

PRESS RELEASE

Project launches for sustainable low-cost production of levulinic acid, for the green chemical industry

- Levulinic acid is one of the key elements of the sustainable chemical industry of the future. It is used mainly in agriculture, pharmaceuticals and cosmetics. But also to make bioplastics and biofuels.
- Volumes produced today are insufficient and market demand will explode in the coming years.
- Bio-on, and Sadam Group will work together in the next 3 years to build a demo plant and develop innovative industrial processes to produce levulinic acid at competitive cost.
- Co-products from the sugar industry will be used as raw materials.

BOLOGNA, 2 MARCH 2017 – A team of two companies, **Bio-on** and **Sadam Group**, has begun working on a project to develop innovative industrial processes, at competitive cost and with low environmental impact, to produce **levulinic acid**, a key element of the sustainable chemical industry of the future.

WHAT IS LEVULINIC ACID AND WHY IS IT IMPORTANT.

The United States government considers levulinic acid to be one of the largest families of industrial derivatives of the future and it is deemed to be one of the 12 most promising bio-intermediates by the National Renewable Energy Laboratory¹. **According to the most recent forecasts and based on various independent research, Bio-on estimates that market demand for levulinic acid will grow 150-200-fold over the next 7-8 years.**

It is a natural compound made from biomass and the project envisages using sugar beet co-products as the raw material. It is a platform chemical product that can be used to produce other chemical substances or to replace the synthetic alternatives. The main end users of levulinic acid are the agricultural, pharmaceutical and cosmetics sectors, but this natural molecule also helps create new ecological fuels, fertilisers and antiparasitic products. It is also used in the biodegradable plastics sector, expanding its field of application, and it is an intermediate element for making high-performance plastics, drugs and many other new-concept “green” products.

THE PROJECT OF BIO-ON AND SADAM GROUP.

To anticipate the growing demand and exploit a competitive advantage, **Bio-on** and **Sadam Group** have launched a shared project to develop innovative industrial processes to produce **levulinic acid** using sugar industry by-products as raw material. Particular attention will be paid to economic and ecological aspects: current global production of levulinic acid comes from highly polluting plants, with an unacceptable environmental impact for European standards and with vast production costs, resulting in high market prices.

¹ Top Value Added Chemicals from Biomass Volume I: Results of Screening for Potential Candidates from Sugars and Synthesis Gas: <http://www.nrel.gov/docs/fy04osti/35523.pdf>

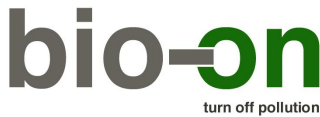
For this reason, and thanks to the knowledge acquired by **Bio-on** laboratories in the last two years², a pilot plant will be built for research. Subsequent project development would involve the construction of a demo plant with a capacity of **5,000 tonnes of levulinic acid per year**. This structure should be built at Sadam's **Tre Casali agro-industrial plant in San Quirico (Parma)**, which will also include an industrial plant, using **Bio-on** technology, to produce **PHAs biopolymers** from **glycerol**, a co-product of bio-diesel production.

The final goal of the project, which in the next 3 years can count on a budget of **6 million Euro**, is to demonstrate the possibility of creating a production process at competitive cost and with low environmental impact that can be replicated on a larger scale in a subsequent industrial and commercial phase. The project entitled "Industrial eco-sustainable production of levulinic acid from sugar industry by-products not intended for human food – PROECOLEV" has been approved by MISE (Italian Ministry of Economic Development) with a 2016 ministerial decree now in effect. The project has a duration of 36 months and has an estimated budget of 6 million Euro backed by MISE from the Sustainable Growth fund, Sustainable industry tender 2015, with a blend of subsidised and non-recoverable credit. The technology developed by **Bio-on, Sadam Group** will encourage the creation of bio-refineries in Europe capable of converting crude, natural raw materials into renewable elements with high added value, within the circular economy and green economy to be promoted in the European Union.

*"Levulinic acid is considered one of the 12 'building blocks' of the green chemical industry of the future," explains **Marco Astorri, Chairman of Bio-on S.p.A.** "Working on a new method of producing levulinic acid on an industrial scale over the coming months, as we announced in 2015, fills us with pride and enables us to consolidate our global leadership in the development of modern biochemistry. The project," continues **Astorri**, "is also approved by **MISE**, which will support an investment, through financial subsidies within a budget of 6 million Euro, that will determine the budgets needed for the future industrial realisation."*

*"We are pleased with this initial development stage conducted by **Bio-on, Sadam Group**," says **Massimo Maccaferri, Chairman of Sadam**, "because this molecule is an extraordinary tool that can kick-start the re-launch of the Italian chemical industry, safeguarding employment and guaranteeing an investment in our future."*

² In February 2015 Bio-on and Sadam announced an initial collaboration to study innovative methods of producing levulinic acid sustainably and ecologically using sugar industry by-products as raw material. The research, preliminary to today's agreement, was conducted by Bio-on researchers.



Bio-on S.p.A.

Sadam

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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Sadam S.p.A.

Sadam S.p.A. is a sub-holding in the food and agro-industrial sector entirely controlled by Gruppo Industriale Maccaferri di Bologna through the industrial holding company S.E.C.I., which also operates in environmental and mechanical engineering, construction, real estate, energy and tobacco. Gruppo Industriale Maccaferri ended 2015 with a turnover of 1,191 million Euro and has over 4,600 employees worldwide.

Gruppo Sadam, operating on the Italian sugar market since 1936, owns the **Agro-industrial hub in San Quirico (PR)** and controls **Sadam Engineering**, which offers technical know-how and solutions for the sugar sector, **Sadam Meccanica**, for mechanical processes, and **Naturalia Ingredients**, for the production and sale of grape-based natural sugars.

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