Terpene degradation and fungicide

VNIVERSITAT DE VALÈNCIA

R&D RESULT

Patent

Knowledge Area

- Biotechnology
- Bioremediation
- Fungicides

Collaboration

- Technology available for licensing
- Other collaborations

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Pseudomonas sp. strain and uses thereof

Inventors:
Manuel Porcar Miralles, Cristina Vilanova Serrador, Amparo Latorre Castillo and Joaquín Baixeras Almela (Universitat de València).

Background: Terpenes and terpene derivatives are non-biodegradable compounds in natural environmental conditions so they are major environmental pollutants. These compounds contaminate effluents from industrial factories such as water from pulp mills and they form the basis of materials such as rubber tire or latex, signifying tons of residues per year from materials based on terpenes. Few microorganisms that are capable of degrading terpenes are known and those who have this capability only degrade either cyclic or acyclic terpenes. Therefore, microorganisms that are capable of degrading terpenes without discriminating the concrete type of terpene are not known and thus, recycling is the only solution to date for the accumulation of such materials.

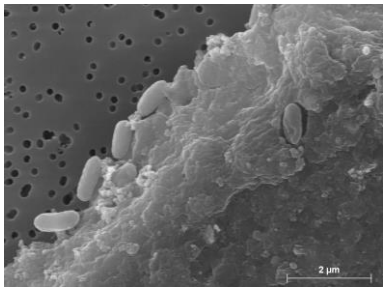
The invention: Researchers from Universitat de València have isolated a strain belonging to *Pseudomonas sp.* that is capable of degrading cyclic and acyclic terpenes and terpene derivatives. This strain can be used as biofactory for industrial-scale production of substances using terpene rich resin as carbon source. It is also possible to treat biomass rich in limonene, a major terpene is in citrus peels, prior to fermentation by terpene sensitive microorganisms such as yeasts, which carry out the alcoholic fermentation of these biomasses.
On the other hand, the strain is able to tolerate fungicides, especially imazalil and has antifungal activity against *Aspergillus* and *Penicillium* genera.
Strain is also able to grow in the presence of hydrocarbons such as diesel and to produce surfactants in the presence of these hydrophobic compounds, allowing further processing of hydrocarbons due to enhanced emulsification.

Applications: The main application of the technology is in biotechnology sector for different purposes such as:

- Bioremediation, degradation of terpene-based materials such as latex.
- Processing of terpene-rich food industry residues, for example, removal of terpenes with antimicrobial action in citrus peels.
- Industrial scale production of substances or compositions from terpenes and / or terpene derivatives as carbon source.
- Fungicide, for inhibiting the growth of phytopathogenic fungi with the possibility of combination with other fungicides such as imazalil.
- Elimination of compounds such as diesel or other hydrocarbons in polluted environments due to the production of surfactants.

Advantages: The main advantages provided by the technology are:

- Degradation of both cyclic and acyclic terpenes.
- Increased rate of degradation of rubber or latex than other strains, two weeks instead of months.
- Strain adhesion to latex and *in situ* degradation that allows the treatment of large-scale accumulated materials without pretreatment to solubilize them.



SEM images of latex particles from a culture of the strain

OTRI oficina de transferència de resultats d'investigació

Avda. Blasco Ibáñez, 13
46010 Valencia (España)
Tel. +34 96 3864044
otri@uv.es
www.uv.es/otri