



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : **Ph.D.**

Thesis Title: **Ultrasound-Assisted Extraction of Bioactives from Horticultural Produces and their Encapsulation with Ion Gelation Method**

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**SHORT ABSTRACT**

Till date, various extraction and purification processes have been deployed to obtain liquid extraction of bioactive constituents from plants and their by-products. Traditional techniques such as maceration, hydro-distillation, soxhlet extraction, and hot water extraction have been deployed to extract valuable bioactive compounds from plant sources. These techniques suffer with the basic limitations of long extraction time, use of expensive and toxic solvents and degradation of heat sensitive compounds. On the other hand, the application of ultrasound assisted extraction (UAE) has been mostly explored in food and pharmaceutical processing schemes for the needful extraction of bioactive components. This is due to its simplicity, lower cost, lower processing time, lower solvent requirements, effective extraction efficiency, lower energy, higher reproducibility, scalability, and environmentally friendly nature.

Despite being a host of all above mentioned nutritional benefits, the bioactive compounds suffer with few limitations. These include sensitivity towards heat and light, quicker degradation due to processing, gastrointestinal and other environmental conditions, low water solubility, and a high metabolic rate in free form that fosters their easy excretion from the human body. Considering these issues, the Ph.D. thesis devotes towards the fulfilment of five major objectives. Among these, the first three objectives refer to aqueous ultrasound-assisted extraction (normal UAE (NUAE) and pulsed UAE (PUAE)) and hot water extraction (HWE) of bioactives from various leafy and non-leafy sources of North-East India (guava leaves, papaya leaves, raw papaya peel (PPE) and pulp(PPU)). The fourth objective involved citric acid based (CA) aqueous NUAE, PUAE and acidic hot water extraction (AHWE) for the pectin extraction from pomelo peel. Finally, the fifth objective targeted ion gelation based encapsulation of bioactives extracted into the aqueous phase from the papaya leaf system and with calcium alginate (Ca-Al) pectin beads.