

*Carduus nutans* and *Rosmarinus officinalis*. Inhibitory effect was determined by measuring radial growth of *P. infestans* mycelium cultivated on PDA medium containing the obtained plant extract. The choice of this mix of plants was founded on past trials targeted on antimicrobial activity of native plants using various extraction methods and different individual plant extracts.

On the control plates, the mycelium growth began on the 4th–5th day after inoculation and on the plates containing mix plant extract, after seven days from inoculation. In the control treatments, the mycelium reached the margins of the plates (90 mm) six–seven days after the beginning of growth while the diameter of the treated colony was between 37 and 44 mm. These results encourage us to transfer the future tests of the formula on plants. This study resulted in important data concerning plant extract application for biocontrol of late blight. These results were obtained under the frame of European Social Fund, Human Resources Development Operational Programme 2007–2013, project no. POS-DRU/159/1.5/S/132765.

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### Heavy metals and arsenic uptake by wild vegetation in old mining areas of Portugal: Phytoremediation perspectives



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The aim of this study is to evaluate the phytoremediation potential of native flora of soils and mine tailings enriched with metals and metalloids in several old mining areas of Portugal. As metal concentrations in above ground parts were maintained at low levels, metal tolerance in most cases may mainly depend on their metal excluding ability. However, metal(loid) concentrations higher than toxic levels in some species like "*Agrostis castellana*" "(As, Fe)," "*Cistus ladanifer*" "(Cr, W)," "*Cistus salvifolius*" "(Ni, Pb)," "*Digitalis purpurea*" "(Sb, W, Zn)," "*Helichrysum stoechas*" "and" "*Hypochaeris radicata*" "(U)," "*Holcus lanatus*" "(As, Cu, Fe)," "*Lonicera periclymenum*," "and" "*Mentha suaveolens*" "and" "*Phytolacca americana*" "(Pb, Zn)," "*Pinus pinaster*" "(As, W, Zn)," "*Polystichum setiferum*" "and" "*Solanum nigrum*" "(Zn)," "*Pteridium aquilinum*" "(As), as well as the serpentine plant species" "*Alyssum serpyllifolium*" " subsp." "*lusitanicum*" "and" "*Lavandula stoechas*" " subsp." "*sampaiana*" "and" "*Linaria spartea*" "subsp." "*virgatula*" "and" "*Ulmus procera*" "(Cr, Ni)," "*Bromus hordeaceus*" "and" "*Plantago radicata*" "subsp." "*radicata*" "(Ni) indicate that internal detoxification metal tolerance mechanisms might also exist. Therefore, their utility for phytoremediation is possible. Furthermore, the plants could grow and propagate in substrata with low nutrient conditions which would be a great advantage in the revegetation of mine tailings.

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### Aerobic granular sludge in a sequencing batch reactor



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Granular sludge consist of bacterial aggregates that are much more compact than traditional activated sludge, thus offering numerous advantages such as high biomass retention, good settling ability and simultaneous removal of organic load and nutrients. In a laboratory scale sequencing batch reactor (SBR) granules were cultured under aerobic conditions. To enhance the growth of granular sludge the SBR was operated with very short sedimentation and draw phases resulting in the washout of slow settling biomass (anaerobic feeding – 45 min, aerobic reaction – 11 h, settling – 5 min and effluent withdrawal – 10 min). The reactor was inoculated with conventional activated sludge and fed with dairy industry wastewater with high organic and nutrients load. The first aerobic granular structures, having 67–556 μm in diameter, were observed after 5 days. After 25 days, they reached diameters between 513 μm and 1276 μm and increased gradually up to diameters of 2 mm by the end of the experiment. Treatment performances increased along with the growth of granules size. Experimental results were obtained under the frame of European Social Fund, Human Resources Development Operational Programme 2007–2013, project POSDRU/159/1.5/S/132765.

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### Biological evaluation of some PVA/starch composites as sustainable food packaging candidates



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The use of natural polymers has received a great attention in the last decade, having great potential as substitutes for conventional polymers in a broad range of applications. The disposal of synthetic packaging materials wield a huge pressure on the environment and, therefore, replacing synthetic materials with "green" versions obtained from renewable resources is essential for reducing environmental pollution.

Polyvinyl alcohol (PVA) is a water soluble polymer with a low electrical conductivity, excellent film forming capacity, good transparency and compatibility with additives. Starch is the most abundant and commonly used renewable raw materials. Its unique chemical and physical characteristics can be distinguished from all other carbohydrates. It can be obtained from seeds, corn, rice, wheat, potato, sweet potato and cassava.

Starch/polyvinyl alcohol blends and composites have been widely investigated for the production of "green materials" for food packaging, agricultural and biomedical applications.