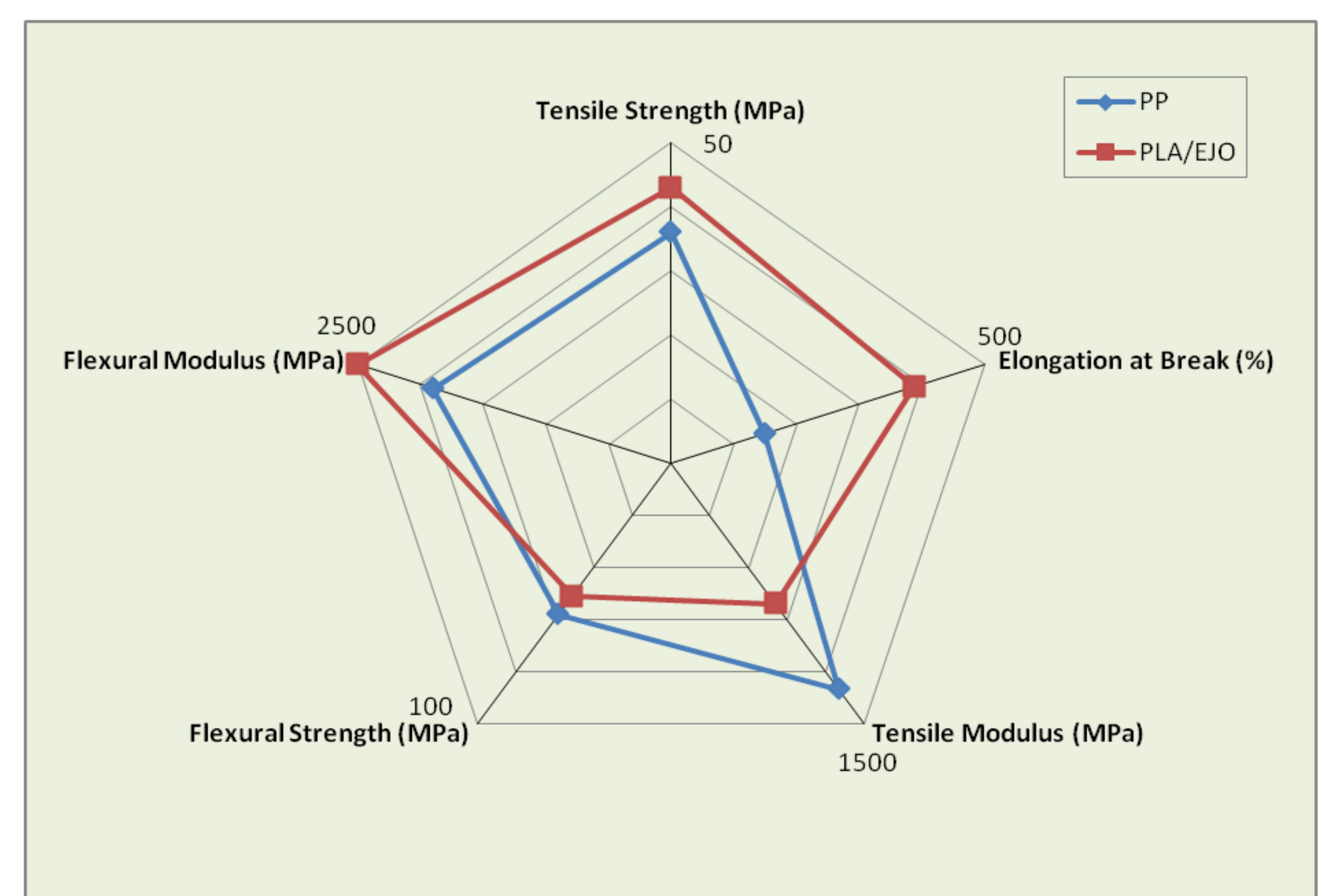
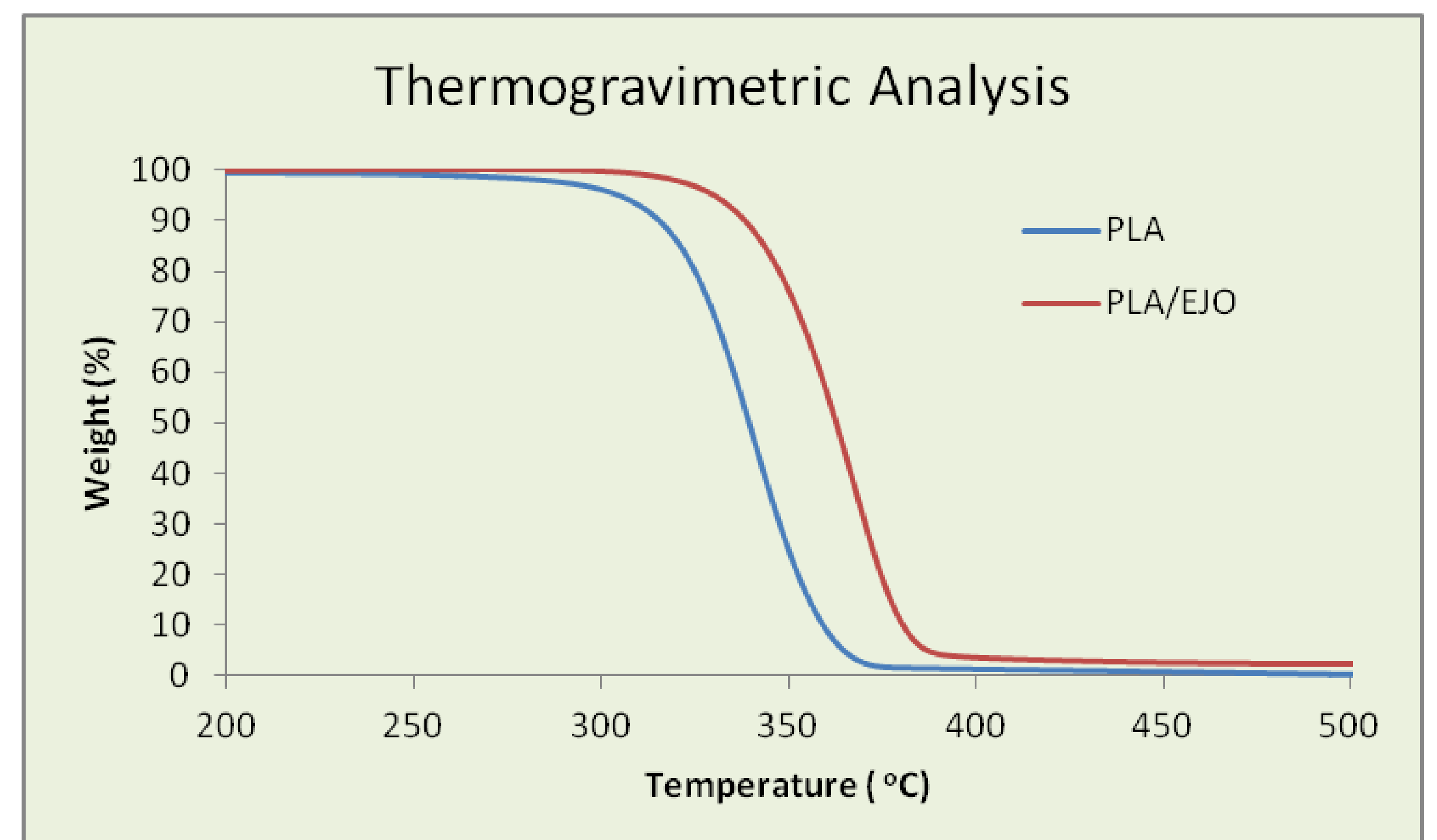
