

## Dr. Winny Routray

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I, Dr. Winny Routray joined as **Assistant Professor in the Department of Food Process Engineering at NIT Rourkela in February 2020**. I have also been working as the **Associated Graduate Faculty at University of Guelph, Canada**. I received my **Ph.D. in Bioresource Engineering from McGill University, Canada** under the supervision of Prof. Valerie Orsat, where I was a Graduate Excellence Fellow and also worked as teaching assistant for Bioresource Engineering Material program. I received **2015 Best Graduate Thesis Award for best Ph.D. thesis awarded by the Canadian Society for Bioengineering**. Afterwards, I moved to **Memorial University of Newfoundland for my post-doctoral work**, where I carried out vibrant research activities in nutraceuticals and biofuels. I was also involved in start-up activities including new lab set-up and planning and setting up of pilot plant, transfer of scientific research to local industrial enterprise, and entrepreneurs, writing of successful independent research grant proposals in thrust areas of **downstream processing and valorisation of marine industry by-products and waste**. Subsequently, I worked as Research consultant for Memorial university for planning and development of several on-going and future projects. I also **worked as Senior Research Associate on projects focussed on bioplastic production employing leather industry and agricultural waste at CSIR-CLRI, Chennai and CSIR-IMMT, Bhubaneswar**. I obtained my **M.Tech. in Food Engineering from IIT Kharagpur and B.Tech. degree in Agricultural Engineering** from Orissa University of Agriculture and Technology. I have **also completed Post Graduate Program in Data Science from Purdue University, USA in 2020**. My main research interests encompass many aspects of **food and post-harvest engineering, by-product utilisation and waste valorisation through bio-processing, downstream processing and microbial applications, with the general themes of exotic frontiers of bio-engineering including biofuels, sustainable biomaterials production and value-added product development from agricultural and industrial waste and by-products**. I am also **working on the application of Data Science and Machine Learning in the field of food and agriculture**. Apart from research activities, I have **keen interest in transfer of knowledge between academia and industry, mentoring of students and fresh entrepreneurs, and outreach activities**. Other aspects of my career can be found on

the site <https://website.nitrkl.ac.in/FProfile.aspx?e=routrayw>. A brief summary of my major professional, teaching and research accomplishments is presented here.

## **ACADEMIC QUALIFICATION**

✓ **2019-2020: PG Diploma Data Science**

**Purdue University, USA**

The program included courses on Data Science with R Programming, Data Science with Python, Tableau Desktop, Machine Learning, and Natural Language Processing

✓ **2009-2014: Ph.D. Bioresource Engineering with CGPA: 4/4**

**McGill University, Quebec, Canada**

**Thesis title:** Effect of different extraction methods, environmental and post-harvest factors on yield of phenolic compounds from blueberry leaves. *No. of times cited: 1* ([http://digitool.library.mcgill.ca/webclient/StreamGate?folder\\_id=0&dvs=1508465898285~0&usePid1=true&usePid2=true](http://digitool.library.mcgill.ca/webclient/StreamGate?folder_id=0&dvs=1508465898285~0&usePid1=true&usePid2=true) )

Supervisor: **Prof. Valerie Orsat**

✓ **2007-2009: M.Tech. (Post-Harvest Engineering) with CGPA: 9.06/10**

**Indian Institute of Technology Kharagpur, India**

**Thesis title:** Processing technology for Dahi (Indian yoghurt) powder

Supervisor: **Prof. H. N. Mishra**

✓ **2003-2007: B.Tech. (Agricultural Engineering) with CGPA: 8.17/10**

**Electives:** Food Process Engineering courses

**College of Agricultural Engineering and Technology, Bhubaneswar, Odisha, India**

**Thesis title:** Post harvest technology for Annapurna (*Pandanus amaryllifolius*) leaves

Supervisor: **Prof. Kalpana Rayaguru**

## **RESEARCH INTERESTS**

- ✓ **Novel, advanced and eco-friendly food processing and post-harvest techniques**
- ✓ **Statistical techniques, Data Science, Machine learning, Artificial intelligence (Fuzzy logic) in product development, optimization of processes and assessment of food quality.**
- ✓ **Food industry and farm waste and by-products valorization with sustainable product development/ bio-refinery and downstream processing applications**
- ✓ **Biofuels and biomaterials production**

