



PRESS RELEASE

TWB and AMOEBA: Towards the industrialization of a revolutionary biological biocide against legionella

Toulouse (France), 19 January 2016 - Toulouse White Biotechnology (TWB), a pre-industrial demonstrator, and AMOEBA (FR0011051598 - AMEBA), a company specialized in biological water treatment using biocides, have been working together for nearly 18 months within the framework of a research contract to produce from amoebae a revolutionary biocide capable of eliminating the risk of legionella being present in water. TWB's mission was to take the process to the pre-industrial stage. TWB teams have been able to optimize amoeba production, by knocking down major technological barriers: transposing the process from an adhesion culture to a continuous suspension culture, multiplying by 10 the final amoeba concentration, developing a stable and economically viable culture medium. Following these first successes and its initial public offering, AMOEBA reinforced its partnership with TWB. The aim is a shift to the industrial production of amoebae with a view to a first commercialization in the first half of 2016, subject to obtaining marketing authorization.

The use of amoebae, natural bacterial predators, for the treatment of industrial waters prior to their discharge into the environment, is a breakthrough technological solution. To date, potentially contaminated waters are treated with chemical products, which generate problems of bacterial resistance to treatments and a significant risk of toxicity or infrastructure deterioration. Amoebae appear to be an **ecological alternative to chemistry, 100% effective against certain water-based germs, and safe for humans and the environment**. Particularly effective, they eliminate waterborne pathogenic microorganisms and they also attack biofilms that form in waterways (sticky layer which traps microorganisms). AMOEBA targets a market of chemical biocides estimated at more than 21 billion euros and is now focusing on that of air-cooling towers, estimated at 1.7 bn€.

After obtaining the proof of industrial feasibility of amoeba production in continuous liquid culture, **TWB is now involved in the optimization process**, with an obligation to achieve results in the short term, in view of the trade issues for AMOEBA. For this project, six TWB staff are mobilized and cutting-edge equipment of TWB is being solicited. In particular, the use of the culture robot with 24 instrumented mini-reactors (50 mL) recently acquired by TWB (Hamilton, HEL) will make it possible to define very rapidly the optimal amoeba culture conditions (growth medium). **Industrial optimization will be achieved in TWB's fermenter park up to a volume of 300 L**, within the framework of collaboration with CRT/CRITT Bio-Industries Midi-Pyrénées (Toulouse, France). The close and fruitful cooperation between TWB teams and AMOEBA is one of the key factors in the success of the project. The transfer of AMOEBA's knowledge and experience concerning their amoeba strain (*Willaertia magna C2c Maky*) has been of crucial importance for the TWB team to rapidly master the subject.

« Collaboration with AMOEBA is exciting in several respects. In scientific and technological terms, the production of amoebae in suspension is a first. At the economic level, contributing to the development of a

start-up by providing it with an infrastructure and a know-how conducive to the industrialization of its process is a source of great pride» said Julien Cescut, Manager of TWB's Biotransformation & Culture platform, in charge of the project.

« On the side of AMOEBA, satisfaction is also complete. One of the company's major issues was to industrialize its production process. TWB's expertise in association with AMOEBA's R&D teams have made it possible to successfully knock down the technological barrier. TWB's work has led AMOEBA to initiate its production plant, which will become operational in the first half of 2016. » Fabrice Plasson, AMOEBA's President and co-founder, also emphasized the professionalism of TWB teams and their reactivity.

With this project which is a unique technological advance, with no known and documented expertise, TWB shows its ability to innovate, to respond in a very short lapse of time to industrial imperatives and to create value. TWB strengthens once again its role as an accelerator in the development of industrial biotechnologies. Other industrial applications will be announced very shortly.

About TWB:

Toulouse White Biotechnology (TWB) is a preindustrial demonstrator whose goal is to speed up the development of industrial biotechnologies by facilitating exchanges between public research and industry. Its vocation is to contribute to the expansion of a bioeconomy based on the use of renewable carbon in various fields (chemistry-biochemistry, materials, energy, etc.). Various kinds of collaborative research and development projects are proposed, as well as personalized services for businesses.

In March 2011, TWA was awarded the call for project for the Investments for the Future Program (PIA – Programme Investissements d'Avenir). It receives State aid through the ANR (Agence Nationale de la Recherche- National Research Agency). TWB is a UMS (Unité Mixte de Service – Mixed Service Unit) managed by INRA under triple INRA/INSA/CNRS tutelage. With €18 million in contracts signed at the end of 2015 after three years of full-time work, the relevance of TWB's positioning and its role as an interface in public/private transfers have been reinforced.

More about TWB: www.toulouse-white-biotechnology.com/

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About AMOEBA:

Based in Lyon, France, AMOEBA develops a biological biocide capable of eliminating waterborne bacterial risk (legionella, pseudomonas, listeria, etc.). This entirely natural solution appears to be an alternative to chemical treatments traditionally used, especially in the industrial world. AMOEBA plans the commercialization of its biocide in France from the first half of 2016 and in the rest of Europe at the end of 2016, provided market authorization is awarded and the required notifications have been made. In a worldwide market of chemical biocides estimated to be worth 21 bn€, AMOEBA is focusing today on the segment of industrial air-cooling towers (ACT) estimated at 1.7 bn€. Its breakthrough technology complies with the new regulations relating to environmental chemical emissions. AMOEBA is quoted on compartment C of Euronext Paris and joined the CAC® Small index on 21 September 2015.

More about AMOEBA: www.amoeba-biocide.com

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