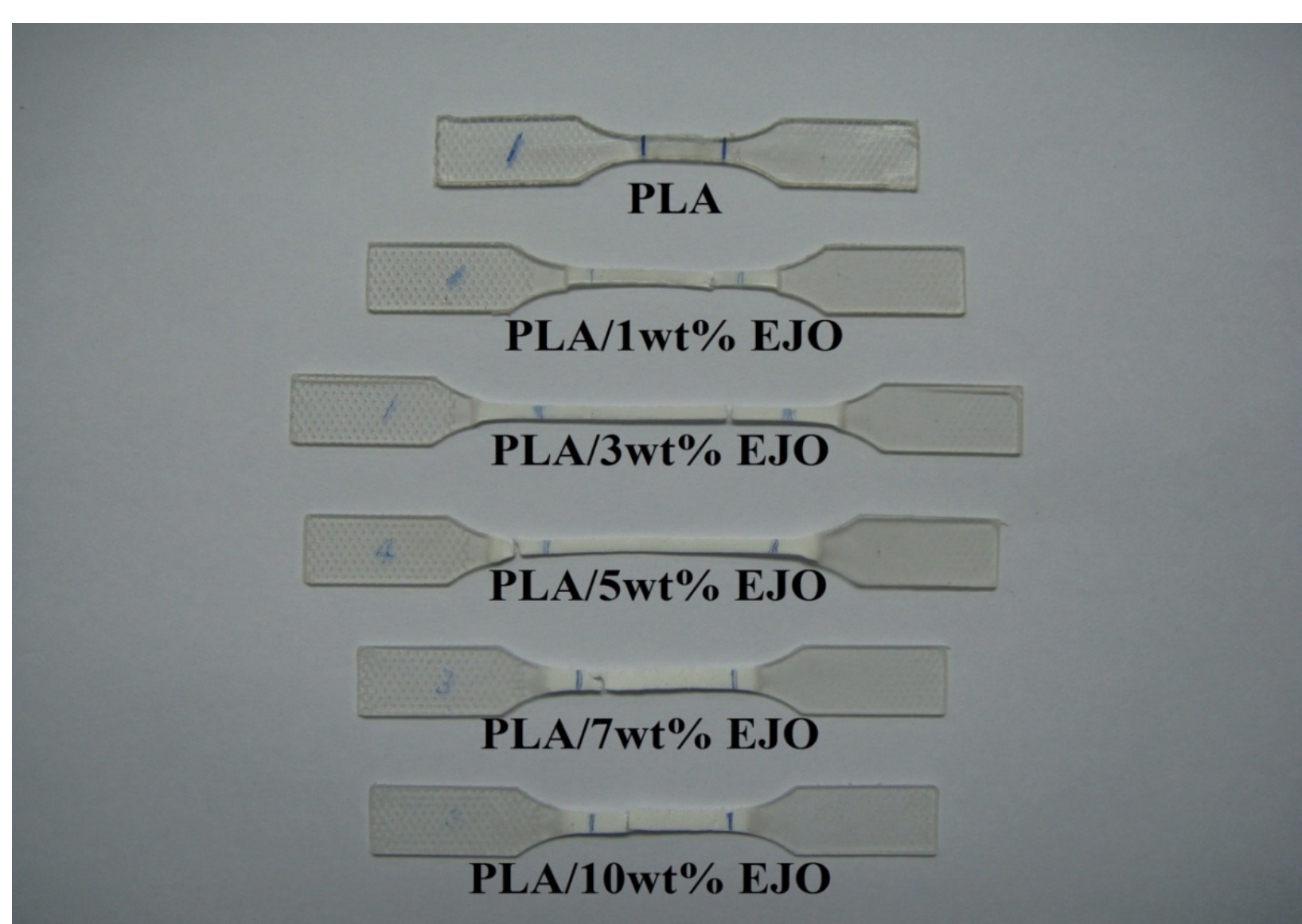


