investigator) Bioalpha Holdings Bhd (RM 100 000)  |
| 2014-2017 | Formulation and Sensory Acceptance of Functional Beverage and/or Nutraceutical Product from Standardized Roselle (Hibiscus Sabdariffa) Extract - Matching Grant. (Principle Investigator) (RM40 000)  |
| 2014-2017 | -Process Design and Fabrication of Durian Extraction Prototype for the Formulation of Instant Beverages - Contract Research with Industry.  |

(Principle Investigator) Mega View Network Sdn Bhd (RM100 000)

- 2014-2016 Formulation and Sensory Acceptance of Durian Extraction Fortified in Instant Beverage - Matching Grant. (Principle Investigator) (RM40 000)
- 2014-2017 -Development of Quality Index for Edible Bird's Nest after Cleaning and Processing - Collaboration Research with Centre of Excellent: Swiftlet. (Principle Investigator) (RM200 000)
- 2014-2015 -Development of Quality Index for Edible Bird's Nest after Cleaning and Processing - Geran Insentif Penyelidikan and Pengajaran. (Principle Investigator) (RM71 000)
- 2014-2017 -The Potential of Edible Bird's (EBN) Extract as Anti-cancer Agent and Immunoadjuvant on Human Breast Cancer - Collaboration Research with Centre of Excellence: Swiftlet. (Principle Investigator) (RM250 000)
- 2015-2016 -New Emerging Pollutant Detection and Their Removal from Wastewater Using Nano Ozonation Process - Look East Policy Grant. (Key Researcher) (RM165 000)
- 2015-2016 -Edible Bird's Nest (EBN) Authentication by Using Gel Electrophoresis Method - Encouragement Grant. (Principle Investigator) (RM20 000)
- 2016-2017 -The Potential of Edible Bird's (EBN) Extract as Anti-cancer Agent and Immunoadjuvant on Human Breast Cancer - Research University Grant. (Principle Investigator) (RM65 000)
- 2017 -Preliminary Study of Pulverization of Edible Bird's Nest and Herbal Mixture. ) - Contract Research with International Company. (Principle Investigator) EBN PTE. LTD, Singapore (RM10 600)
- 2017 Formulation and development of flavoured tempeh - Contract Research with Industry. (Key Researcher) Malinja Rice Sdn Bhd (RM9 328)
- 2017 -Qualitative Analysis of Aloe Vera Extract using High Performance Liquid Chromatography QTOF Mass Spectrometer (HPLC-QTOF/MS). Contract Research with Industry. (Principle Investigator) PIJ Manufacturing Sdn Bhd (RM21 200)
- 2017-2018 Integrated Nano-Ozonation and Sonication Process for the Removal of Nitrogen Species in Edible Bird's Nest – Ministry of Agriculture (Key Researcher) MOA (RM172 000)
- 2017- Present Fractionation, Isolation and Purification of Bioactive Phytochemicals from fruit biomass of Ananas comosus and Cocos nucifera - Higher

Centre of Excellence. (Key Researcher) HICOE (RM190 000)

- 2017- Present    Fractionation, Isolation and Purification of Annona Muricata and Carica Papaya Leaves Extract - Higher Centre of Excellence. (Key Researcher) HICOE (RM255 000)
- 2017- Present    -Production of Standardized Melastoma Malabathricum and Annona Muricata Whole Extract- Higher Centre of Excellence. (Principle Investigator) HICOE (RM147 950)
- 2018-Present    -Benchmark of Edible Bird's Nest Quality Indicator by Using Amino Acids and Epidermal Growth Factor Profile – Research University Grant. (Principle Investigator) GUP Tier 1 (RM50 000)
- 2018-Present    -Optimization and Development of Edible Bird's Nest and Herbal Mixture using Freeze Drying Technique in Pilot Scale - Contract Research with Industry. (Principle Investigator) Procid Sdn Bhd (RM20 000)
- 2018-Present    -Metabolites Qualitative Analysis of Sweet Corn from Malacca District, Malaysia using High Performance Liquid Chromatography QTOF Mass Spectrometer (HPLC-QTOF/MS) - Contract Research with International Company. (Principle Investigator) PT Margo Agrindo Mandiri (RM10 000)
- 2018-Present    -Development of Freeze Drying Technique using Herbal Mixture and Edible Bird's Nest Extract – Industry-International Incentive Grant. (Principle Investigator) IIIG (RM10 000)
- 2018-Present    -Development of Metabolites Qualitative Analysis Method for Sweet Corn from Malacca, Malaysia using High Performance Liquid Chromatography QTOF Mass Spectrometer (HPLC-QTOF/MS) – Industry-International Incentive Grant. (Principle Investigator) IIIG (RM10 000)