## **PREVIOUS WORK EXPERIENCES**

✓ **Sept 2019 -Feb 2020: CSIR-Senior Research Associate**

Department of Environment and Sustainability, CSIR-Institute of Minerals and Materials Technology, Bhubaneswar, Odisha, India

✓ **May 2018-Sept 2019: CSIR-Senior Research Associate**

Department of Biochemistry and Biotechnology, CSIR-Central Leather Research Institute, Chennai, Tamil Nadu, India

- Project focused on **valorization of leather waste and agricultural byproduct**

✓ **Oct 2015- April 2018: Research Consultant (non-academic)**

Centre of Aquaculture and Seafood Development, Marine Institute, Memorial University of Newfoundland, Canada

✓ **Sept. 2014- Sept 2015: Post-doctoral fellow**

Centre of Aquaculture and Seafood Development, Marine Institute, Memorial University of Newfoundland, Canada

- Major work done for the project “**Bioprocessing strategy for the production of biodiesel and other value-added products from salmon waste**” funded by Research & Development Corporation of Newfoundland and Labrador, Ignite Research and Development.
- Participation in *development of new projects in Newfoundland, Canada*, focussed on
  - **utilization of fish blood/ fish industry wastewater for value added product development**
  - lab. scale and pilot scale studies for **extraction of omega-3 fatty acids from fish industry waste**
  - preparation of **value –added products from invasive and underutilised crab species *Carcinus maenas***
- Participation in **pilot plant planning and establishment.**
- Active involvement in **development of independent projects with industry partners and transfer of knowledge from lab to pilot plant and subsequently to industries.**

### ***TEACHING EXPERIENCE/ COURSES TAUGHT AT NIT ROURKELA***

**FP428:** Food Industry By-Product and Waste Management

**FP3301:** Processing of Spices, Condiments and Plantation crops

**FP4207:** Food Industry By-Product and Waste Management

**FP4208:** Experimental Design and Statistical Methods

**FP4212 :** IT Applications in Food industry

**FP3272:** Experimental Design and Statistical Methods Laboratory

**Teaching assistant** in Bioresource Engineering Department for the subject **Bioresource Engineering Material**, during Fall semesters of 2012 and 2013.

### ***GRADUATE/ UNDERGRADUATE SUPERVISION***

✓ ***Ph.D.:2 (Continuing)***

✓ ***Graduate Projects: 1 M.Tech. (Completed), 1 MTech. and 1 MSc. (Continuing)***

✓ ***Undergraduate: 1 (Completed), 3 (Continuing)***

***(Projects are focused on food industry byproducts characterization and corresponding product development)***

## **GRANTS AND CONSULTANCY PROJECTS**

- ✓ **Seed money grant:** 2020, served as **Principal Investigator**, funded by NIT Rourkela.
- ✓ **BIRAC's BIG scheme:** 2021-2023, serving as **Scientific Advisor** for GreenPod Labs Private Limited, supported by Department of Biotechnology (DBT), Government of India

