Indian Institute of Technology Guwahati

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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

Thesis Title: **Formulation and Characterization of Leafy and Non-leafy Vegetables based Mix Soup Formulations**

Name of Thesis Supervisor(s)	:	**Prof. Ramagopal Uppaluri and Prof. Latha Rangan**
Thesis Submitted to the Department/ Center	:	**School of Agro and Rural Technology**

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Key words for description of Thesis Work	:	Antioxidant activity; Drying kinetics; Leafy vegetables; Non-leafy vegetables; Optimization; Oven drying; Proximate analysis; Rheology; Sensory, Soup formulation; Tray drying; Vitamin C

SHORT ABSTRACT

To encourage translational and value-added product development of endemic and underutilized horticultural produces, the Ph.D. thesis devotes towards the development of a robust experimental and design methodology for the formulation and characterization of leafy and non-leafy vegetable based mix soup recipes with high nutritional content in terms of proximate, Vitamin C and antioxidant activity characteristics. The targeted leafy and non-leafy vegetables include Kolmou (*Ipomoea aquatica* Forssk.), Pui (*Basella alba*) and Jatialao sak (*Lagenaria siceraria* leaves) and Kolphul (*Musa balbisiana* Colla blossom), Kaskal (*Musa splendida*), green Komora (*Benincasa hispida*) and Posola (*Musa balbisiana* Colla pseudostem) respectively. Firstly, the thesis addressed the comparative efficacy of tray and oven drying processes towards the chosen leafy vegetables in terms of the nutritional characteristics of the dried vegetable samples. Thereby, tray drying process has been evaluated to be superior among tray and oven drying processes with respect to the superior combinations of mentioned nutritional characteristics (minimum moisture content, maximum vitamin c and antioxidant activity). Thereafter, the thesis advocated upon the optimality of process-product characteristics of the chosen leafy and non-leafy vegetables using both trial and error and statistical design approaches. Also, trial and error methodology based drying kinetics studies have been conducted to determine best fit kinetic model, moisture diffusivity and activation energy. Further, statistical design based parametric optimality was carried out to identify best fit response expressions representing nutritional sensitivity with respect to drying temperature and time. Eventually, nutritionally best mix was identified by using a robust mathematical model followed by trial and error based sensory evaluation. The optimal leafy and non-leafy vegetable soup formulations refer to individual drying based optimal constitution of leafy vegetables (10:74.95:15.05 for Kolmou, Jatilao and Pui respectively) and non-leafy vegetables (21.58:25:43.42:10 for Kolphul, Kaskal, Komora and Posola respectively). Further, the optimal dry vegetable mix to corn flour ratio was obtained as 40:60. The reconstituted soup mixes (20g dry soup mix:400 mL of water) indicated an overall sensory score of 8.4/9 and 8.6/9 for the leafy and non-leafy vegetable mix soup formulations respectively. Both soups affirmed pseudo-plastic shear thinning behavior during steady state analysis and elastic behavior during dynamic analysis.