Newsletter

BIOTEC INTERNATIONAL

BEB

BIOTEC EXTERNAL BULLETIN

JUNE 2020

biotec The Biogas Experts

SINCE 1984

| BELGIUM | MALAYSIA | INDONESIA | COLOMBIA |

EDITORIAL

CORONAVIRUS times

¨A world disaster or breakthrough in our way of living? An opportunity for the Planet and for the Human being? Let's see the cup half-full¨.

By Philippe Conil, CEO Biotec

Our last 12 months have been full of events, technologies development, works, etc. and this Biotec External Bulletin (BEB) will present some of these moves. Nevertheless, the world of today, June 2020, is completely different than the world and our lives four months ago (February 2020).

Our Planet was suffering, due to the action of the human beings: climate change and abrupt loss of biodiversity. Additionality, Humanity is affected by increasing social inequalities; demonstration of millions of people in the streets in 2019 (Chile, Colombia, Lebanon, Algeria, France, Iraq, etc.) showed that people in most countries wanted other rules for the economy and better life. Something was ready to happen.

Many of us are working for a better Humanity, but did something happen thanks to our initiative, conscience, brilliant mind, kindness and goodwill? No: the world economy stopped due to a mindless organism.

When it was set-up in 1984, BIOTEC was conceived as a tool with the following VISION (2050):

- *Sustainable development of humanity, fed through organic agriculture and powered with renewable energy*

And the following MISSION:

- *The sound management of the organic matter (carbon and nutrients) to generate renewable energy and to increase the fertility of soils.*

We have to recognize that, despite an impressive job of millions of citizens and companies, the Humanity is going faster and faster in the wrong direction: more fossil fuels consumption every year, more chemicals in our food and environment, lower biodiversity, less human links and finally more stress and less happiness. Humans feel powerful and want to dominate the nature and other humans. Where did they get these incurable illnesses of greediness and corruption? Is the money able to buy happiness?

A few people will remember the first alerts generated in the 70' (Roma Club
- Stop the Growth!), the 1992 World Meeting in Río de Janeiro (Brazil) to save the Planet, the Kyoto Protocol (ratified in 2005 but sink in 2012), the 2015 COP-21 Paris agreement on climate change, etc. Did we reduce the biodiversity destruction, the chemicals consumption and the global warming in these 50 years? No, on the contrary.

And suddenly, early 2020, a small bug, with no brain, has been able to place people's health before profit, reduce substantially global warming on the earth in two months and reduce drastically the human footprint on the Planet, so that wales, dolphins and wild animals are recovering their natural habitat. Humans suddenly reduced abruptly their daily run, start thinking in the loneliness of their cocoon, and discover that social links can be more important for them than consumption. Power and money are suddenly not the priority.

Main cause of the planet and humanity destruction lies in the rules of the economy. We, entrepreneurs, businessmen, we are surprised that the only KPI (Key Performance Indicator) we must meet is "financial profit at the end of the year". We are evaluated by the society, the authorities and the peers on this unique KPI. What a pity. What a lack of imagination.

We all have seen the degradation of the human values in the last decades. The denser and poorer a country is, the more widespread is generally the virus of corruption and greediness. Can Coronavirus defeat Corruptionvirus? Probably not, unfortunately. Can Coronavirus defeat greediness? Probably not, but let's work on it. Can Coronavirus make the humans change the rules of economy into a system where all humans and animals can live together without prepotency? Let's expect it. Let's see this terrible health catastrophe as a message and an opportunity to change our behavior with the nature and the other humans. The worst attitude would be to wait for some Covid-19 immunity or vaccine and go-on with the same mindset, up to the next catastrophe. We now discover that

(surprisingly?) short-term health matters can generate political decision to slow down the world economy for months. Who could imagine it four months ago? Up to now, survival matters, like biodiversity extinction and climate change, social links, collaboration vs. competition, and the essence of our "humanity", had not had the same capacity to move political will. Let's work on it also. Something has to be clear: COVID-19 impact on humanity is small; it is a "game" compared with the expected impact of climate change. The severe slowdown of the economy has a positive impact of greenhouse gases and environment and on the options of our humanity medium-term survival, but has a severe negative impact of our sociability, on our democracies and on our faith in the Humanity we are building. The action against the COVID19 look worse than the effect of the COVID itself as most of the humans have a natural immunity against all kinds of coronavirus. Confining all the population, instead of older persons and affected people does not look a smart reaction. The future will tell it. The totalitarian risk is greater than the health risk. Personally I would prefer to have COVID19 in a free country than to escape from it in a totalitarian country.

A good attitude from now, to change paradigms, could be to replace goods consumption by social links consumption and to look to a more local economy, less "energy demanding" and more related with human collaboration (it would require changing the concept of "free market" and of zero customs taxes).

