

bioSTAR[®]



Tisan

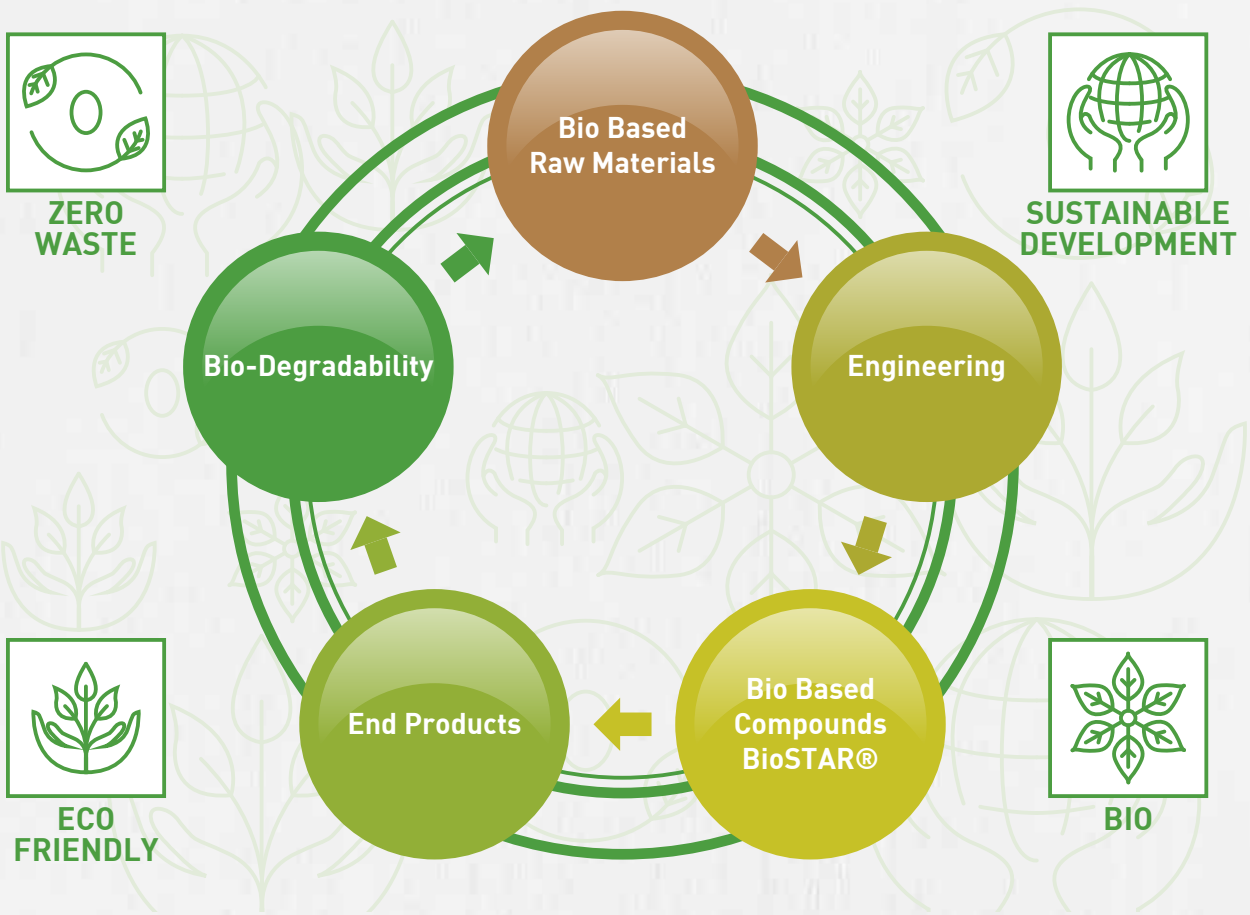
Biodegradable Solutions



Renewable and bio-based materials are started to be used in compounds for environmental sustainability. Tisan Engineering Plastics is aware that compounders have responsibility to environmental issues as a plastic raw material producer. Tisan has produced green compounds with bio-based raw materials to show Tisan's sensitivity to environment under the brand BioSTAR®.

BioSTAR® includes bio-based raw materials which decomposes into carbondioxide, water, methane, inorganic compound and biomass by using enzymatic systems and they intermingle to the environment. By this manner, the life cycle continues. Bio-based compounds are engineered with special additives to increase bio-content in the products to meet the requirements for alternative green products which are biodegradable or has long life.

BioSTAR® grades are developed from PLA and PA bio-based polymers reinforced with glass fiber and improved with halogen free flame retardant. The renewable content of the products start from 20% and increase to 90% due to included bio-based polymers, reinforcements and additives.





Our quality is **your** **guarantee**

Our product reach reliably the customer having passed all the quality tests in our T-LAB laboratory matching international standards.

| | | |
|--------------------------------------|--|--|
| 1 Mechanical tests | 2 Physical properties | 3 Weathering and aging tests |
| 4 Flammability tests | 5 Color arrangement and measurements | 6 Thermal and flow analysis |
| 7 Heat deflection analysis | 8 Electrical and chemical resistance | 9 Dimensional tests |

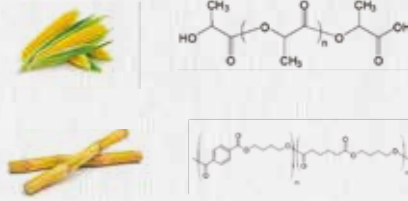


More than 40 years **experience**

Tisan Engineering Plastics specialized on production of compounds used as raw materials more than 40 years experience. Tisan produces competitive and favorable solutions to customers based on their requirements. Our aim is to provide competitive solutions, qualified products, flexible production, high-speed service with strong technical infrastructure and human quality in both standard and exclusive products for all markets.

