

CHAPTER V

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The enhancement of tensile strength observed with the addition of 0.5 grams gambir leaf extract is mainly attributed to the presence of polyphenolic compounds, especially catechins, which promote stronger intermolecular hydrogen bonding within the CMC and chitosan matrix and improve stress distribution during tensile loading. However, when the gambir leaf extract content was increased to 1 gram, the tensile strength decreased, indicating that excessive extract addition negatively affects mechanical performance. This reduction is associated with the dominance of rigid polyphenolic structures that interfere with polymer chain mobility and hinder efficient load transfer, resulting in a less optimal tensile response. Nonetheless, the tensile strength values obtained across all formulations remain within the acceptable range of approximately 2 to 10 MPa established for biodegradable and edible biopolymer films, confirming that the developed CMC and chitosan blend films with gambir leaf extract successfully meet the mechanical standards required for this category of materials.

5.2 Recommendation

The suggestion for further research is to conduct Scanning Electron Microscope (SEM) testing to determine the phenomena that occur in the fracture of the film surface by adding concentration to the sample, so that the effect of adding variations in gambir leaf extract on the tensile strength of the CMC and chitosan sample can be observed.

