



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Development and Characterization of Gluten-free Functional Cookies Enriched with Unripe Papaya Powder

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SHORT ABSTRACT

This Ph.D. thesis addresses the development and characterization of novel gluten-free and gluten-reduced functional cookies. Such novel and optimal formulations were achieved through the incorporation of various gluten-free grain flours, and through the optional substitution of optimally oven dried papaya peel (PPE) and pulp (PPU) powders. Subsequently, the thesis also delved into the further functionalization of the cookies through the fortification with either encapsulated catechin or papaya leaf extract. The utilized non-gluten flours refer to the flours/powders of rice, roasted chickpea, Bengal gram, soy, finger millet, oats, dried unripe papaya pulp and peel. These ingredients are well known indigenous yet abundantly agricultural produces of the North-east India. Subsequent to the assessment of the physicochemical, functional and nutritional properties and other characterization such as the FESEM, FTIR, XRD, particle size, DSC, and color of the mentioned flours/powders, the cookie formulation research was targeted based on sensory analysis. This was followed with the characterization of optimally formulated cookies for the assessment of their morphological and nutritional properties. The ultimately achieved cookie formulations can be categorized into (a) gluten-reduced functional cookies with enriched constitution of bioactives and sensory parameters (b) millet and non-millet based functional cookies with and without substitution of the PPU and PPE flours and (c) gluten-free functional cookies further enriched in terms of encapsulated fortificants (such as catechin extract infused encapsulant or papaya leaf extract infused encapsulant). In summary, all cookies were assessed in terms of physico-chemical properties, functional properties, sensory properties, rheological behavior, bio-accessibility, and storage characteristics. These achievements enabled to critically address highly subjective knowledge gaps in the field of study and through the creation of innovative cookie solutions that addressed good combinations of healthier, nutritional, sensory and storage parameters.