## **ADDITIONAL PROFESSIONAL ACCOMPLISHMENTS**

- ✓ **Invited speaker at several events:**
  - Presented a webinar on Valorisation of Fish Industry byproducts during 17th webinar of the "FCTL Webinar Series" on 5 June 2021 (<https://www.youtube.com/watch?v=I2xpdPovIhc> )
  - Presented an invited talk on ACE: Solutions in the Aftermath of COVID, November 18, 2021 in virtual mode (<https://www.aiche.org/conferences/pace-solutions-aftermath-of-covid/2021/technical-program> )  
Link for the talk: <https://www.youtube.com/watch?v=ZzrW4Is77XY&t=4s>
  - Webinar on "Fish Processing and Business Opportunities " in the Hindi Language under the PM Formalisation of Micro food processing Enterprises Scheme (PMFME SCHEME) organizing by PMFME Cell, NIFTEM on 27th August 2021 (<https://www.youtube.com/watch?v=Ug9Jf25A8HE> )
  - Webinar on Strategies and skill-sets for multidisciplinary work and higher studies on 29 March 2022 organised by College of Agricultural Engineering and Technology, OUAT under National Agricultural Higher Education Project (<https://nahep.icar.gov.in/EventsDetail.aspx?eventid=Tb34KCHm9W6lt4sbVwwfORPOG5M+z3VaqZbCEbHu+n0QtdMdbuw3L6ik/cWn47u+yTCIQYDCvF//nJDYMXOKPQ+zAvIYxPJsE6wL8YMHV84=> )
  - Presented an Invited Talk on Business valorising; agricultural and food industry by-products during workshop "Advanced Innovation and Opportunities in Agri-Tech Entrepreneurship held at FTBI, NIT Rourkela during 5-7 May 2022.
  - Presented a talk on Silage systems : A sustainable system for fish waste utilization and preservation during a Karyashala: SERB-Sponsored Five-day High-End Workshop on Sustainable Disruptive Technology in Agri-Food Sector for Processing and Preservation Mode: Online + Offline, held during July 11-15, 2022, which was organized by Department of Food Process Engineering, National Institute of Technology Rourkela, Odisha, India.
- ✓ Hosting Ts. Dr. Muhammad Heikal Bin Ismail, Senior Lecturer, Universiti Putra Malaysia for **ASEAN-India Research and Training Fellowship Scheme** from the Department of Science and Technology (DST), Government of India
- ✓ I have been selected as one of the **Super Mentors for the BIRAC SPARSH Social Innovators** at **KIIT-Technology Business Incubator, KIIT University, Bhubaneswar, Odisha** for the period starting from June 2022 to December 2023

- ✓ **Evaluator of theses** for M.Tech. program in Dept. of Agricultural Processing and Food Engineering, College of Agricultural Engineering and Technology, OUAT Bhubaneswar, Odisha, India
- ✓ **Advisory committee member** of Ph.D. candidate working on advanced statistical methods
- ✓ **Evaluator of PRISM proposal** in year 2020 for TePP Outreach cum Cluster Innovation Centre (TOCIC), University of Madras, Chennai, Tamil Nadu, India
- ✓ **Person in Charge** handling and examining the projects conducted by undergraduate students of the department.
- ✓ **Co-convenor of webinar** conducted on “Recent trends in Food Processing and Preservation”, sponsored by TEQIP-II, India.
- ✓ Part of the **Editorial board of IJBFS of Science Web Publishing** for Food Engineering and Post-Harvest Engineering.
- ✓ **Reviewer for 80 peer-reviewed international journals** in areas of food, feed, nutrition and energy including *Food and bioprocessing technology*, *Journal of Food Processing and Preservation*, *Industrial crops and products*, *International Journal of Dairy Technology*, *Food Chemistry*, *Food and Bioproducts Processing*, *Biosystems Engineering*, *Phytochemical Analysis*, and several other peer-reviewed journals in the field of biotechnology, food engineering, environmental engineering and post-harvest technology. **The publons reviewer profile** is available at <https://publons.com/author/1185441/winny-routray#profile>.
- ✓ **Invited reviewer** for the papers submitted in **FUZZ-IEEE 2019 and FUZZ-IEEE 2020 conferences**, which are international conference on Fuzzy systems.
- ✓ **Author of Popular Articles on food technology** including:
  - Krill Oil. Ingredients South Asia, A Saffron Media Publication, 10(4): 814-185.
  - Cranberry: A superfood. Ingredients South Asia, A Saffron Media Publication, 10(13): 72-74.
  - Functional beverages of various types. FnBnews.com

