

***In Vitro* and *In Silico* Study on Anti-inflammatory Properties
of ‘Norabogori’ (*Prunus persica*) from Assam and Its
Application in Food Model**

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Urbashi Neog

Registration Number TZ121592



DEPARTMENT OF FOOD ENGINEERING AND TECHNOLOGY

SCHOOL OF ENGINEERING

TEZPUR UNIVERSITY

TEZPUR-784028

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**Conclusions and Future scope of
the work**

CHAPTER 6

6.1 Conclusions

Norabogori is a wild edible species of peach (*Prunus persica*) grow in Assam. It is a scarcely available fruit in some parts of Assam. In the present study, the fruit was identified as *Prunus persica* (L.) Batsch of Rosaceae family. As one of the first time in this field of study for the fruit for Assam region, this thesis explored its physiochemical attributes, phytochemical profile, its anti-inflammatory potential and affecting genes and some other therapeutic effects. At the final steps, a product was also developed ensuring its targeted delivery. These sets of investigations were conducted with four clearly focused objectives comprising of different *in vitro* and *in silico* methodologies.

The salient findings of the thesis are summarized below:

- The norabogori fruit is rich in nutrients and phytochemical compounds.
- The microwave assisted extraction (MAE) of norabogori fruit is more efficient and better yielding than conventional cold maceration technique in terms of total phenolic content (TPC).
- The optimal conditions determined by response surface methodology (RSM) for the microwave assisted extraction of norabogori were 1 g sample in 40 mL, 67% ethanol extracted with a microwave power of 570 Ws for 15 min and resulted in the maximum yield (6824.38 g GAE/100g).
- The phytochemical compounds detected in the fruit extract were taken for 33 compounds.
- On quantifying some prominent compounds from them, kaempferol (211.09 mg/100g), rutin (83.06 mg/100g), ellagic acid (57.98 mg/100g), syringic acid etc found to be in quite high amount.
- These phytochemical compounds are the main factors responsible for the therapeutic effects of the norabogori fruit.
- On applying the extract on macrophage cell-line, the extract does not show any adverse cytotoxic effect and found to maintain around 80% cell viability throughout the experiment.
- The cell-line study of the extract to check its potential anti-inflammatory activity showed to be effective.

- Three important pro-inflammatory marker genes, IL1 β , COX 2 and TNF- α were inhibited in the cell-line by the fruit extract.
- The phytochemical rich norabogori extract showed anti-inflammatory activity in ABTS and DPPH assay.
- Anti-cancer activity of the fruit was effectively evaluated in human ovarian cancer cell line by MTT assay.
- Phytochemical compounds identified in the extract were found to be drug-like compound and they can be effectively absorbed, distributed in the body and non-toxic as evaluated by ADMET property analysis.
- The identified compounds are individually capable to inhibit the pro-inflammatory marker proteins and are dynamically stable in *in silico* environment.
- The extract got effectively encapsulated by sodium alginate.
- The encapsulate incorporated norabogori fruit leather was accepted in both objective and sensory evaluations.

6.2 Future scope of the present investigation

- *In vivo* studies may be conducted for the anti-diabetic and anti-inflammatory properties of the norabogori fruit extract.
- Unknown phytochemical compounds peaks (HPLC chromatogram) present in the extract can be explored.
- Applications of the polyphenol rich extract and microbeads in many fields like, pharmaceutical, food and food packaging industries.
- In order to increase the nutraceutical value of functional foods, confectionary, sauces, chocolates, jellies, ice cream, candy goods, and a range of instant drink powders, microencapsulated norabogori extract could be utilized as a natural additive.
- Other parts of the norabogori plant can be evaluated for therapeutic activities.