Development and characterization studies of fish gelatin film incorporated with natural extracts

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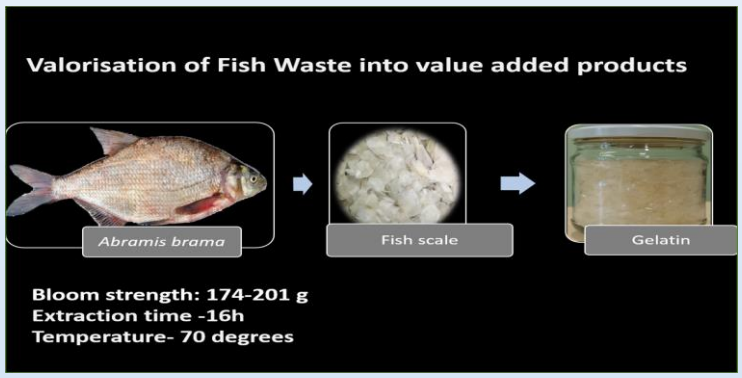
Introduction

- Biopolymer-based packaging materials are attractive and eco-friendly alternative to synthetic polymers due to its availability, low cost, and renewable raw materials from agro-industrial biomass.
- The growing accumulation of packaging waste and the increase of environmental awareness has led to the need to create biodegradable/compostable packaging materials.
- Fish gelatin has been reported to have good film forming property, especially gelatin obtained from cold-water fish species have relatively lower content of proline and hydroxyproline compared to gelatin from mammals and exhibits wide range of bloom values (Derkach et al., 2020).
- Fish gelatin has excellent film-forming ability, transparency, surface hydrophobicity, permeability and thermal property that promote them to be used as a promising material for developing packaging films (Salem et al., 2021).
- In this study, fish gelatin was extracted from a fresh water fish, *Abramis brama* and developed biodegradable films. The physical and functional properties of film was studied using different methods. The effect of crude extract obtained from rhubarb stem pomace was also studied to see the difference in the functional properties of the film.

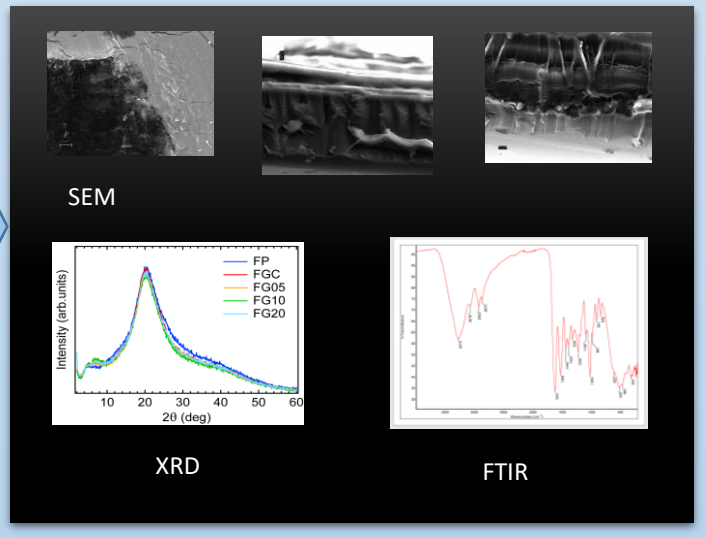
Project theme



Methodology

Objectives & Preliminary Results

- This study was focused on the tailoring effect of rhubarb pomace extract added to fish gelatin-based films.
- Commercial grade fish gelatin was used as a control for comparison.
- Fish gelatin (5%) with glycerol (30%) and rhubarb extracts (5, 10 and 20 milligrams/ 100 ml gelatin solution) was tried out.
- All fish gelatin samples had similar L* values but a* and b* values were high with rhubarb extract (20 mg) included films as well as control films.
- The thickness of the developed films ranged from 0.12 mm to 0.14 mm.
- There was a significant difference ($p \leq 0.05$) in the transmittance (85-90%, water vapor permeability (g/mm2.h.pa) and tensile strength of the films (13-14 MPa).
- Further characterisation studies has been performed by Scanning electron microscopy, XRD and FT-IR spectra as showed .



Research outcome and future plan

Films with rhubarb extract did not show any significant difference in the peak values in XRD and FTIR. Therefore, in the future studies we would be increasing the concentration of plant extract to see the changes in functional properties of the film.
The fish gelatin obtained from fresh water fish in our study showed similar properties as commercial fish gelatin. The developed films will be applied for packing food products such as berries and cheese.

References

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