## **OUTREACH ACTIVITIES**

- ✓ **Short term course:** Co-convenor for TEQIP-III Sponsored National Webinar held in between 26-27 Sep 2020 on the topic “Recent Trends in Food Processing and Preservation”.
- ✓ **Workshop:** One of the convenors involved in organizing an International Webinar on “Food Security & Sustainability in the Post-COVID Food Processing Industry Targeting Zero Carbon Emission” from 5th - 9th March, 2022, sponsored by DST-GATI (WISE KIRAN) under the program NIT-RKL-Nari Shakthi.
- ✓ **Webinar:** Convenor along with Prof. RC Pradhan, for Lecture Series-1 presented by Prof. S.K. Goyal (IIT BHU) on the topic of "Creating awareness about millets (importance, climate resilience, and economic security), conducted for the inauguration and celebration of " International Year of Millets (IYoM)- 2023 at NIT Rourkela.

- ✓ Conducted outreach activities for the **students and industrial personnel at Memorial University of Newfoundland**, Canada, during 2014-2015 academic session.
- ✓ **Volunteer and part of organising committee for JIGYASA program** (a students' outreach program for Kendriya Vidyalaya students), hosted by CSIR-Central Leather Research Institute, Chennai during year 2018.

### **MEMBERSHIPS**

- ✓ *American Society of Agricultural and Biological Engineers*- Yearly membership, 2022
- ✓ *Institution of Engineers (India)* - Life Membership, 2021
- ✓ *Indian Society of Agricultural Engineers* - Life Membership, 2021
- ✓ *American Chemical Society* - Community Membership, 2020
- ✓ *Association of Food Scientists & Technologists (India)* - Life Membership, 2020

### **AWARDS AND FELLOWSHIPS**

- ✓ **2018-2021: CSIR-Senior Research Associate Award**, Council of Scientific & Industrial Research, India
- ✓ **2014-2015: Graduate Thesis Award for best Ph.D. thesis** awarded by the Canadian Society for Bioengineering during 2015 CSBE/SCGAB annual meeting, held at Edmonton, Alberta, Canada (July 5-8, 2015)
- ✓ **2012-2014: Graduate Excellence Award**, McGill University, Canada
- ✓ **2011-2012: Graduate Excellence Fellowship**, McGill University, Canada
- ✓ **2009-2010: Schulich Graduate Fellowship**, McGill University, Canada
- ✓ **2007-2009: Graduate scholarship** for M.Tech. students at IIT Kharagpur, India

### **RESEARCH PROJECTS COMPLETED DURING GRADUATE STUDIES AND POST-DOC**

- ✓ Development of bioplastic from agricultural and leather industry wastes
- ✓ Bioprocessing strategy for the production of **biodiesel** and other value-added products (omega-3 fatty acids and protein hydrolysates) from **salmon waste**.
- ✓ **Microwave** assisted extraction of **phytochemicals** from blueberry biomaterial
- ✓ Processing technology for **Dahi (Indian yoghurt) powder**
- ✓ Post-harvest technology for *Annapurna (Pandanus amaryllifolius)* leaves

### **HIGHLIGHTS OF PUBLICATIONS**

**Google Scholar:**

<https://scholar.google.co.in/citations?user=ZWxbKn0AAAAJ&hl=en&oi=ao>

- ✓ No. of **papers Published/ Accepted: 39**; Total no. of **citations= 2058**; **h-index = 19**; **i10-index = 25**
- ✓ **No. of accepted/ published Book Chapters = 13**
- ✓ **No. of invited manuscripts=3**

- ✓ A figure from one paper was selected for cover page of June 2013 issue of the Journal of Chemical & Engineering Data

