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Potential use of Pennisetum Setaceum as a source of fibres for composites production

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Pennisetum Setaceum is a big concern in Canary Islands and in several parts of the world. It is considered a dangerous specie due to its rapid growth, ability to adapt and rapid reproduction, as well as the variety of reproductive strategies it can use.

There are several campaigns to control these specimens in the Canary Islands, but they have not been demonstrated effective in the control and eradication of this specie, mainly due to the lack of regularity in these works. As a way to increase the effectiveness of these control strategies it has been proposed to use the plants to obtain natural fibres (PSF) for their use in composites.

Fibres were obtained by mechanical processing, by means of pressing rollers, then dried and cut to 2 mm length. Some PSF were also treated with NaOH 1N for 1h at room temperature to increase thermal stability and, thus, obtain better processability. PSF were then mixed with PE (in powder form), and were subjected to compression moulding process in a hot plat press, obtaining composite sheets (4 mm thin), from which test bars were machined, to determine the tensile, flexural and impact properties of the composites. Composites were prepared with up to 40% of PSF.

Results show that PSF increase the elastic modulus of PE (both in flexural and tensile tests), while maximum tensile strength is slightly reduced and slight increase in the maximum flexural strength. Impact resistance decrease significantly for composites with 20% or higher ratios of PSF.







Fig 2. Impact properties

It is also interesting to highlight the good distribution of fibres in the PE matrix, as well as the aesthetics of the obtained parts:



Fig 3. Parts with 10, 20, 30 and 40 % of PSF (left to right)

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