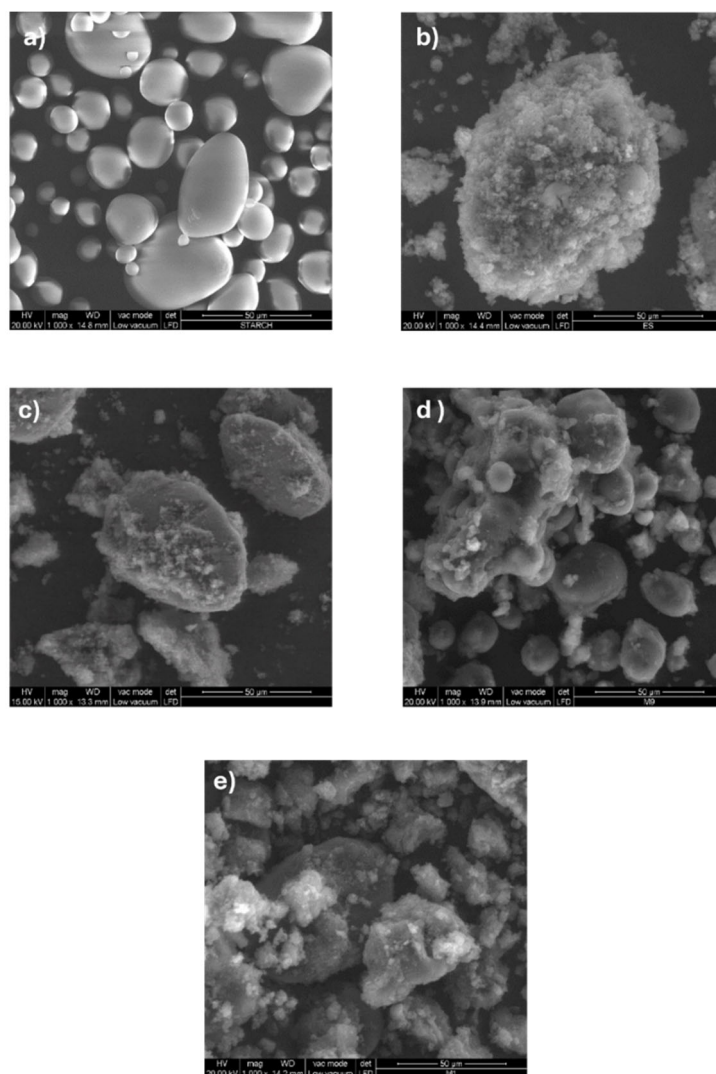


*Supplementary Information for:*

# Synthesis and Characterization of Polyaniline Emeraldine Salt (PANI-ES) Colloids Using Potato Starch as a Stabilizer to Enhance the Physicochemical Properties and Processability

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## SEM



**Figure S1.** SEM images of (a): Starch, (b) PANI-ES and PANI-ES/starch biocomposites: (c): (1:1), (d): (2:1) and (e): (3:1).