## PUBLICATIONS

### International Journal:

1.    **Lee Ting Hun**, Waseem A. Wani, Heng Yong Poh, Umair Baig, Eddie Tan Ti Tjih, Noor Idayu Nashiruddin, Yong Ee Ling and Ramlan Abdul Aziz. Gel Electrophoretic and Liquid Chromatographic Methods for the Identification and Authentication of Cave and House Nests from Common Adulterants. *Analytical Methods*, 2016, 8, 526-536. (IF = 1.915).

2. Waseem A. Wani, Umair Baig, Sheikh Shreaz, Rayees Ahmad Shiekh, Prince Firdous Iqbal, Ehtesham Jameel, Akil Ahmad, Siti Hamidah Mohamad Setapar, Md. Mushtaque and **Lee Ting Hun**. Recent Advances in Iron Complexes as Potential Anticancer Agents. *New Journal of Chemistry*, 2016, 40, 1063-1090. (IF = 3.227).
3. Waseem A. Wani, Ehtesham Jameel, Umair Baig, Syed Mumtazuddin and **Lee Ting Hun**. Ferroquine and its Derivatives: New Generation of Antimalarial Agents. *European Journal of Medicinal Chemistry*, 2015, 101, 534-551. (IF = 3.902).
4. Sheikh Shreaz, Waseem A. Wani, Waseem Raja, Maribasappa Karched, **Lee Ting Hun**, Jawad Behbehani. Cinnamaldehyde and its Derivatives: New Generation Antifungal Agents. *Fitoterapia*, 2016, 112, 116-131. (IF = 2.408).
5. **Lee Ting Hun**, Shalom Wangrangsimakul, Waseem A. Wani, Ee Ling Yong, Ardawati Adnan, Eddie Ti Tjih, Lim Chew Ching, Ooi Siew Yin, Azila Aziz, Hesham A. El-Enshasy, Ramlan Aziz. Thermal Inactivation Kinetics of Peroxidase and Polyphenol Oxidase in Long Bean (*Vigna sesquipedalis*) and the Changes in their Activities during Storage. *Chiang Main Journal of Science*, 2016, 43(X), 1-10. (IF = 0.420).
6. Umair Baig, Waseem A. Wani and **Lee Ting Hun**. Facile synthesis of electrically conductive polycarbazole-zirconium(IV)phosphate cation exchange nanocomposite and its room temperature ammonia sensing performance. *New Journal of Chemistry*, 2015, 39, 6882-6891. (IF = 3.227).
7. **Lee Ting Hun**, Waseem A. Wani, Eddie Tan Ti Tjih, Nur Ardawati Adnan, Yong Le Ling, Ramlan Abdul Aziz. Investigations into the Physicochemical, Biochemical and Anti-bacterial Properties of Edible Bird's Nest. *Journal of Chemical and Pharmaceutical Research*, 2015, 2015, 7, 228-247. (IF = 0.35).
8. **T.H.Lee**, L.S.Chua, E.T.T.Tan, C.Yeong, C.C.Lim, S.Y.Ooi, R.A.Aziz and M.R.Sarmidi. (2009). Kinetics of Thermal Inactivation of Peroxidase and Polyphenol Oxidase in Pineapple (*Ananas comosus*). *Food Science and Biotechnology Journal* Vol 18 (3) pp 661-666. (IF = 0.699)
9. Fadhilah Zainal Abidin, Chua Kien Hui, Ng Sook Luan, Elvy Suhana Mohd Ramli, **Lee Ting Hun** and Norzana Abd Ghafar (2011). Effects of edible bird's nest (EBN) on cultured rabbit corneal keratocytes. *BMC Complementary and Alternative Medicine* . 11:94 (IF = 2.02)
10. Lee Suan Chua, Nor Amaiza Mohd Amin, Jason Chun Hong Neo, **Ting Hun Lee**, Chew Tin Lee, Mohamad Roji Sarmidi and Ramlan Abdul Aziz (2011). LC-