Biopolymers In **bioSTAR**[®]

- Polylactic acid (PLA)
- PA 56
- PBAT
- Bio-based PE
- Bio-based PP



bioSTAR[®] Applications

Packaging:

- Film
- Sachet / Bag
- Bottle

Niche Products:

- Automotive
- Electrics and Electronics

Food Industry:

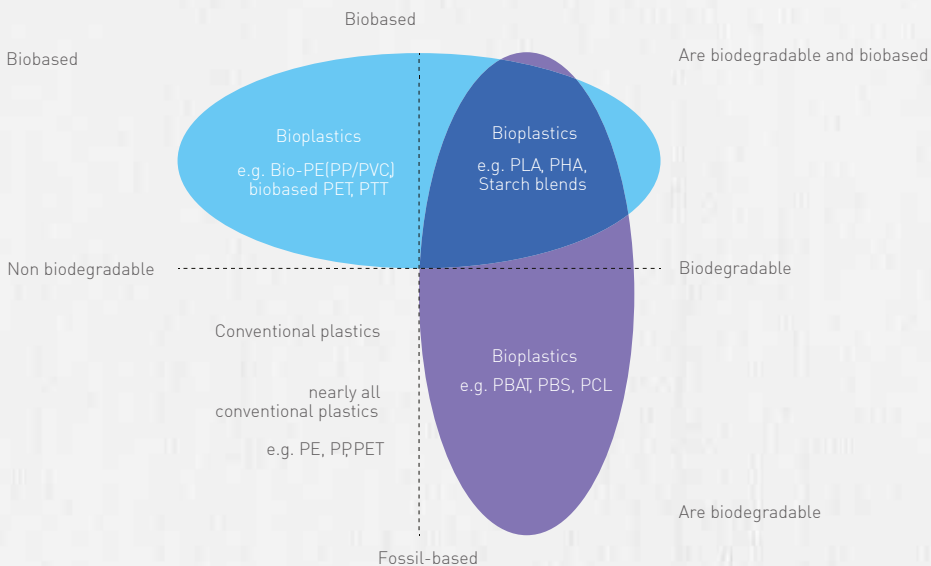
- Disposable cutlery
- Plates and service products



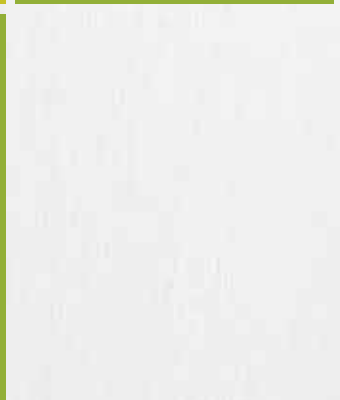
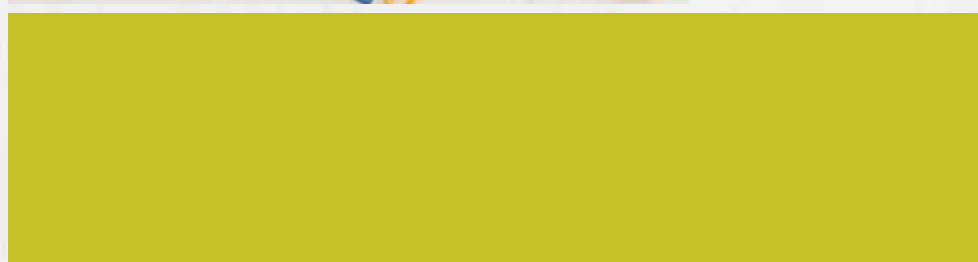
bioSTAR[®] Products

| Product Code | Application | Density (g/cm ³) | Notched Izod Impact Strength (kJ/m ²) | E-Modulus (MPa) |
|--------------------------------------|---|------------------------------|---|-----------------|
| BIOSTAR [®] 7419 I TF 15 NC | Biodegradable and compostable compound suitable for injection process | 1,38-1,42 | 2-6 | 4000-5000 |
| BIOSTAR [®] 7419 F | Biodegradable and compostable composite suitable for film processing | 1,23-1,26 | - | - |
| BIOSTAR [®] 7419 N GF 30 NC | Biodegradable and compostable compound suitable for injection process | 1,44-1,48 | 4-8 | 9000-10000 |

Bioplastics



Graph:
Material coordinate system of bioplastics
Prof. Dr. Ing. H.J. Endres, IFBB
University of Applied Sciences and Arts



Tisan

www.tisan.com.tr

Tisan Factory 1

Address:

Eksiođlu Mah. Yavuz Selim Cad. 86. Sk.
No:4 Alemdađ / İstanbul / TURKEY

Tisan Factory 2

Address:

Eksiođlu Mah. Atabey Cad. No:24
Çekmeköy / İstanbul / TURKEY

Phone: +90 216 429 36 65

Fax: +90 216 312 14 78

E-mail: tisan@tisan.com.tr