## **JOURNAL PUBLICATIONS**

1. R. I. Barbhuiya, N. N. Tinoco, S. Ramalingam, A. Elsayed, J. Subramanian, **W. Routray**, A. Singh. (2022). A review of nanoparticle synthesis and application in the suppression of diseases in fruits and vegetables. *Critical Reviews in Food Science and Nutrition*, 1-23. **Impact factor = 11.208**
2. **W. Routray**, R. Chetry, B.S. Jena. 2022. Drying of food industry and agricultural waste: Current scenario and future perspectives. *Drying Technology*, pp.1-27. 2021 **Impact factor = 3.556**
3. Rahul Islam Barbhuiya, Saipriya Ramalingam, Harsimran Kaur Kalra, Abdallah Elsayed, **Winnie Routray**, Manickavasagan Annamalai, Ashutosh Singh. Application of Non-Destructive Testing Techniques (NDTT) to Characterize Nanocarriers Used for Drug Delivery: A Mini Review. *Biophysica*. 2022.
4. Veknesh Arumugam, Muhammad Heikal Ismail, Tharsini Amma Puspadaran, **Winnie Routray**, Ngadisih Ngadisih, Joko Nugroho Wahyu Karyadi, Bambang Suwignyo, Hatma Suryatmojo. Food Waste Treatment Methods and its Effects on the Growth Quality of Plants: A Review. *Pertanika Journal of Tropical Agricultural Science*. 2022
5. Prabhjot Kaur, Gagan Jyot Kaur, **Winnie Routray**, Jamshid Rahimi, Gopu Raveendran Nair, Ashutosh Singh. Recent advances in utilization of municipal solid waste for production of bioproducts: A bibliometric analysis. *Case Studies in Chemical and Environmental Engineering*. 2022.
6. M Deb, **W Routray**, Kshirod Kumar Dash. Assessment of quality change with frying temperature and sensory analysis using Fuzzy logic of hydrocolloids fortified flour-based multilayered snack. *Journal of Food Processing and Preservation*. 2022. **2020 Impact factor = 2.190**
7. P Nayak, K Rayaguru, S Brahma, **W Routray**, SK Dash. Standardization of process protocol for isolation of starch from mango kernel and its characterization. *Journal of the Science of Food and Agriculture*. 2022. **2020 Impact factor = 3.639**
8. Muhammad Heikal Ismail, Hii Ching Lik, **Winnie Routray**, Wai Woo. Determining the Effect of Pre-Treatment in Rice Noodle Quality Subjected to Dehydration through Hierarchical Scoring. *Food Safety Management & Quality Control, Processes*. 2021. **2021 Impact factor = 3.352**
9. VV Ramakrishnan, D Dave, Yi Liu, **W Routray**, Wade Murphy. Statistical optimization of biodiesel production from salmon oil via enzymatic transesterification: Investigation of the effects of various operational parameters. *Processes* 9(4). 2021. **2021 Impact factor = 3.352**
10. N. Afzal Ali, W Routray, KK Dash. Physicochemical characterization of modified lotus seed starch obtained through acid and heat moisture treatment. *Food Chemistry* 319. 2020. **2021 Impact factor= 9.231**