MS/MS-based metabolites of *Eurycoma longifolia* (Tongkat Ali) in Malaysia (Perak and Pahang). *Journal of chromatography B*, 879: 3909-3919. (IF = 2.87)

11. Kien-Hui Chua, **Ting-Hun Lee**, Kamini Nagandran, Nor Hamdan Md Yahaya, Chew-Tin Lee, Eddie Tan Ti Tjih and Ramlan Abdul Aziz (2013). Edible Bird's nest extract as a chondro-protective agent for human chondrocytes isolated from osteoarthritic knee: in vitro study. *BMC complementary and Alternative Medicine* 13:19. (IF = 2.64)
12. **Ting Hun Lee**, Waseem A. Wani, Yin Shin Koay, Supparmaniam Kavita, Tan Eddie Ti Tjih and Sheikh Shreaz (2017). Recent advances in the identification and authentication methods of edible bird's nest. *Food Research International*, 100: 14-27. (IF = 3.86)
13. **Ting Hun Lee** and Waseem A. Wani. The Future of Edible Bird's Nest as a Nutraceutical and Pharmaceutical Animal Bioproduct. *Insights in Clinical Pharmacology-OPR Science*, 1:1.1.

#### **International and National Proceeding:**

1. **Lee Ting Hun** and Waseem A. Wani. Gel Electrophoresis Ideally Identifies and Authenticates Cave and House Edible Bird's Nests from Common Adulterants (OS07-02). 10th South East Asian Technical University Consortium (SEATUC) on 22-24 February 2016 at Shibaura Institute of Technology (SIT), Japan.
2. **Lee, T.H.**, Yoshiny, M., Chua, K.H. and Waseem, A.W. Effect of Edible Bird's Nest (EBN) Extract on Human Breast Cancer and Immune Cells. Edible Bird's Nest International Conference (EBNIC) on 11-12 October 2016 at Putrajaya, Malaysia.
3. **Lee, T. H.**, Tong, S. R., Waseem, A. W. and Lim Y. M. Preliminary Metabolite Profiling of Edible Bird's Nests in Malaysia via Liquid Chromatography-Mass Spectrometry. Edible Bird's Nest International Conference (EBNIC) on 11-12 October 2016 at Putrajaya, Malaysia.
4. **Lee Ting Hun**. "Swiftlet Ranching: Elements to Consider" International Conference and Training on Swiftlet Ranching (ICOTOS 2011), Taman Tamadun Islam Convention Centre, Kuala Terengganu, Terengganu, Malaysia, 17-19 July 2011. Presented as an Invited Speaker.
5. **Lee Ting Hun**. "Edible Bird's Nest: A Potential Product Breakthrough". International Conference and Training on Swiftlet Ranching (ICOTOS 2011), Taman Tamadun Islam Convention Centre, Kuala Terengganu, Terengganu, Malaysia, 17-19 July 2011. Presented as an Invited Speaker.
6. Nagandran, K. Hui, C.K., Yahaya, N.H.M. Tin, L.C. Tjih, E.T.T. and **Hun, L.T.** "Edible Bird's Nest Extract Improved Anabolic Mechanism In Chondrocyte



Isolated from Osteoarthritic Articular Cartilage". 3<sup>rd</sup> International Conference On Biotechnology for the Wellness Industry (ICBWI 2010), Putra World Trade Centre, 8-9 October 2010.