Let's pay attention to all these pro-active initiatives of citizens worldwide to change the rules of the economy, like for example the "economy of the common good" (https://www.ecogood.org), launched in Austria ten years ago, an economic model in which the good life is the ultimate goal: for everyone, now and in the future, for people, animals and nature. The baseline of this model is that collaboration definitively gives a strong long-term advantage versus competition, which only gives short-term profits. To allow it, companies operating sustainably and socially (under dozens of KPI) have a market advantage. They publish a Common Good Balance Sheet, which more than 500 companies have already done.

On our BIOTEC side, following our VISION and MISSION stated in 1984, we will go on with our honest work and with our support to:

- The agroindustry valorizing their effluents and waste (www.bio-tec.net), reducing pollution, global warming and chemical fertilizer usage

- The remote communities and tropical regions generating renewable natural gas (RNG) and decent employment (www.agrogaz.com), allowing the set-up of a local sustainable circular economy

Take care of yourself and your beloved family, friends and neighbors, but not only: take also care of the future of your children and of the Humanity. This is a special moment in our lives to take transcendental decisions on the trace we will let to the next generations: What will be our personal, professional, social and environmental footprint in this life? What have we done to improve the World?

www.bio-tec.net

Newsletter

BIOTEC INTERNATIONAL

biotec
The Biogas Experts
SINCE 1984

BEEB
BIOTEC EXTERNAL BULLETIN

JUNE 2020

| BELGIUM | MALAYSIA | INDONESIA | COLOMBIA |

2019 - 2020 main R&D and new products

CITRUSVIL Plant in Argentine

Citrus Industry:

How to valorize the lemon "core" (skin, seeds), generating renewable natural gas?

The Citrus industry (orange, lemon, mandarins) processes the fruits and produces concentrated juice, pectin (from the husk) and essential oil (the most valuable of all the products in the case of lemon fruits). Seeds and fine internal skin have still to be better valorized.

Starting with a one-year R&D project, **BIOTEC** supported **CITRUSVIL** (Argentina) to produce biogas/electricity from lemon seeds, fine skin (white) and husks (yellow) with impressive results. The objective is to use the existing industrial biodigesters, processing effluents, all the year instead of six months per year (harvesting period).

More Info R&D...

Biological H_2S removal

New model for high H_2S content biogas.

The traditional **BIOTEC** filtering system, used in 80% of our biogas plants, is a 3 steps process with air application: H_2S removal in the biodigester itself (under the geomembrane), in a biological scrubber and in a dry (compost) filter. It is a low-cost system well adapted for H_2S levels lower than 2.000 ppm.

BIOTEC launched now a new three-steps model, which does not require air injection, separating the wet scrubber step (washing the biogas with water and dissolving the sulfide in the liquid phase), and an "activated sludge" unit oxidizing the sulfide into sulphate. We maintain the dry filter as a biological polishing unit and gas pre-dryer.

This new model delivers a gas at 200 ppm without any external input, except a small electric consumption, , and is adapted to higher H2S concentrations, from 2.000 ppm to 15.000 ppm.

Download Brochure Biological H2S removal

AGUAN, Biogas Plant

The concept of "Zero Discharge Milling" (ZDM) in the industry

In the **BIOTEC** philosophy, effluents and residues treatment is a must by is not a sufficient solution for the business sustainability. And it is its financial interest also, as everything throwed has been bought by the industry in some step of its process.

Many technology provider (TPs) are already working for years on effluents polishing for re-use. BIOTEC wants to make a step forward and commit with zero discharge milling (ZDM). This goal is obviously easier for agro-industries surrounded with plantations (sugarcane, cacao, oil palm, cassava,…) than for industries located in the middle of the cities or for urban sewage plants.

The concept has already been well worked by our partner SSP in India *(www.sspindia.com)* in several Indian industries like sugar mills and distilleries, but also in non-food industries like pharmaceutical and textile industry.

BIOTEC and SSP have complementary expertise, more focused on thermal evaporation and drying for SSP and more focused on biotechnologies and agricultural production for BIOTEC.

Some effluents re-use technologies are developed by BIOTEC for nearly 30 years already, like the liquid fertilization or ferti-irrigation (fertigation).

