

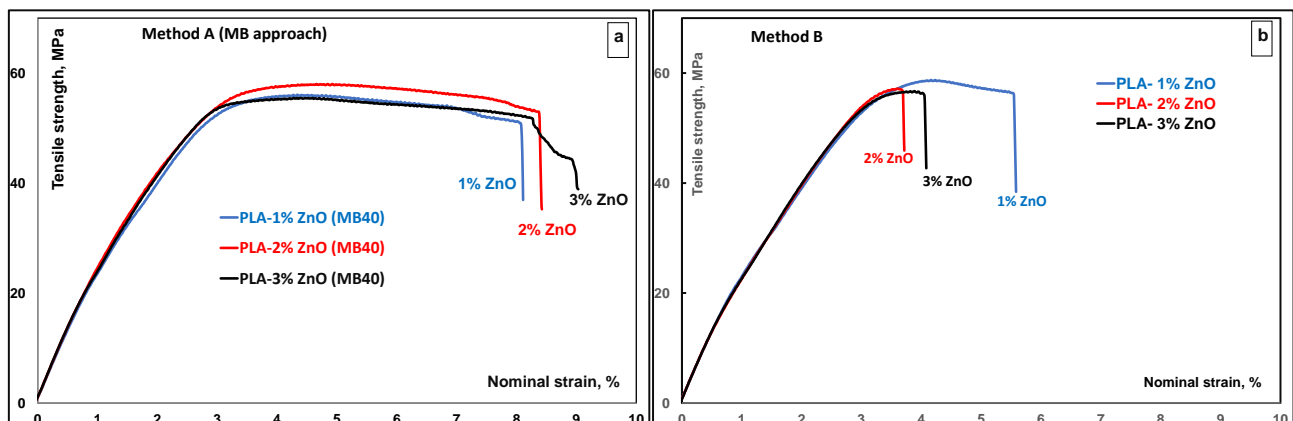
## Supplementary Material S1 (online publication)

**Table S1.** Comparative molecular parameters determined by SEC\* of PLA - ZnO nanocomposites extruded as films using different methods.

Sample	Method	$M_{n(PS)}$	$M_{w(PS)}$	PI
PLA (reference)	-	113 600	205 800	1.81
PLA- 1% ZnO <sub>(MB)</sub>	A	92 100	194 000	2.11
PLA- 1% ZnO	B	69 700	149 600	2.15
PLA- 3% ZnO <sub>(MB)</sub>	A	92 600	195 800	2.11
PLA- 3% ZnO	B	54 800	117 500	2.14

### \*Size exclusion chromatography (SEC)

Molecular weight determination of PLA was carried out on samples dissolved in chloroform (10 mg polymer/5 ml solvent). Size exclusion chromatography (SEC) measurements on previous centrifugated and filtered samples were performed at 30°C using an Agilent liquid chromatograph equipped with an Agilent degasser, an isocratic HPLC pump (flow rate = 1 mL/min), an Agilent autosampler (loop volume = 100 µL), an Agilent-DRI refractive index detector and three columns: a PL gel 5 µm guard column and two PL gel Mixed-B 5 µm columns (linear columns for separation of molecular weights (PS standards) ranging from 200 to 4.10<sup>5</sup> g/mol). The experimental errors in the case of SEC measurements are estimated to about 10%. Molecular weights and molecular distributions were calculated by reference to a universal calibration curve relative to polystyrene standards.



**Figure S1 (a, b).** Typical tensile stress – strain curves of PLA - ZnO nanocomposite films (thickness ~400  $\mu\text{m}$ ) produced using **a)** the MB approach (method A) and **b)** PLA – ZnO nanocomposites as granules (method B, current technique).