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Innovative antimicrobial adhesive films to reduce infection risk in hospitals

(*Nanowerk News*) In Europe each year, over 500,000 people get infected in hospitals, in unsterilised transit areas such as toilets, corridors or rooms. The University of Alicante Research Group in Polymer and Nanomaterial Analysis (NANOBIOPOL), together with research and industry staff from Italy, Spain, Portugal, the UK and Germany, is involved in the FLEXPOL project to make an antimicrobial adhesive film reducing infection risk in hospitals.

In hospitals, patients, visitors and staff are at high risk of fatal bacterial infections. FLEXPOL, funded by the European Commission, is intended to develop a pilot line for cost-effectively producing these transparent, antimicrobial, polypropylene-based films.

To that end, two factors are essential: nanostructures on the plastic surface and capsules containing a mixture of oils with antimicrobial properties. The surface structure, combined with the material, can kill several types of germs and inhibit bacterial growth with a 99% effectiveness rate. Specifically, the structures employed cause mechanical damage to cell membranes, thus killing pathogens.

This strategy will guarantee patients and medical staff's health protection and bring considerable economic benefits, as spending on detergents and disinfectants will be reduced. A promising solution requiring various steps and contributions from the ten project partners.

In this sense, the researchers from the University of Alicante's NANOBIOPOL group, Alfonso Jiménez, María del Carmen Garrigós and Carlos Pelegrín, are designing formulations with antimicrobial properties from essential oils extracted from plants such as thyme or oregano, for use as bactericidal agents. According to Jiménez, "our main role is to develop the polypropylene film with the antimicrobial essential oils in the laboratory. These oils are extracted from natural plants such as thyme or rosemary, which can be found near Alicante and are integrated in the basic material of the film".

Applications

These antimicrobial plastic films will be used in hospitals to reduce infection risk. In this regard, FLEXPOL's main goal is for the material to be used on large surfaces, such as walls and floors, as well as on smaller ones, like tables, beds or doorknobs, where more and more bacteria grow. For this reason, the product will be tested in actual medical environments, namely at Donostia University Hospital, a project partner, to evaluate how effective, durable and infection-resistant these films are, as well as their compatibility with the cleaning and disinfection protocols in place.

FLEXPOL meeting at the UA

On 23 and 24 January 2018, the UA San Vicente del Raspeig campus hosted a meeting of the FLEXPOL project consortium, formed by Germany's Fraunhofer Institute for Production Technology (IPT), project coordinator; Naturality, Propagroup S.p.A. and Granta Design Ltd. (a Spanish, an Italian and a British company, respectively); two research centres, IK4-TENIKER and the Catalan Institute for Nanoscience and Nanotechnology (ICN2); the Universities of Alicante and Minho, Portugal; and Donostia University Hospital.

The FLEXPOL project, launched in January 2017, will be running for three years and is set to receive €5.17 million of funding from the European Union.

Source: Asociación RUVID