In the case of POME (palm oil mill effluents) the conditions are done for a integral valorization, as:

- Powdered POME is an excellent animal feed
- Biodigested (or composted) POME is an excellent fertilizer

So that, in 2019, BIOTEC focused on the ZDM for the palm oil industry, developing four paths for POME management/valorization:

a) Use of effluents for liquid fertilization (see brochure on bio-tec.net WEB site)

b) Use of effluents for co-composting, with (see brochure, with or without a step of evaporation) (see brochure on bio-tec.net WEB site)

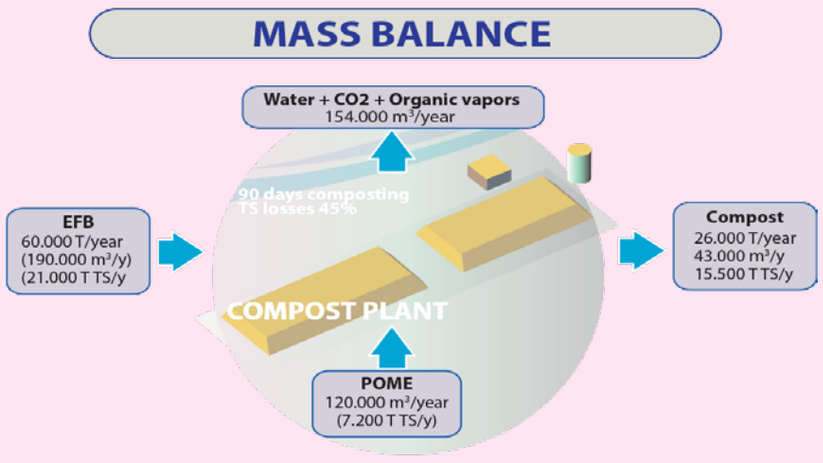
c) Evaporation and drying of the POME up to powder for animal feed

Note: a first industrial plant has been implemented by SSP for Godrej for 5.000 T/year bio-feed.

d) Bio-evapo-drying: Methanization + MEE evaporation + drying. Generation of a nutrients-rich powdered biofertilizer (50% humus, 50% macronutrients).

Download Brochure Zero Discharge Milling

EFB + POME co-composting plants:



Mass balance for a 60 T/h mill (300.000 T/year FFB)

Among the four pathways developed by **BIOTEC** for ZDM in the palm oil industry, one seems to be a "well-known" technology: POME + EFB co-composting. Nevertheless, most of the EFB compost plants in the world have failed and most have been shut down (around 80% in Malaysia) as the composting technological choices taken by the mills and the TPs have usually been erroneous:

- Or they opt for very cheap systems under (expensive) covers that do not deliver a good final fertilizer and do not allow much POME incorporation. It conduces to high O&M costs and little fertilizer recovery.
- Or they go for some very sophisticated composting plant whose investments and O&M costs are excessive for a normal mill

EFB has a fertilizer value around 3 US$/T FFB. POME has a fertilizer value between 4 and 5 US$/T FFB. To "capture" this impressive fertilizer value must be an industrial objective. BIOTEC is proud to have launched on the market an alternative way of composting, with no roof requirement, reducing the total footprint and the investment costs, and able to deliver a good quality compost. We hope this disruptive composting technology, inspired by our green waste composting units in Europe, will be a breakthrough technology for the palm oil sector.

Download ***Brochure "EFB-POME co-composting***

Newsletter

BIOTEC INTERNATIONAL

biotec
The Biogas Experts
SINCE 1984

BEB
BIOTEC EXTERNAL BULLETIN
JUNE 2020

| BELGIUM | MALAYSIA | INDONESIA | COLOMBIA |

SOME 2019 EVENTS:

■ **CITRUS INDUSTRY:** Conference at the Argentinian CITRUS congress, Tucuman, June 2019.

■ **PINEAPPLE Industry:** July 2019: BIOTEC executives have been received by GG Foods (Indonesia), the major canned pineapple producer of the world (32.000 hectares). Objectives: Organic matter management / Biogas for the process / Soil fertility

Pictures with Madame S. Julee Edmund, Biotec Asia's Managing Director

■ **SUGARCANE Industry:** VINASSES treatment and valorization as powdered potash biofertilizer: BIOTEC-SSP conference at the EEAOC Center, Tucuman, June 2019

■ **SUSTAINABLE DEVELOPMENT:** Booth at IGEM, Kuala Lumpur, Malaysia: 10th International Greentech & Eco Products Exhibition & Conference Malaysia

■ **PALM OIL INDUSTRY:**

• Conference on POME valorization at MOSTA (Malaysian Oil Scientists' and Technologists' Association) seminar, Kluang, Malaysia, October 2019
http://mosta.org.my/events/recipe-for-high-sustainable-oil-palm-yields-series2/

• Booth and conference, with our partner SSP India, at PIPOC, Kuala Lumpur, Malaysia, November 2019: Conference: POME Zero Discharge: A Necessary Step for Sustainability and a Business Opportunity

BIOTEC booth at PIPOC 2019

LATIN AMERICA

CITRUS Industry

Basic engineering step of the lemon skin & seeds storage and methanization for a continuous operation of the CITRUSVIL biodigesters in Argentina for a 3 MW electricity sale all over the 12 months of the year.