7. N. Kamini, K.H. Chua, E.T.T. Tan and **T.H. Lee** (2009). Edible Bird's Nest Extract Rejuvenate Skin By Increased Fibroblast Proliferation And Skin Matrixes Synthesis. 7<sup>th</sup> International Traditional & Complementary Medicine Conference and 2nd International Conference on Biotechnology for the Wellness Industry (7<sup>th</sup> INTRACOM-2<sup>nd</sup> ICBWI 2009). 23-26 July 2009. PWTC, Kuala Lumpur, Malaysia. Universiti Teknologi Malaysia.
8. N. Kamini, **T.H. Lee**, K.H. Chua, N.H.M. Yahaya, E.T.T. Tan and C. T. Lee (2009) Edible Bird's Nest Extract Promoted Cartilage Matrix Expression And Supressed The Catabolic Genes Expression In Osteoarthritic Chondrocytes. . 7<sup>th</sup> International Traditional & Complementary Medicine Conference and 2nd International Conference on Biotechnology for the Wellness Industry (7<sup>th</sup> INTRACOM-2<sup>nd</sup> ICBWI 2009). PWTC, Kuala Lumpur, Malaysia. Universiti Teknologi Malaysia
9. Tan, E.T.T., **Lee, T.H.**, Sarmidi, M.R., Aziz, R.A., Chua, L.S. and Lee, C.T. (2009). Protein Extractability and Antioxidant Studies of Edible Bird's Nest Extracts. International Scientific Conference on Nutraceuticals and Functional Foods (Food and Function 2009). 9-11 June 2009. Holiday Inn Hotel, Zilina, Slovakia, 47.
10. E.T.T.Tan. **T.H.Lee**, C.T.Lee, M.R.Sarmidi and R.A.Aziz. (2008). Amino Acids Studies of Edible Bird's Nest. 1st International Conference on Biotechnology for the Wellness Industry. 5-6 August 2008. PWTC, Kuala Lumpur, Malaysia. Universiti Teknologi Malaysia.
11. **T.H.Lee**, C.C.Lim, C.Yeong, S.Y. Ooi, E.T.T.Tan and R.A.Aziz. (2008). Thermal Inactivation of Peroxidase (POD) in Long Bean (*Vigna sesquipedalis*) 1st International Conference on Biotechnology for the Wellness Industry (ICBWI). 5-6 August 2008. PWTC, Kuala Lumpur, Malaysia. Universiti Teknologi Malaysia.
12. N. Kamini, **T.H. Lee**, K.H. Chua, E.T.T. Tan and F.S. Siti (2008). The preliminary study on the effect of edible bird's nest extract on human skin fibroblast proliferation. 1st International Conference on Biotechnology for the Wellness Industry (ICBWI). 5-6 August 2008. PWTC, Kuala Lumpur, Malaysia. Universiti Teknologi Malaysia
13. E.T.T.Tan, **T.H.Lee**, M.R.Sarmidi, R.A.Aziz and C.T.Lee. (2006). Morphological and Proximate Studies of Edible Bird's Nest (EBN). Asian Pacific Confederation of Chemical Engineering (11th APCCChE Congress). 27-30 August 2006. Kuala Lumpur, Malaysia. The Institution of Engineers Malaysia.
14. **T.H.Lee**, E.T.T.Tan, I.A.W. Tan, M.R. Sarmidi, R.A.Aziz and C.T.Lee. (2005). Preliminary Characterization of Bird's Nest. Malaysia Science and Technology Congress (MSTC). 18-20 April 2005. Kuala Lumpur: Confederation of the Scientific and Technological Associations in Malaysia (COSTAM), 130.

