# RIGID COMPOSITE MATERIALS FROM OLIVE BRUSH SEED AND UNSATURATED POLYESTER RESIN

L. Jimenez[1], M. Sibaja[1]*, P. Alvarado[1], J. Vega[1], G. Jimenez[1]
M.F. Barreiro[2] and M. Lopretti[3]
[1]Laboratory of Polymers (POLIUNA), School of Chemistry, Universidad Nacional, Heredia, Costa Rica
[2]Laboratory of Separation and Reaction Engineering, Instituto Politécnico de Bragança, Portugal
[3]Nuclear Research Center, College of Sciences, Universidad de la Republica, Montevideo, Uruguay
*Email: maria.sibaja@gmail.com

## Abstract

A composite material using unsaturated commercial polyester resin (UPE), and olive brush seed (OBS) was prepared. OBS was treated with sodium hydroxide and maleic anhydride (MAN), and subsequently utilized in a proportion of 35 wt.% to prepare UPE composite. These materials were evaluated in terms of moisture absorption, surface, and mechanical properties such as flexure and tensile.

## Materials

Starting materials: OBS and UPE // Composite materials without and with MAN: CM and MANCM

## Procedure

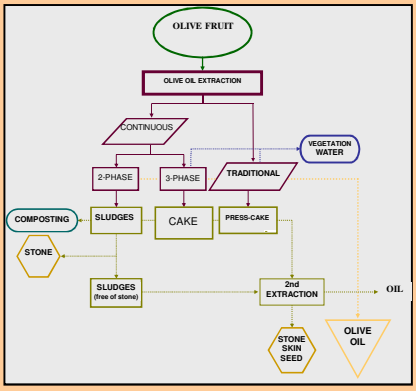


Fig 1. Olive oil extraction process and related by-products.

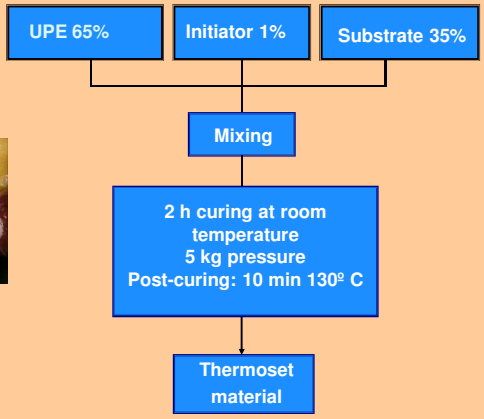


Fig 2. Scheme of processing of the composite materials

## Results

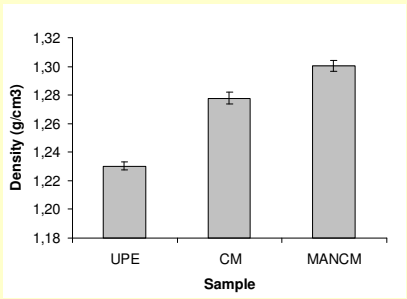


Fig 3. Density of UPE and its composites.

Table 1. Mechanical properties of the composites

| Sample | Bending modulus (±1 MPa) | Tensile break (±0,02 MPa) | Tensile modulus (±1 MPa) |
|---|---|---|---|
| UPE | 1370 | 36,80 | 125 |
| CM | 3411 | 57,10 | 775 |
| MANCM | 2047 | 42,40 | 766 |

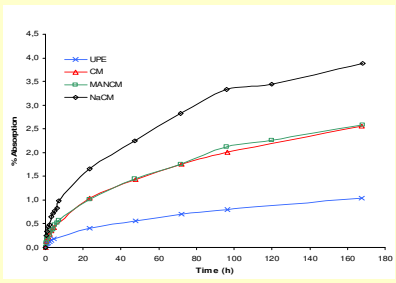


Fig 4. Water absorption of the composites.
(NaCM stands for a composite with NaOH-treated OSB)

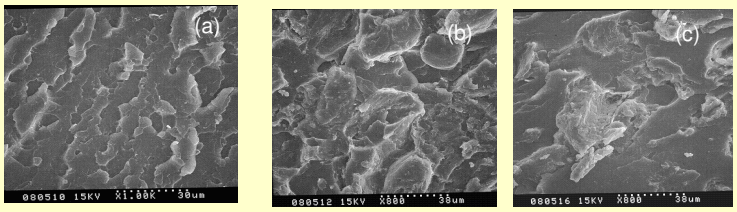


Fig 5. SEM micrographs of (a) UPE, (b) CM, and (c) MANCM

## Conclusion

The high content of lignin present in the olive brush seed provides to this substrate suitable properties to be used in the fabrication polymer composite materials. It seems that this substrate does not require chemical modification because it acts as a reasonable reinforcement for a polyester matrix.

## Acknowledgements

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