

Ajay Rana, Ph. D.

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Dr. Ajay Rana (Scientist Fellow) Food and Nutraceuticals Division Block - K, CSIR-Institute of Himalayan Bioresource Technology, Palampur, District- Kangra, Himachal Pradesh, India (176061)	Dr. Ajay Rana S/o Sh. Punit Chand Rana Village- Nain, P.O. – Kamlerh, Tehsil- Palampur District – Kangra, Himachal Pradesh India (176061)

Research Activites

Extraction, purification and characterization of bioactive phytochemicals (phenolics, terpenoids, alkaloids, carbohydrates and organic acids) and biochemical fingerprinting of metabolites using RP-SPE, HPLC, UPLC, LC-MS/MS, ESI-QTOF-MS and NMR techniques. Metabolomics study of bioactives using LC techniques. Development and validation of analytical HPLC methods using different stationary phases for evaluation of bioactive phytochemicals.

Development of green and sustainable process technologies for bioresource valorization and formulation of diversified value added products; functional beverages (alcoholic and non-alcoholic) and nutraceuticals from underutilized agro-biomass. Quality and stability evaluation of nutraceuticals, herbal extracts and functional beverages. Process optimization from lab scale to pilot facility

Interests Areas

- ✚ **Development of green and sustainable process and technologies**
- ✚ **Value added products/ nutraceuticals and functional beverages (low alcoholic and non-alcoholic)**
- ✚ **Bioprocessing of natural bioactives molecules and quantitative LC metabolomics**
- ✚ **Process up-scaling and analytical method development and validation**

ACADEMIC RECORDS

Qualification/Degree	Year	From Institute/ University
Ph. D.* Science	2015	CSIR-Institute of Himalayan Bioresource Technology, Palampur, Himachal Pradesh Academy of Scientific and Innovative Research (AcSIR)
M.Sc. Bio-Chemistry	2009	Dolphin (P.G.) Institute of Biomedical and Natural Sciences, Dehradun H N B Gharwal Central University, Uttarakhand
B.Sc. (Medical) (Zoology, Botany, Chemistry)	2006	S.C.V.B. Government Degree College, Palampur, Himachal Pradesh Himachal Pradesh University, Shimla, Himachal Pradesh
Higher Secondary	2003	St. Paul's Sen. Sec. School, Palampur, Himachal Pradesh HP Board of School Education, Dharamshala, Himachal Pradesh
Matriculation	2001	Jai Public Sen. Sec. School, Banuri, Himachal Pradesh HP Board of School Education, Dharamshala, Himachal Pradesh

*(Thesis title - *Exploration of Major Phytochemicals and Development of Value Added Products from Underutilized Parts of Camellia sinensis (L.) O. Kuntze*)

RESEARCH/PROFESSIONAL EXPERIENCE

Institute/Organization	Position	Time Period
CSIR-IHBT Palampur, Himachal Pradesh (India)	Scientist Fellow	July 2015 - Present
CSIR-IHBT Palampur, Himachal Pradesh (India)	Post doc Researcher (Job Contract)	September 2014 - July 2015
CSIR-IHBT Palampur, Himachal Pradesh (India)	Research Scholar (Project Fellow and Ph.D. Student)	August 2011 - September 2014
CSIR-IHBT Palampur, Himachal Pradesh (India)	Project Assistant	July 2009 – July 2011