15. **T.H.Lee**, E.T.T.Tan, C.Y. Chan, C.T.Lee, R.A.Aziz and M.R.Sarmidi. (2005). Preliminary Study of Bird's Nest Recovery Process. Malaysia Science and Technology Congress (MSTC). 18-20 April 2005. Kuala Lumpur: Confederation of the Scientific and Technological Associations in Malaysia (COSTAM), 131.
16. **T.H.Lee**, T.T.Tan, M.R. Sarmidi and R.A.Aziz. (2003) Preliminary Study of Blanching Diagnostic Kit for Vegetables and Fruits. International Conference on Chemical and Bioprocess Engineering (ICCBPE). 27-29 August 2003. Kota Kinabalu, Sabah: Universiti Malaysia Sabah (UMS), 725.

### **Books**

1. **Lee Ting Hun**, Waseem A. Wani and Eddie Tan Ti Tjih. Edible Bird's Nest: An Incredible Salivary Bioproduct from Swiftlets. Lambert Academic Publishing, 2015, ISBN: 978-3-659-79255-7. (Book).

### **Book Chapter**

1. **Lee Ting Hun** and Waseem A. Wani. Antifungal Effects and Future Perspectives of Curcuma Longa (Turmeric) Rhizomes: A Natural Source for Developing A Novel Class of Antifungals. Biopolymers and Nanocomposites for Biomedical and Pharmaceutical Applications. Nova Science Publishers, 2016. (Book Chapter).

### **NEWSPAPER ARTICLES:**

1. Article "The Truth on Edible Bird's Nest Nutritional Content". Published in Nanyang Shang Pau, 22 August 2011.
2. Article "Bleaching Bird Nest". Published in Nanyang Shang Pau, 22 August 2011.
3. Article "The Genuine Bird's Nest". Published in China Press and Oriental Daily, 18 April 2005.
4. Article "Kaedah terbaru uji tahap penceluran hanya 5 minit" Published in Berita Harian 22 April 2004.
5. Article "Carte blanc" Published in New Sunday Times 18 April 2004.

### **DRAFTING OF MALAYSIAN STANDARD:**

1. Edible Birdnest (EBN)- Specification MS2334:2011
2. Good Manufacturing Practice (GMP) for processing Raw-Unclean and Raw Clean Edible Birdnest (EBN) MS2333:2010

3. Good Animal Husbandry Practice MS 2273:2009

#### **PATENTS:**

1. PI 20041745 Blanching Diagnostic Kit
2. PI2013700981 A Seed Removal Device
3. In Progress: Process for Identification of Geo Location of Avian Secretions

#### **OTHERS**

1. Site Evaluation of Swiftlet Ranching for Plentiful Bird Nest Sdn. Bhd.
2. Processing and plant set up for Yan Zheng Sdn. Bhd. for its bird's nest cleaning plant.
3. Product development for Living Active Sdn. Bhd. for its bird's nest skin care products
4. Product development for Living Active Sdn. Bhd. for its bird's nest extract and its products.
5. Site Evaluation and Swiftlet House Observation for Felda Wellness Sdn. Bhd.
6. 4 Days Edible Bird's Nest Cleaning Course for Felda Wellness Sdn. Bhd.
7. Plant set up for Sri Tanjung Enterprise for its Goats Milk Pasteurization Process and Supply of Equipments.
8. Processing plant and company set up for Phytomass Sdn. Bhd. for its silage processing plant from corn waste.
9. Processing plant and company set up for Longevity Wellness Sdn. Bhd. for its bird's nest cleaning facilities and equipment supply.
10. Processing plant set up and equipments design for Magic Corn Marketing Sdn. Bhd. for its sweet corn processing plant.
11. Product development for Procid Sdn. Bhd. for its bird's nest skin care products

12. Product development for Procid Sdn. Bhd. for its bird's nest extract and its products.
13. Product development for Mah Yong Trading Sdn. Bhd. for its Tongkat Ali and Ginseng supplement products.
14. Project consultant and factory set up for Daily Fresh Foods Sdn Bhd. for its sweet corn processing plant and plant design.
15. Plant design for Sunflower Confectionary Industrial Sdn. Bhd. for its confectionary plant.