11. K Vivek, KV Subbarao, **W Routray**, NR Kamini, KK Dash. Application of fuzzy logic in sensory evaluation of food products: A comprehensive study. Food and Bioprocess Technology 1-29. 2021 **Impact factor =5.581**.
12. **W Routray**, D Dave, VV Ramakrishnan, J Pohling, SK Cheema. Biorefinery approach and environment-friendly extraction for sustainable production of astaxanthin from marine wastes. Critical reviews in Biotechnology 39: 469-488, 2019. 2020 **Impact factor = 8.429**.
13. M Ilamaran, S Sriram Raghavan, S Karthik, K Sanjay Nalawade, S Samvedna, **W Routray**, NR Kamini, P Saravanan, N Ayyadurai. A facile method for high level dual expression of recombinant and congener protein in a single expression system. Protein Expression and Purification 156: 1-7, 2019. 2020 **Impact factor = 1.650**
14. **W Routray**, V Orsat. Recent advances in dielectric properties - Measurements and importance. Current Opinion in Food Science 23: 120-126, 2018. 2021 **Impact factor = 9.8**.
15. **W Routray**, V Orsat, M Lefsrud. Effect of postharvest LED application on phenolic and antioxidant components of blueberry leaves. Chem Engineering 2 (4): 56-64, 2018.
16. D Dave, **W Routray**. Current scenario of Canadian fishery and corresponding underutilized species and fishery byproducts: A potential source of omega-3 fatty acids. Journal of Cleaner Production 180: 617-641, 2018. 2020 **Impact factor = 9.297**.
17. D Dave, **W Routray**. Effect of moisture reduction and harvest times on quality characteristics of salmon processing byproducts. Advances in Food Processing and Technology. DOI: 10.29011/AFPT-119. 100019, 2018.
18. **W Routray**, K Rayaguru. 2-Acetyl-1-Pyrroline: A Key Aroma Component of Food Products. Food Reviews International 34(6): 539-565, 2018. 2021 **Impact factor = 6.043**.
19. **W Routray**, D Dave, VV Ramakrishnan, W Murphy. Production of High Quality Fish Oil by Enzymatic Protein Hydrolysis from Cultured Atlantic Salmon By-Products: Investigation on Effect of Various Extraction Parameters Using Central Composite Rotatable Design. Waste and Biomass Valorization 9: 2003–2014, 2018. 2021 **Impact factor = 3.449**.
20. **W Routray**, D Dave, VV Ramakrishnan, W Murphy. Study of drying kinetics of salmon processing by-products at different temperatures and the quality of extracted fish oil. Drying Technology 35(16):1981-1993, 2017. 2021 **Impact factor = 3.556**.
21. **W Routray**, V Orsat. Variation of dielectric properties of aqueous solutions of ethanol and acids at various temperatures with low acid concentration levels. Physics and Chemistry of Liquids 52(2): 209-232, 2014. 2021 **Impact factor = 1.838**
22. **W Routray**, V Orsat. MAE of phenolic compounds from blueberry leaves and comparison with other extraction methods. Industrial Crops and Products 58: 36-45, 2014. 2021 **Impact factor =6.449**



23. **W Routray**, V Orsat, Y Garipey. Effect of different drying methods on the microwave extraction of phenolic components and antioxidant activity from highbush blueberry leaves. *Drying Technology* 32(16): 1888-1904, 2014. 2021 **Impact factor = 3.556**
24. **W Routray**, V Orsat. Variation of phenolic profile and antioxidant activity of North American highbush blueberry leaves with variation of time of harvest and cultivar. *Industrial Crops and Products* 62: 147-155, 2014. 2021 **Impact factor =6.449**
25. **W Routray**, V Orsat. Dielectric properties of concentration-dependent ethanol + acids solutions at different temperatures. *Journal of Chemical & Engineering Data* 58(6): 1650-1661, 2013. 2021 **Impact factor = 3.119**. [A figure from this paper was part of the cover page of June 2013 issue of the *Journal of Chemical & Engineering Data*].
26. **W Routray**, HN Mishra. Sensory evaluation of different drinks formulated from dahi (Indian yogurt) powder using fuzzy logic. *Journal of Food Processing and Preservation* 36(1): 1-10, 2012. 2020 **Impact factor =2.190**.
27. **W Routray**, V Orsat. Microwave-assisted extraction of flavonoids: A Review. *Food and Bioprocess Technology* 5(2): 409-424, 2012. 2021 **Impact factor =5.581**.
28. K Rayaguru, **W Routray**. Mathematical modeling of thin layer drying kinetics of stone apple slices. *International Food Research Journal* 19(4): 1503-1510, 2012. 2021 **Impact factor =1.169**.
29. K Rayaguru, JP Pandey, **W Routray**. Optimization of process variables for accelerated aging of basmati rice. *Journal of Food Quality* 34(1): 56-63, 2011. 2021 **Impact factor = 3.2**.
30. K Rayaguru, **W Routray**. Microwave drying kinetics and quality characteristics of aromatic *Pandanus amaryllifolius* leaves. *International Food Research Journal* 18(3): 992-999, 2011. 2021 **Impact factor = 1.169**.
31. K Rayaguru, **W Routray**, SN Mohanty. Mathematical modeling and quality parameters of air-dried betel leaf (*Piper betle* L.). *Journal of Food Processing and Preservation* 35(4): 394-401, 2011. 2020 **Impact factor =2.190**.
32. **W Routray**, HN Mishra. Scientific and technical aspects of yogurt aroma and taste: A Review. *Comprehensive Reviews in Food Science and Food Safety* 10(4): 208-220, 2011. 2021research **Impact factor = 15.75**.
33. **W Routray**, HN Mishra, YMM Jusoh. Study of the variation in viscosity during addition of stabilizers to obtain an optimised reconstituted Indian yoghurt (dahi) powder-based drink. *International Food Research Journal* 18(4): 1269-1273, 2011. 2021 **Impact factor = 1.169**
34. **W Routray**, V Orsat. Blueberries and their anthocyanins: Factors affecting biosynthesis and properties. *Comprehensive Reviews in Food Science and Food Safety* 10(6): 303-320, 2011. 2021 **Impact factor = 15.75**.
35. K Rayaguru, **W Routray**. Effect of drying conditions on drying kinetics and quality of aromatic *Pandanus amaryllifolius* leaves. *Journal of Food Science and Technology* 47(6): 668-673, 2010. 2020 **Impact factor =3.117**

