

Cork, energetic and environmental aspects

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Cork is a material whose applications have been known since Antiquity. The cork materials applications range from bottling to the building and car industry, sports, aeronautics and several others. Cork is closely related to the maintenance of biodiversity and the reduction of emissions and sequestration of CO₂. The periodic extraction of cork oaks for cork production, produces between 250% and 400% more cork than they would produce if it they were not explored (when the bark is harvested the tree produces rapidly new bark for protection) increasing the fixation of CO₂. Other services such as the formation of the landscape, soil protection, regulation of hydrological cycle, and other activities such as hunting, bee-keeping, livestock, harvesting of mushrooms and herbs and medicinal plants reflect multi-functionality and are also very important. Cork oak forests are a habitat for many plant and animal species and are integrated in one of the 34 "hotspots" of biodiversity worldwide, featuring a number of species per m² even higher than the Amazon rainforest. Cork oak forests make a sequestration of about 5.7 ton CO₂/ha/year. The 2.3 million ha of cork oak forests worldwide are seen as promoting the retention of about 14.4 million tonnes CO₂/year, and each kg of a cork final product is responsible for fixing 1.833 kg of CO₂. Cork material incorporates carbon fixed by the cork tree that remains there during the lifetime of the products, thus increasing the delay of the emission of this carbon back to the atmosphere. Also noteworthy is that if there is no more use after their useful life, cork products can be used in energy production and when incinerated, having a high calorific value, the CO₂ produced is equivalent to the material being fixed in the material, what is commonly referred to as being "carbon neutral". Besides this e.g., to produce 1000 cork stoppers 1,5 kg CO₂ are emitted, but 14 kg of CO₂ are emitted for the same amount of plastic stoppers or 37 kg CO₂ for 1000 screwcaps. In cork processing operations for the production of cork products important wastes are produced, e.g. cork powder (CP) (e.g. from grinding, sanding) and cork boiling wastewaters (CBW). These wastes are already or can be used in the future (CP burning and studies for bioethanol and H₂ production, studies for biogas production from CBW) for energy production. Besides this cork products can be used to improve energy efficiency, e.g. in sustainable and green building. Significant reductions in emissions of greenhouse gases in the construction sector can be achieved through various measures for energy savings. Cork derivatives can have a very important role, particularly regarding the thermal performance of buildings, but not only. The results suggest that cork is a very sustainable material and that several cork wastes can be b.