SUGARCANE industry (distilleries):

Together with its partner SSP (www.sspindia.com), BIOTEC started working with two distilleries in Latin America to change their vinasses management system and transform them into biogas and a marketable powdered biofertilizer. Raw vinasses have around 10% K2O vs Total Solids. After methanization and drying, the powder has around 25% K2O. It is a valuable potash biofertilizer, with nearly 50% of humic acids and a market value between 250 and 300 US$/T. Part of the gas is used for drying; part of the gas is free for sale.

www.bio-tec.net

YEAST industry

25 years ago, BIOTEC designed, built and operated a UASB-type WWTP to treat the sugarcane molasses-based vinasses of the Fleishmann yeast factory in Colombia, located in the middle of a city of Palmira. In 2019, BIOTEC has been called again by FLEISHMANN for an audit and reshape of the WWTP. Today, 25 years later, the BIOTEC portfolio of solutions is wider, and a combination of methanization with evaporation, RO and drying is feasible and seems suited.

PAPER INDUSTRY

a) CAME (Colombia):

30 years ago, BIOTEC rehabilitated a UASB reactor in a paper mill in Cali, Colombia. At that time, this industry generated 30 T COD per day prior pre-treatment.

15 years ago, BIOTEC complemented that project with a post-treatment (Activated Sludge Unit) and with the biogas utilization for steam generation.

In 2019, CAME asked BIOTEC for the WWTP audit and early 2020 CAME hired BIOTEC for the engineering of a new WWTP adapted to the effluent of today, taking advantage of the existing infrastructure (pre-treatment, post-treatment, old UASB unit). BIOTEC is presently designing two new UASB reactors for 12 T COD/day (Glass Fused to Steel tanks) as well as the UASB sludge management

b) PAPELERA DEL SUR (Peru):

This papermill asked BIOTEC, end of 2019, for an audit of the WWTP and hired BIOTEC early 2020 for a continuous operation assistance during 2021.

Newsletter

BIOTEC INTERNATIONAL

biotec
The Biogas Experts
SINCE 1984

BEEB
BIOTEC EXTERNAL BULLETIN
JUNE 2020

| BELGIUM | MALAYSIA | INDONESIA | COLOMBIA |

ASIA

TGM supervision (Indonesia):

Congratulation to **EVANS** team for the good operation and due maintenance of the **BIOTEC** RAC-20 model biodigester. The biogas is used in two engines: a 600 kW engine for internal consumption and a 1,2 MW engine to sell to the grid as "excess power".

As far as we know, EVANS is the palm oil mill with the lowest POME generation per ton of FFB in the world (around 0,45 m3/T). Some dilution with boiler RO water has even been required to fluidize, pump, cool and process the POME

BBS supervision (Indonesia):

This project has been inaugurated in Indonesia in 2018 for a 2 MW feed-in-tariff. KPI have been perfectly met for more than one year, with around 1 million kWh sold to the Grid per month with a continued supervision by the Indonesian **BIOTEC** team. After a 12 months period of low milling, BBS is progressively going back to normal milling and by the way electricity generation. BIOTEC team whishes all the best to BBS for its milling recovery.

MSE commissioning (Indonesia, 2,4 MW)

This 2,4 MW biogas project of the MAL mill on Bangka island in Indonesia has been commissioned early 2020 and is in the process of signing its PPA with the Grid operator (PLN). Congratulations to MSE and the indonesian BIOTEC team.

MSE and the Indonesian BIOTEC team

TANER commissioning (Malaysia)

TANER hired **BIOTEC ASIA** end of 2015, during the PIPOC event, for a "partial turn-key" biogas plant for its small R&D mill in Sabah, Malaysia, under construction at that time.

For a series of reasons, TANER had to delay the mill construction and by-the-way the civil works of the biogas plants and its inoculation, both under TANER scope. For that reason, the official commissioning could only be hold end of 2019. It is a small mill but with many disruptive technologies for testing, especially regarding POME polishing; this is a smart way for a palm oil mill TP as TANER to get valuable experience.

On-going: BTB biogas plant finalization (2,4 MW)

NAGATA BIO ENERGI (NBE) company, part of the ABM Group (SEWATAMA / TRAKINDO), is an independent electricity producer in Indonesia. It hired BIOTEC ASIA three years ago for a turn-key 2,4 MW biogas plant in South Kalimantan (Borneo) but had to stop the project for 18 months. That project resumed in September 2019 and has to be commissioned in two months. The finalization of the works happened during the Coronavirus crisis, with all the logistic inconveniences associated.