36. **W Routray**, K Rayaguru. Chemical constituents and post-harvest prospects of *Pandanus amaryllifolius* leaves: A Review. Food Reviews International 26(3): 230-245, 2010. 2020 **Impact factor = 6.043**.

### ***INVITED JOURNAL PUBLICATIONS/ REFERENCE MODULES***

1. **W Routray**, V Orsat. Recent advances in dielectric properties - Measurements and importance. Current Opinion in Food Science 23: 120-126, 2018. **2019 Impact factor = 4.577**.
2. D Dave, **W Routray**. Fishery byproducts: recovery of high value nutritional components. Reference Module in Food Science 1-7. Feb 2019
3. **W Routray**, V Orsat. Microwave assisted extraction of flavonoids. Reference Module in Food science. 2019.

### ***PUBLISHED/ ACCEPTED BOOK CHAPTERS***

1. S. Chakraborty, **W. Routray**, K. K. Dash. 2022. Numerical Study of Baking. In Advanced Computational Techniques for Heat and Mass Transfer in Food Processing (pp. 247-274). CRC Press.
2. A. Mitra, **W. Routray**. 2022. Bioactive Compounds in Cumin. Spice Bioactive Compounds: Properties, Applications, and Health Benefits.
3. **W Routray**, V Orsat, BS Jena. Recent advances in extraction, isolation, characterisation and applications of phenolic compounds. Studies in Natural Products Chemistry. Edited by: Atta-Ur-Rahman, FRS
4. **Winnny Routray**, Crystallization and it's fundamentals, In: Kshirod Kumar Dash and Sourav Chakraborty (Eds.), Food Processing: Advances in Thermal and Non-Thermal Technologies, 2021.
5. R Anand Kumar, **Winnny Routray**, Role of Microbial Fermentation in Gluten Free Products, In: Navneet Singh Deora, Aasatha Deswal, Madhuresh Dwivedi (Eds.) Challenges and Potential Solutions in Gluten Free Product Development, Springer Nature
6. D Dave, J Pohling, **W Routray**. Marine oil biodiesel. Bailey's Industrial Oil and Fat Products. 2019. **Wiley-VCH**. Edited by: Shahidi, F
7. **W Routray**. Food industry byproducts: Sources of health beneficial and medicinal components and potential medical materials. Food Bioactives Functionality and Applications in Human Health. 2019. **Apple Academic Press**, USA. Edited by: Seth D, Deka SC, Hulle NRS.
8. **W Routray**, V Orsat. Agricultural and food industry by-products: Source of bioactive components for functional beverages. Nutrients in Beverages. 2019. **Academic Press**. Edited by: Grumezescu, AM; Holban, AM.

