Bio-on PRESS RELEASE

Bio-on presents a revolutionary new technology to eliminate oil pollution in the sea within 3 weeks.

- *New Minerv Biorecovery technology, patented worldwide by Bio-on and based on the revolutionary 100% biodegradable bioplastic, opens up unprecedented scenarios for environmental recovery and bioremediation of hydrocarbon pollution (oil-bioremediation).*
- *Sea water polluted by oil is cleaned within 3 weeks.*
- *Bio-on has developed the technology and entrusted validation testing to Istituto per l'Ambiente Marino Costiero del CNR (Institute for Marine Coast Environment of the National Research Council - IAMC-CNR) in Messina.*
- *Connect4Climate – The World Bank Group partners the project to raise awareness of the benefits of this technology for safeguarding the oceans.*

Bologna, 5 June 2017 – Some innovations bring truly revolutionary change to the planet and this is why **Bio-on** is proud to present its new technology, **Minerv Biorecovery**, which enables hydrocarbon sea pollution to be eliminated within approximately three weeks.

"From today we offer the world and the market the technology to take effective, natural and ecological action in the event of environmental disasters such as oil spills into the sea," explains **Marco Astorri**, **Chairman and CEO of Bio-on**, which announces the success of its research conducted in collaboration with **IAMC-CNR** in Messina. "We have discovered," explains **Astorri**, "that the particles forming our PHAs bioplastic are the ideal environment for hosting and feeding the special microorganisms that eliminate oil from the sea." The World Bank Group will support Bio-on in raising awareness of the benefits of this technology for safeguarding the oceans as part of the Connect4Climate programme.

MINERV BIORECOVERY: HOW IT WORKS

Minerv Biorecovery is a technological solution made of micro powders, measuring just a few microns and of a particular shape, created out of Bio-on's revolutionary PHAS bioplastic that is **natural and 100% biodegradable%**. The particles of these micro powders are thrown into polluted sea waters and form a porous structure housing a series of bacteria, naturally present in the marine environment, which feed on the bioplastic, multiply and grow stronger until they attack the oil. The biodegradation processes activate within approximately 5 days and the degradable fraction of the hydrocarbons (e.g. oil) is eliminated in approximately 20 days.

"It is nature looking after itself," explains **Astorri**, "because our bioplastic, which is biobased, helps protect and feed these bacteria, thus accelerating their natural action." The micro powders in **Minerv Biorecovery** are 100% biodegradable and therefore do not release any residue into the sea unlike many solutions used to date in these cases. The biodegradation process for PHAs powder is sufficiently slow (1-2 months depending on conditions) to allow the bioremediating action of the microorganisms which, after having eliminated the pollutants, return to normal levels in the marine environment.

Tests on **Minerv Biorecovery** have been ongoing for several months at **IAMC-CNR in Messina**, which has tested, measured and validated the technology. Thanks to these studies, **Bio-on** is able to define an entirely new application in the **oil-bioremediation** field - a targeted activity that aims to “remediate” the negative impact on the environment of polluting molecules and products such as hydrocarbons, thanks to the metabolic degradation, and biodegradation, of microorganisms. This activity is carried out by companies specialising in environmental remediation, Harbour Master's Offices, Navy, sea traders, etc.

*"The principle of **oil-bioremediation**,"* explains **Dr Simone Cappello**, leading the Bioremediation project at **IAMC** in Messina*, "is based on the existence of microorganisms, bacteria mainly, which are capable of attacking the molecular structure of many of the components in the naturally complex formulation of hydrocarbons. These microorganisms," explains **Cappello**, "are present in the marine environment but in metabolic, physiological conditions and not in sufficient quantities to enable substantial reduction of the hydrocarbon spills. It is thanks to PHAs bioplastic that it is now possible to encourage and accelerate the otherwise prolonged transformation to CO_2, the end product of biodegradation. Using **PHAs** bioplastic is also safe for the environment and marine life because it leaves no trace."*

In the coming weeks, further tests will be conducted in the seas around the world: at ports and at industrial sites such as the refineries and cisterns at major oil companies. The application of this new technology will allow cleaning not only in the event of disasters, but also in the everyday maintenance of ports or industrial sites.

"*We are proud to announce this extraordinary discovery and contribute to protecting the marine environment,*" says **Marco Astorri, Chairman and CEO of Bio-on**, "*We will license this technology, which is a further example of the many applications made possible by the PHAs bioplastic micro powders we will produce at the plant in Castel San Pietro Terme (Bologna) from 2018. We will continue to extend our direct presence even more in the bioremediation, cosmetics, biomedical and nanomedical sectors. Working with IAMC, a point of global excellence in marine research, fills us with pride."*

Minerv Biorecovery, like all the PHAs bioplastics **(polyhydroxyalkanoates)** developed by **Bio-on** is made from renewable plant sources with no competition with food supply chains. It is 100% eco-sustainable and naturally biodegradable at ambient temperature.

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Bio-on will license the Minerv Biorecovery technology in the course of 2017. Marine pollution remediation products will be available from 2018.

Bio-on S.p.A.

Bio-On S.p.A., an Italian Intellectual Property Company (IPC), operates in the bioplastic sector conducting applied research and development of modern bio-fermentation technologies in the field of eco-sustainable and completely naturally biodegradable materials. In particular, Bio-On develops industrial applications through the creation of product characterisations, components and plastic items. Since February 2015, Bio-On S.p.A. has also been operating in the development of natural and sustainable chemicals for the future. Bio-On has developed an exclusive process for the production of a family of polymers called PHAs (polyhydroxyalkanoates) from agricultural waste (including molasses and sugar cane and sugar beet syrups). The bioplastic produced in this way is able to replace the main families of traditional plastics in terms of performance, thermo-mechanical properties and versatility. Bio-On PHAs is a bioplastic that can be classified as 100% natural and completely biodegradable: this has been certified by Vincotte and by USDA (United States Department of Agriculture). The Issuer's strategy envisages the marketing of licenses for PHAs production and related ancillary services, the development of R&D (also through new collaborations with universities, research centres and industrial partners), as well as the realisation of industrial plants designed by Bio-On.

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IAMC – Istituto per l'Ambiente Marino Costiero (IAMC) U.O.S. di Messina

The Institute for Marine Coast Environment (IAMC) of the National Research Council (CNR) groups together, in the Italian territory, different sections that traditionally deal with ocean science subjects mainly regarding aquaculture, chemical and physical oceanography, geology, renewable resources (fishing), earth and coastal science, general and applied microbiology and development of marine technologies and biotechnologies.
Within a multi-faceted framework of skills and professionalism, at the Messina Sub-Office, the "General Applied Microbiology and Environmental Biotechnology" group (GAMBIT) coordinated by Dr Simone Cappello, has long partnered with other groups in the same Institute on the qualitative and quantitative study of hydrocarbon-degrading bacteria and their environmental application with the consequent development of new "environmentally friendly" strategies for the recovery of marine areas contaminated by hydrocarbons. The Messina site's large microbiology, molecular and chemical biology laboratories and recently set-up "Mesocosm Laboratory/Plant", whose large-scale systems (with hydraulic and structural engineering unique in Europe) both indoor and outdoor are designed to simulate marine environments (pelagic and/or coastal), have proved to be decisive for a progressive general increase and development in the awareness of bioremediation processes and the development of internally designed environmental biotechnologies with national and international project development capabilities.

For further information:

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