



## Patent: Systems of heterologous expression for the functional analysis of metagenomic DNA libraries

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### Description

The invention refers to a system for facilitating the expression of metagenomic genes that do not express by themselves in bacteria hosting a metagenomic DNA library, thus maximising the detection of the functions that, formerly, remained unidentified.

### Need or problem solved

- Metagenomic DNA libraries store DNA from bacteria found in a given environment and make it possible to analyse the codified functions in their genomes, regardless of the culture of such bacteria, thus bridging the difficulties encountered in the laboratory culture of certain microorganisms. However, these libraries have a limitation: most of the genes do not express in any particular host bacteria selected for replication and their functions remain silenced and undetected. The present invention **maximises the possibilities of expressing any gene in a metagenomic DNA library and the detection of the functions that it codifies.**
- The patent makes it easy to discover new proteins with already-known functions, new proteins with novel functions, well-known proteins with unique functions and novel natural products performing useful activities in the medical, agricultural or industrial fields. For instance, this patent could be applied to the detection of biocatalytic functions.
- The data provided by the metagenomic DNA libraries and the potential of this patent enhances knowledge and practical applications in the fields of industry, therapeutic research or the environment.

### Innovative issues/Competitive advantages

- This patent refers to an expression system offering the possibility of identifying genes of interest that do not express by themselves in the bacteria hosting the metagenomic DNA library, making it possible to detect the functions that they codify and that, otherwise, would remain silenced.
- The invention results in a higher number of metagenomic clones showing a particular function of interest for a given metagenomic DNA library.
- The potential of metagenomics (the field of microbiology aimed at obtaining sequences of the genomes in different microorganisms, bacteria in this case, comprising a community, by extracting and analysing their DNA in a global manner) is thus enhanced.

### Types of interested companies

- Research units/centres
- Biotechnological companies
- Companies performing R&D, cloning vectors, gene therapy, etc.