9. VK Shiby, D Seth, **W Routray**, HN Mishra. *Dahi powder and dahi powder based energy/health drink mixes*. Food Product and Process Innovations. 2018. **New India Publishing Agency**, India. Edited by: Mishra, HN.
10. VV Ramakrishnan, **W Routray**, D Dave. An overview of bioprocessing and biorefinery approach for sustainable fisheries. *Developing Technologies in Food Science Status, Applications, and Challenges*. 2017. **CRC Press**, USA. Edited by: Meghwal, M; Goyal, MR.
11. **W Routray**, V Orsat. Plant by-products and food industry waste: A source of nutraceuticals and biopolymers. *Handbook of Food Bioengineering*. 2017. **Elsevier**. Edited by: Grumezescu, AM; Holban, AM. *No. of times cited=2*
12. V Orsat, **W Routray**. Microwave assisted extraction of flavonoids. *Water Extraction of Therapeutic Compounds from Plants*. 2017. **Springer**. Edited by: Hess, A.
13. **W Routray**, V Orsat. Preparative extraction and separation of phenolic compounds. *Handbook of Natural Products*. 2013. **Springer**. Edited by: Ramawat, KG; Merillon, JM.

### ***PAPER PRESENTATIONS AT CONFERENCES***

1. **Winnny Routray**, B.S. Jena. Drying of food and agricultural industry waste for further valorization and product development: Challenges and future perspectives. (Oral paper presentation at 10th Asia pacific drying conference 2019, December 14-17, Vadodara, India)
2. **Winnny Routray**, Deepika Dave. Effect of storage conditions on salmon processing waste used for biodiesel production. (Oral presentation at NABEC 2015, July 12-15, Newark, Delaware, USA)
3. **Winnny Routray**, Deepika Dave. Newfoundland's Fisheries and aquaculture towards Blue Economy. (Oral presentation at NABEC 2015, July 12-15, Newark, Delaware, USA)
4. **Winnny Routray**, Valerie Orsat. Study of the phytochemicals present in Blueberry leaves. (Oral presentation at ASABE 2014 conference, Montreal, Canada)
5. **Winnny Routray**, Valerie Orsat. Blueberry leaves: A rich source of useful phytochemicals. (Poster presentation at the 2013 BIO World Congress on Industrial Biotechnology, Montreal, Canada)
6. **Winnny Routray**, Valerie Orsat. A potential source of extra income for farmers: Blueberry leaves. (Poster presentation at the 2013 6<sup>th</sup> McGill Conference on Global Food Security, Montreal, Canada)
7. **Winnny Routray**, Valerie Orsat. Microwave-assisted extraction of phenolic compounds from blueberry leaves. (Oral presentation at NABEC 2012, Orillia, Ontario, Canada)
8. **Winnny Routray**, Valerie Orsat. Microwave assisted extraction of anthocyanins from blueberry biomaterial. (Oral presentation at NABEC 2011, Burlington, VT, USA)

9. **Winy Routray**, Valerie Orsat. Microwave extraction of myrtillin from blueberry. (Oral presentation at 17<sup>th</sup> World Congress of CIGR, 2010, Quebec City, Canada)
10. Kalpana Rayaguru, **Winy Routray**. Post-harvest processing of *Pandanus amaryllifolius* leaves: a potential substitute of basmati aroma. (Oral presentation at FSES 2009, IIT Kharagpur, India)

### ***CONFERENCES ATTENDED***

1. 24<sup>th</sup> Annual Green Chemistry & Engineering Conference: Systems-Inspired Design. ACS Green Chemistry Institute- Pharmaceutical Roundtable, June 15-19 2020.