## Solubility data

**Table S1:** Solubility of PANI-ES/Starch composites.

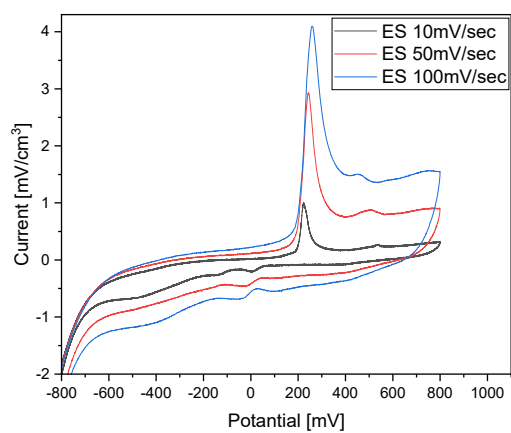
T °C	ES-Starch (W% w%)	Acetone	Methanol	Ethanol	Glycerol	Ethyle Acetate	Chloroform	Toluene	Hexane	Cyclohexane	DMSO	Water	DMF	NMP
20	Z11	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	Z21	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	Z31	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	PANI ES	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	Starch	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	X	O	O	X
40	Z11	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	Z21	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	Z31	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	PANI ES	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	Δ	X	O
	Starch	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	X	O	O	X
60	Z11	-	Δ	Δ	O	Δ	O	Δ	Δ	Δ	X	Δ	X	X
	Z21	-	Δ	Δ	O	Δ	O	Δ	Δ	Δ	X	Δ	X	X
	Z31	-	Δ	Δ	O	Δ	O	Δ	Δ	Δ	X	Δ	X	X
	PANI ES	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	X	Δ	X	X
	Starch	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	X	O	O	X
80	Z11	-	-	-	O	Δ	-	Δ	Δ	Δ	X	Δ	X	X
	Z21	-	-	-	O	Δ	-	Δ	Δ	Δ	X	Δ	X	X
	Z31	-	-	-	O	Δ	-	Δ	Δ	Δ	X	Δ	X	X
	PANI ES	-	-	-	Δ	Δ	-	Δ	Δ	Δ	X	Δ	X	X
	Starch	-	-	-	Δ	Δ	-	Δ	Δ	Δ	X	O	O	X

Symbols: Δ: not soluble, O: slightly soluble, X: soluble, -: evaporation of the solvents

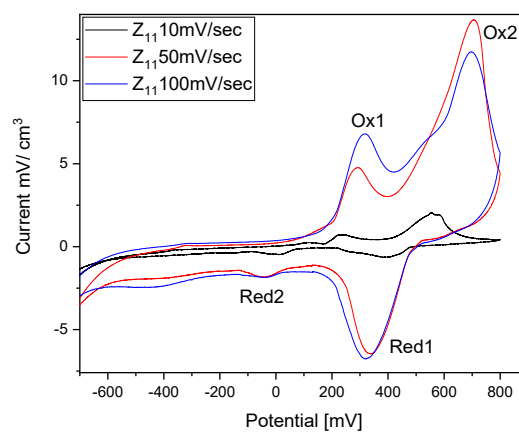
**Table S2:** Elaborated thermal characteristics (% weight loss at specific temperatures) from TGA curves. Data were obtained by TA Universal Analysis software of starch, PANI-ES, and the biocomposites, respectively Z<sub>11</sub>, Z<sub>21</sub>, and Z<sub>31</sub>.

Materials	T 5% (°C)	T 10% (°C)	T 50% (°C)	T 95% (°C)	Residual (%) at 700 °C
PANI-ES	56.4	164.2	673.0	--	50
Starch	50.2	70.2	289.6	-	16.5
Z <sub>11</sub>	59.8	197.1	376.8	--	23.9
Z <sub>21</sub>	50.3	102.2	416.7	--	35.1
Z <sub>31</sub>	50.6	91.7	574.3	--	40.7

