BIO-BASED COMPOSITE MATERIALS FROM OLIVE STONE

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Introduction

•Olive oil extraction industry generates a huge amount of residues. These by-products include a liquid effluent (vegetation water) and a solid residue formed by olive skin and stone. Figure 1 shows schematically the three processes currently used (traditional pressing process, continuous two phase process and continuous three phase process) and the corresponding residues.
•Olive stone is a lignocellulosic material mainly used as energy source.
•Some other applications have been proposed, such as production of activated carbon.

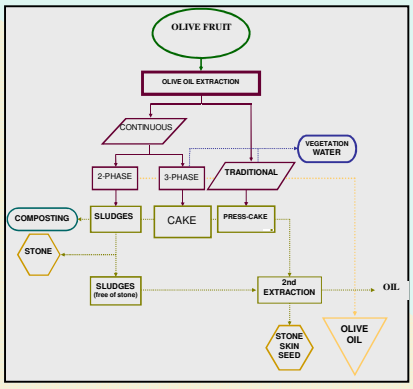
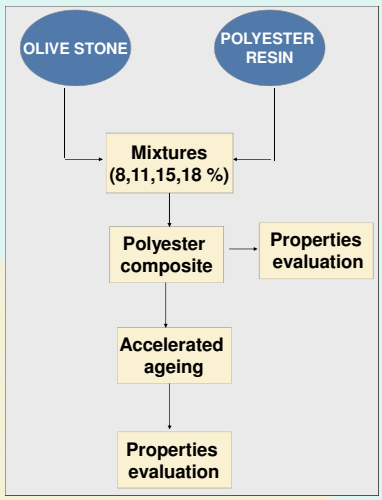


Fig. 1. Olive oil extraction industrial process

Olive stone could be used as a filler to make composite materials. Using natural materials, it is possible to make a low cost materials which can have a significant impact on environment.

Experimental



•The biodegradation of composite materials biodegradation of the samples was studied using soil with a mixed culture of *gloeophyllum trabeum* fand *phanerochaetes crysosporium* (50% each).
•Samples were incubated at 30 ºc for 30 days and observed diary and control the colonization of the micelio on the polyester, following a methodology similar to that of Ferreira da silva (9)

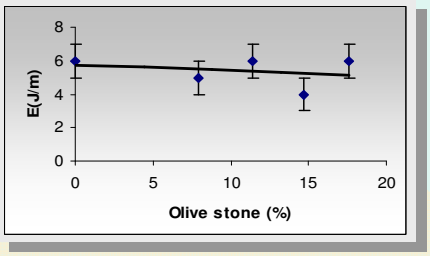
Results

Proximate analysis of Olive Stone residues

Analysis	Method ASTM	Results
% Humidity	D1102	8,06
% Ash	D1102	0,52
%Ciclohexane etanol extracts	D1107	2,1
% Cold water solubility	D1110	1,50
% Holocellulose	D1104	71,53
% lignin	D1106	55,8
Density (g/cm^3)	D 792	1,67

Density of composite materials

Olive Stone (%)	Density (g/cm^3)	
	No ageing	192 hrs. ageing
0	1,25	0,82
8	1,24	1,08
11	1,24	0,83
15	1,20	1,12
18	1,22	1,22



Effect of the content of seed of olive in the resistance to the impact

Amount of CO_2 produced during the assay

Olive stone (%)	% degradation	m moles CO_2 produced	
		15 days	30 days
0	0	0,10	0,40
11	10	0,45	0,85
15	20	0,50	0,85
18	20	0,60	0,90

Glass transition temperature (Tg) of polyesters reinforced, to the being put under 192h of aging

Olive Stone (%)	Tg (°C)	
	No ageing	192 hrs. ageing
0	88	114
8	91	117
11	90	105
15	85	102
18	89	103

Temperature media of decomposition (Tdm) of polyesters reinforced with different percentage from pressed olive stone

Olive stone (%)	Tdm (°C)	
	No ageing	192 hrs ageing
0	404	395
8	409	405
11	381	408
15	386	406
18	382	406

Degradating inoculum of of *G. trabeum* and *P. chrysosporium and P.ostreatus*

Olive Stone (%)	t_0	$t_{15\ days}$	t_{30days}
11	A_{280}	-	A_{254}
11	-	-	A_{254}, A_{280}
15	A_{280}	-	-
15	A_{280}	A_{254}	A_{260}, $A_{310.A254}$
18	-	A_{254}	A_{310}, A_{352}
18	-	A_{254}	A_{260}, $A_{310.A254}$

Conclusions

The experimental results show composite materials with a heterogeneous distribution with matrix, reason for which the properties exhibited by these materials are not good enough to be used in the plastic making industry. Nevertheless, it is important to mention that these materials, although do not reinforce the matrix can be used like fillings in order to contribute with the environmental diminution produced by them. It is necessary to carry on further studies to obtain a more homogeneous material in order to study the effect of the olive stone content in their mechanical properties.

Acknowledgment

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