

Bio-based Polymeric Composites Incorporating Granular Activated Algae Biomass


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Scope:

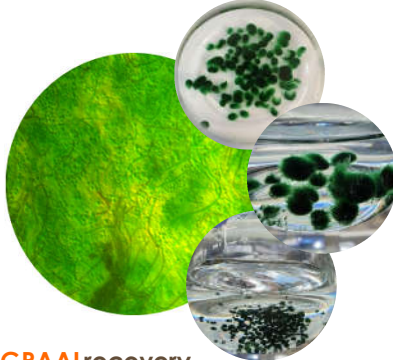
Development of bio-based polymeric composites using algal biomass as filler, study of their physico-chemical and mechanical properties, and behavior under thermal, radiative and oxidative stress


Bio-based polymeric composites are obtained by incorporating into the structure of the base polymer matrix different biogenic materials from renewable resources such as microalgae, bacteria, and plants. Due to obvious environmental benefits and economic impact, this new category of advanced materials is currently gaining an increased market share.




Microalgae biomass

- proteins (40-60 %)
- carbohydrates (20-30%)
- lipids (10-20%)
- photosynthetic pigments (carotenoids, chlorophylls, and phycobilins)






Granular activated algae biomass used in **GRAALrecovery** technology is a mixture of **microalgae** and bacteria populations acting in an induced symbiotic relationship for wastewater treatment through nutrients uptake and resources recovery.




SBS copolymers

*CC1=CC=CC=C1C(C)C(C)C1
*CC1=CC=CC=C1C(C)C(C)C1



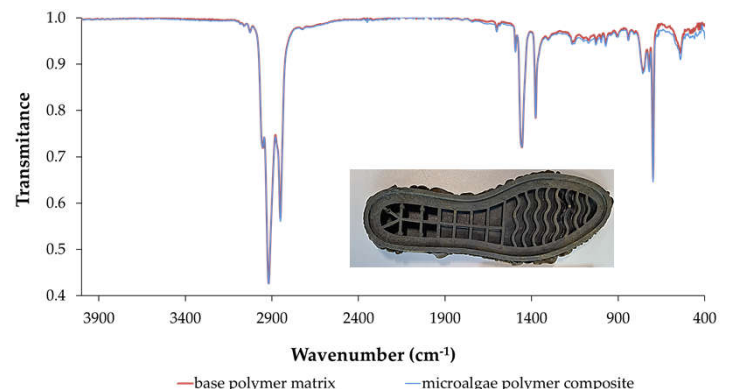
Paraffin oil

Polymer composite – starting materials



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No.	Measured characteristics	Measure units	Values for base polymer matrix	Values for microalgae polymer composite	Tolerance
1	Specific gravity (6 mm standard plaque)	n/a	0.89	0.9 – 0.95	± 0.02
2	Melt flow index	g/10 min	30	20 - 28	± 5
3	Hardness Shore A (15 sec)	Shore A	60	58 - 62	± 2
4	Tensile strength	Kg/cm ²	52	30 - 45	± 2
5	Elongation at break	%	496	300 - 400	± 50
6	Abrasion resistance on 6 mm internal standard plaque	mm ³	190	140 - 160	± 20
7	Bennewart flex	cycle	< 6 mm at 30000 cycles	< 6 mm at 30000 cycles	



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