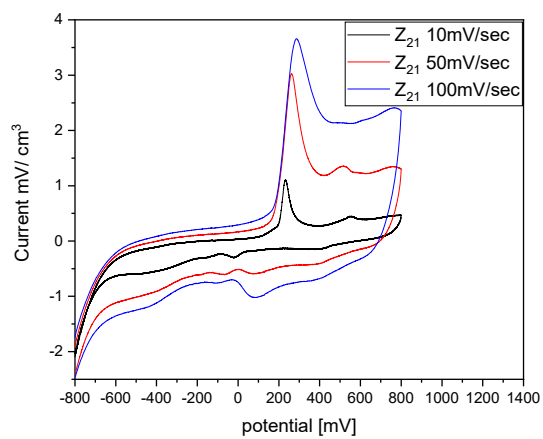
## Cyclic voltammetry



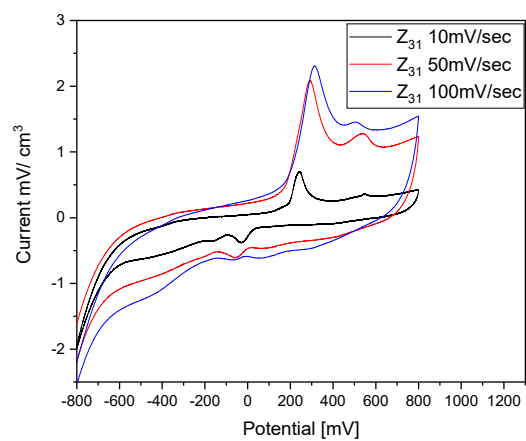
PANI ES



Z<sub>11</sub>



Z<sub>21</sub>

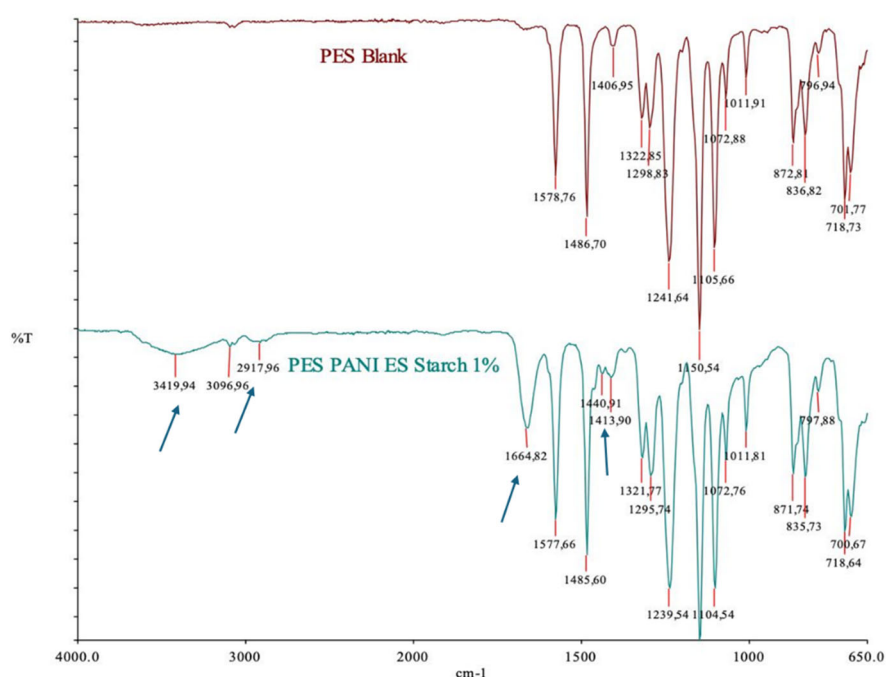


Z<sub>31</sub>

**Figure S2.** Cyclic voltammograms of PANI and PANI/starch biocomposites.

**Table S3.** Redox parameters from cyclic voltammogram peaks of PANI and PANI/starch biocomposites.

Products	Scan rate mV/sec	OX 1	OX 2	Red 1	Red 2
Z <sub>11</sub>	10	0.71	2.1	-0,71	-0.57
	50	4.7	13.74	-6.43	-1.8
	100	6.8	11.75	-6.77	-1.8
Z <sub>21</sub>	10	1.1	0.46	-0.17	-0.31
	50	3.03	1.38	-0.41	-0.6
	100	3.63	2.41	-0.69	-0.77
Z <sub>31</sub>	10	0.71	0.36	-0.09	-0.38
	50	2.08	1.28	-0.31	-0.6
	100	2.30	1.47	-0.47	-0.64
PANI ES	10	0.99	0.26	-0.08	-0.2
	50	2.93	0.88	-0.22	-0.47
	100	4.11	1.5	-0.37	-0.69



**Figure S3.** FTIR-ATR of PES and PES with PANI-ES/starch 1%wt. The peaks indicted by arrows are mostly due to starch. Residual PVP can also contribute to the peak at 1665  $\text{cm}^{-1}$  (C=O stretching).