GREEN PLASTIC: JATROPHA OIL-PLASTICIZED POLY(LACTIC ACID)

PATENT NO. PI2016700772



NEED

- Growing market demand for green products has placed pressure on manufacturers and supplier to find alternatives for petroleum-based plastics.
- Fluctuations in the prices of petroleum, forcing the companies to search for a stable source of raw material.
- The government in the country has also been encouraging the usage of bioplastics in the country, with some local governments making laws to ban the usage of non-bioplastics in the retail shops.
- Biodegradable poly(lactic acid) PLA offers a possible alternative to the petroleum-based polymers. However, the inherent brittleness have limited its wider applications.

APPROACH

We have focused on plant-based and non-edible oil (Jatropha curcas) for PLA plasticization. Jatropha oil with higher content of linoleic acid (C18:2) compared to palm oil and soybean oil thus gives higher percentage of oxirane content upon epoxidation process which lead to better plasticization effect. Use existing equipment for plastic processing.

BENEFIT

EJO is epoxidized derivative of jatropha oil which content high amount of oxirane content (4 – 6 %) compared to other edible oils such as palm oil and soybean oil. This plasticizer is biodegradable, non-volatile, non-toxic and exhibits no or minimum leaching or migration during use or aging. EJO significantly improved flexibility property of poly(lactic acid). In addition improved the thermal stability. The products and the processing methods are green.

Polymer (ASTM D638)	Tensile Strength (MPa)	Elongation at Break (%)	Tensile Modulus (MPa)
PP	36	150	1300
LDPE	12	515	285
HDPE	28	500	800
PET	55	70	2700
PC	70	100	2400
PLA	60	5	1500
PLA/EPO (our research)	32	114	942
PLA/ESO (our research)	37	220	919
PLA/EJO (this invention)	43	388	815

COMPETITOR/MARKET POTENTIAL

- The material has many possible uses in the manufacture of automotive component, consumer goods, product packaging and agricultural goods.
- The bioplastics & biopolymers market is projected to witness a CAGR of 12.0% from 2016 to reach a market size of USD 5.08 billion by 2021.
- Incorporating bioplastics into products will allow manufacturers to meet current and upcoming regulatory requirements for sustainable content. These businesses will also find it easier to qualify for the Government Green Procurement (GGP) scheme and gain access to valuable export markets.



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