RESEARCH ARTICLES/PUBLICATIONS

1. **Rana, A.**, Dhyani, D., Gulati A., Singh, H. P. 2011. Isolation of two major iridoid glucosides from *Incarvillea emodi*. *Natural Product Research*, 25 (10): 1014-1017.
2. **Rana, A.**, Singh, H. P., Dhyani, D. 2012. Comparative estimation of major iridoid glucosides from different parts of *Incarvillea emodi*. *ISRN Chromatography*, DOI:10.5402/2012/783752.
3. **Rana, A.**, Singh, H. P. 2012. A rapid HPLC-DAD method for analysis of theaflavins, using C₁₂ as stationary phase. *Journal of Liquid Chromatography and Related Technologies*, 35: 2272–2279.
4. **Rana, A.**, Singh, H. P. 2013. Bio-utilization of wild Berries for manufacturing of highly valued herbal wines. *Indian Journal of Natural Products and Resources*, 4 (2): 165-169.
5. **Rana, A.**, Bhangalia, S., Singh, H. P. 2013. A new phenylethanoid glucoside from *Jacaranda mimosifolia*. *Natural Product Research*, 27 (13): 1167-1173.
6. **Rana, A.**, Rana, S., Majeed, R., Singh, H. P., Gulati, A., Hamid, A., Vyas, D., Dhyani, D. 2014. Comparative studies for screening of bioactive constituents from various parts of *Incarvillea emodi*. *Natural Product Research*, 28 (8): 593-596.
7. Rana, S., **Rana, A.**, Gulati, A., Bhushan, S. 2014. RP-HPLC-DAD determination of phenolics in industrial apple pomace. *Food Analytical Methods*, 7:1424–1432.
8. **Rana, A.**, Singh, H. P., Gulati, A. 2015. Concurrent analysis of theanine, caffeine and catechins using hydrophobic selective C₁₂ stationary phase. *Journal of Liquid Chromatography and Related Technologies*. 38: 709-715.
9. Joshi, R., **Rana, A.**, Gulati A. 2015. Studies on quality of orthodox teas made from anthocyanins rich tea clones growing in Kangra Valley, India. *Food Chemistry*. 176: 357-366.
10. **Rana, A.**, Singh, H. P., Gulati, A. 2015. Investigation of major phenolic antioxidants from *Camellia sinensis* Fruits. *Cogent Chemistry*, Vol. 1, Issue 1.
11. **Rana, A.**, Kumar, D., Joshi, R., Gulati, A., Singh, H. P. 2015. *In vitro* cytotoxicity of black tea theaflavin digallates against Chinese hamster ovary cell lines (CHOK1) and glioma cell lines (C-6). *Chemistry of Natural Compounds*. 51: 835-839.
12. Rana, S., Gupta, S., **Rana, A.**, Bhushan, S. 2015. Functional properties, phenolic constituents and antioxidant potential of industrial apple pomace for utilization as active food ingredient. *Food Science and Human Wellness*. 4: 180-187.
13. Rana, S., Kumar, S., **Rana, A.**, Sharma, V., Katoch, P., Padwad, Y., Bhushan, S. 2016. Phenolic Constituents from Apple Tree Leaves and their *in vitro* Biological Activity. *Industrial Crops and Products*. 90: 118-125.
14. **Rana, A.***, Sharma, E., Rawat, K., Sharma, R., Verma, S., Padwad, Y.S., Gulati, A. 2016. Screening and Purification of Catechins from Underutilized Tea Plant Parts and Their Bioactivity Studies. *Journal of Food Science and Technology*. 53(11):4023–4032.
15. Joshi, R., **Rana, A.**, Kumar, V., Kumar, D., Padwad, Y.S., Yadav, S.K., Gulati, A. 2017. Anthocyanins Enriched Purple Tea Exhibits Antioxidant, Immuno-Stimulatory and Anticancer Activities. *Journal of Food Science and Technology*. 54 (7): 1953-1963.
16. Sharma, R., Verma, S., Rana, S., **Rana, A.*** 2018. Rapid Screening and Quantification of Major Organic Acids in Citrus Fruits and their Bioactivity Studies. *Journal of Food Science and Technology* (Accepted)

PATENTS

1. A Solvent free process for purification of free bio-amino acids.
Harsh Pratap Singh and **Ajay Rana**
India (IN2012DE00371 20120210) Pending
United States of America (US 2015/0051422 A1) Granted (23-02-2016)

China (CN104105685A, CN104105685B) Granted (19-10-2016)
Japan (JP2015508070 A), PCT (WO 2013/118152 A1) Granted (04-07-2017)

2. A new energy efficient process for manufacturing of high quality flavored teas.
Ajay Rana, Harsh Pratap Singh and Ashu Gulati (0190NF2012) India and PCT Countries

DEVELOPED PRODUCT/PROCESS TECHNOLOGIES

1. Developed a green and sustainable technology for purification and production of green tea polyphenols (Catechins)*
***Technology transferred to**
 - i. **M/s Baijnath Pharmaceutical Pvt. Ltd. Paprola, Himachal Pradesh**
 - ii. **The INDCOSERVE- Coonor Tea Trade Association, Nilgiris, Tamil Nadu**
2. Developed a sustainable process technology for production of black tea polyphenols (Theaflavins)
3. Developed a new sustainable process technology for manufacturing of high quality green tea with enhanced flavour
4. Developed a green process based technology for production of bio-amino acids from tea and other bioresources
5. Developed a new process for preparation of green and black tea concentrates from secondary grade teas
6. Developed process technology for preparation of tea and tea based wines
 - i. **MOU Signed with SDZ Cha Sarl Mozambique**

WORKSHOPS/CONFERENCES, POSTER PRESENTATIONS

1. Attended "3rd National Workshop on Reorientation in Life Sciences", Chumni Kalan, Punjab, India, (20-21 January 2007).
2. Attended and presented a poster at the "National Workshop on Biotechnology Education", Dehradun, Uttarakhand, India, 6-7 October 2007.
3. Attended and presented a poster in "Symposium on Phytochemistry and Ayurveda: Potential and Prospects", Dehradun, Uttarakhand, India, 29 December 2007.
4. Attended and participated in Photo gallery in "A creative Workshop on World Environment Day - Save the Mother Earth". At Dehradun, Uttarakhand, India, 5 June 2008.
5. Attended "Ayurvedic Pharmacopoeia Committee (APC)-Industry Interactive Workshop". At CSIR-Institute of Himalayan Bioresource Technology, Palampur, 25 August 2016.

GUEST REVIEWER

1. Natural Product Research
2. Medicinal Chemistry Research
3. Journal of Food Quality
4. Journal of The Science of Food and Agriculture
5. Industrial Crops and Products
6. International Journal of Biotechnology and Food Science
7. Journal of Functional Foods

AWARD

1. Awarded 2nd Prize for Poster Presentation in "National Conference on Biotechnology Education" Dehradun, Uttarakhand. India (6-7 October 2007).
2. Start Up Research Grant (Young Scientists) 2015 from Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India (YSS/2015/000097).

(AJAY RANA)