



Joint press release of 19 September 2014

EnBW Start-up JatroSolutions receives additional millions for final research push **Raw material for biodiesel from a wild plant**

Stuttgart/Karlsruhe. JatroSolutions, the Stuttgart-based start-up for research on biofuels, has been allocated several million euros by EnBW Energie Baden-Württemberg AG for its breeding work on the energy plant *Jatropha*. The start-up is financed by EnBW and was established by Professor Klaus Becker, a renowned agricultural scientist from the University of Hohenheim. The company's current research objective is to stabilise the yields of the oleaginous plant *Jatropha*, which also thrives on barren soils, using conventional breeding methods with a view to enabling its large-scale cultivation. Countries like India and China have been using *Jatropha* oil on a small scale as a raw material for biodiesel for years with a view to reducing their dependency on fossil energy sources and improving their CO₂ balance. However, the yields from the wild plant were not sufficiently stable for industrial use to date.

JatroSolutions is now approaching the final milestones on the road to *Jatropha*'s industrial use: With the help of the first marketable varieties, from 2015 the researchers will demonstrate on a reference farm that the cultivation of *Jatropha* is not only socially and environmentally desirable, it can also be commercially viable. In doing this, the EnBW start-up will provide impressive proof of the success of its breeding programme. By way of comparison: it took over 100 years of constant breeding work for maize to attain its current strong yields. A particularly exciting market perspective for *Jatropha*: when refined to form biokerosene, it could even make flying more environmentally friendly.

"On behalf of JatroSolutions GmbH, I would like to thank EnBW for its many years of confidence in our company. This enabled us to develop JatroSolutions GmbH into the leading expert on *Jatropha* in just a few years. With the additional support now confirmed by EnBW, we aim to further consolidate and develop this position," says Klaus Tropf, Managing Partner and co-owner of JatroSolutions GmbH.

"EnBW believes in JatroSolutions' business plan, including its next phase. With regard to market opportunities, based on my own experience of the *Energiewende*, I believe it is entirely conceivable that aviation will have to reduce its CO₂ emissions. Through the purchase of high-quality seed material, bred using expertise developed in Baden-Württemberg, Stuttgart-based JatroSolutions has opened a door for itself to the global market," says Professor Wolfram Münch, Director of Research and Development at EnBW, the majority shareholder in JatroSolutions GmbH.

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Fact sheet for press release of 19 September 2014

History of Jatropha as an energy plant – and the challenge for industry

The cultivation of the Jatropha plant has been promoted in tropical countries, e.g. in India, Myanmar and China, for many years, particularly for the purpose of fuel production. Large-scale industrial use has been targeted for a long time; however, due to the extremely low yield of the wild plant, it was not economically viable up to now. The research team at JatroSolutions has succeeded in developing varieties of the plant in the context of a breeding programme that are characterised by a stable and high oil yield. Moreover, important insights about the practical cultivation of the plant were gained on a research farm in Madagascar which has a 1,000-hectare Jatropha plantation. However, according to Professor Klaus Becker, a founder of JatroSolutions and leading global expert on Jatropha, the research process is far from complete. By way of comparison: people had been cultivating maize for centuries before it was possible to quadruple its yields over the last century – mainly thanks to the consistent application of scientific plant-breeding methods.

Jatropha was a major media topic in 2009 – what was all the “hype” about?

According to Klaus Tropf, Managing Partner of JatroSolutions GmbH: “The previous Jatropha boom from 2009, when plantations were established using uncultivated wild plants and insufficient agricultural expertise, lacked the necessary preconditions for resounding success. Today, however, we are certain that, based on our many years of experience and the first varieties from our breeding programme, we can achieve global success with this energy-rich plant. Jatropha will join the ranks of major crops like maize and soya in a few years’ time at the latest, when we will also introduce the first hybrid varieties.”

