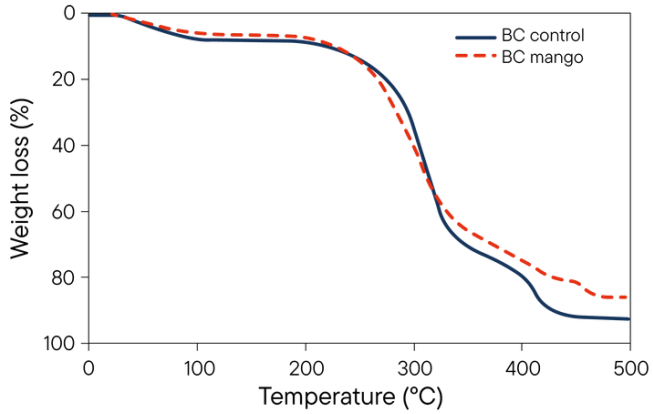
Thermal Stability of Bacterial Cellulose Produced from Mango Waste

STA L82 Analysis of Sustainable Bacterial Cellulose

Bacterial cellulose is an advanced biomaterial with excellent mechanical properties and growing importance in biomedical applications. In this study, the LINSEIS STA L82 was used to compare the thermal degradation behavior of bacterial cellulose produced from conventional culture media and mango waste-derived feedstock. The measurements demonstrate that agricultural waste can be used without compromising thermal stability.

Measurement Setup

- Instrument: LINSEIS STA L82
- Material: Bacterial Cellulose (Control / Mango Waste)
- Temperature Range: 25–500 °C
- Atmosphere: Air
- Measurement: Simultaneous Thermal Analysis (TGA)
- Application: Biopolymers & Sustainable Materials



The thermogravimetric analysis reveals nearly identical degradation behavior for both bacterial cellulose samples.
Key observations include:

- Similar thermal stability for both materials
- Initial moisture loss below 100 °C
- Main decomposition between 225 and 360 °C
- Comparable residual mass after heating

The results confirm that bacterial cellulose produced from mango waste exhibits thermal behavior comparable to conventionally produced material.

Interpretation

The observed behavior can be attributed to:

- Similar cellulose chemical structure
- Comparable degradation mechanisms
- Stable polymer network
- Consistent thermal stability

This results in:

- Equivalent thermal performance
- Reliable processing behavior
- Sustainable material production

Industrial Relevance

Simultaneous Thermal Analysis supports:

- Biopolymer development
- Biomedical materials
- Sustainable cellulose production
- Packaging materials
- Functional bio-based materials

Conclusion

The LINSEIS STA L82 enables reliable characterization of the thermal stability of bacterial cellulose. The measurements confirm that mango waste is a suitable alternative carbon source while maintaining the characteristic thermal degradation behavior required for advanced bio-based applications.

Source:
García-Sánchez, M. E., Robledo-Ortíz, J. R., Jiménez-Palomar, I., González-Reynoso, O., González-García, Y.
Production of Bacterial Cellulose by Komagataeibacter xylinus Using Mango Waste as Alternative Culture Medium.
Revista Mexicana de Ingeniería Química, 2020.
Adapted from simultaneous thermal analysis (TGA) measurements performed using a LINSEIS STA L82 (formerly designated as STA PT 1000).