Breeding success by JatroSolutions in Stuttgart with no help from genetic technology

The testing, recognition and release of a new plant variety must be preceded by several years of precise selection and highly-concentrated work. This research and development phase demands a great deal of investment capital, which was contributed by EnBW. JatroSolutions’ scientific programme uses classic plant breeding methods – the work does not involve the use of genetic technology. Before seed material can be offered for sale on the market, the potential varieties are tested in different locations. JatroSolutions therefore operates several breeding stations and test fields in Paraguay, Argentina, Cameroon and India, and on a research farm in Madagascar. The sites differ significantly with respect to climate and soil fertility. This enables the selection of the varieties best suited to the specific conditions in the

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relevant *Jatropha* cultivation areas. The main focus of attention here is on the selection of varieties that achieve high and stable oil yields.

Botanic features and incidence of the energy plant *Jatropha*

Jatropha is a large drought-tolerant perennial shrub or small tree, which is extremely robust in nature. Individual specimens can reach an impressive 12 metres in height; however, to simplify its management, it is maintained at a height of 2-3 metres in plantations. The plant can reach over 50 years in age, although a useful life of 20-30 years is expected for plantation crops. The *Jatropha* fruit is around the size of a walnut and usually contains three inedible seeds that are very rich in oil and nutrients. As a result, the residues from the pressing of the oil are suitable for use as an organic fertiliser. Due to its characteristic components, which render it unsuitable for food and arise in all parts of the plant, *Jatropha* is not disturbed by grazing animals; it more or less provides its own protection.

***Jatropha*'s climate and soil requirements**

Jatropha is adapted to a wide range of climate and soil conditions: it grows in hot arid areas and in low-nutrient wasteland. Its cultivation can counteract erosion and desertification, and can enable the reclamation of degraded soil in the long term. Unlike other energy plants, *Jatropha* can even survive light frost and long periods of drought, albeit with reduced productivity. *Jatropha* is suitable for the reclamation of degraded land that is no longer utilisable for agricultural use. The total area of such degraded lands in the tropics is estimated at two billion hectares, and continues to increase dramatically year on year. Land loss also arises in many tropical regions due to the conversion of primary rainforest to arable land. Very often, this land is only used intensively for a few years and then remains leached and fallow. It is all the more important in future to reclaim land for food production so that food security can be guaranteed. JatroSolutions was able to prove on several hundred hectares of land in Madagascar that *Jatropha* has the attribute necessary to facilitate this process. The primary purpose of reclamation using *Jatropha* is not the attainment of economic yields, but the remediation or stabilisation of the soil.

About the EnBW start-up JatroSolutions GmbH from Stuttgart

JatroSolutions GmbH, which was established by the renowned agricultural scientist Professor Klaus Becker from the University of Hohenheim, largely developed from a joint research project undertaken by the University of Hohenheim and EnBW. JatroSolutions GmbH, whose Managing Partner is Klaus Tropf, is based in Stuttgart and has 15 permanent employees. EnBW is the company's majority shareholder.

Previous and next steps for JatroSolutions?

As a clean-development-mechanism (CDM) pilot project, the first joint bioenergy project between JatroSolutions and EnBW in 2008 was devoted to the reduction of greenhouse gas emissions through the binding of CO₂ by the *Jatropha* plant. Due to the development necessary in relation to *Jatropha* cultivation and the marketing of the products, the cost of implementing this venture as a CDM project proved to be disproportionately high and was

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not, therefore, pursued. JatroSolutions succeeded in demonstrating on its research farm in Madagascar that the cultivation of Jatropha makes land unsuited for agricultural use suitable for cultivation again. In a second step, JatroSolutions concentrated on the breeding of high-yielding varieties of the plant and the improvement of the cultivation methods used. The economically viable production of biodiesel from inedible oleaginous Jatropha seeds, which mainly grows in Africa, Asia and South America, is already possible today. Thanks to the support provided by EnBW, the world's first commercial demonstration farm encompassing 1,000 hectares, on which the new varieties of the energy plant developed by JatroSolutions will be grown, will open in 2015.