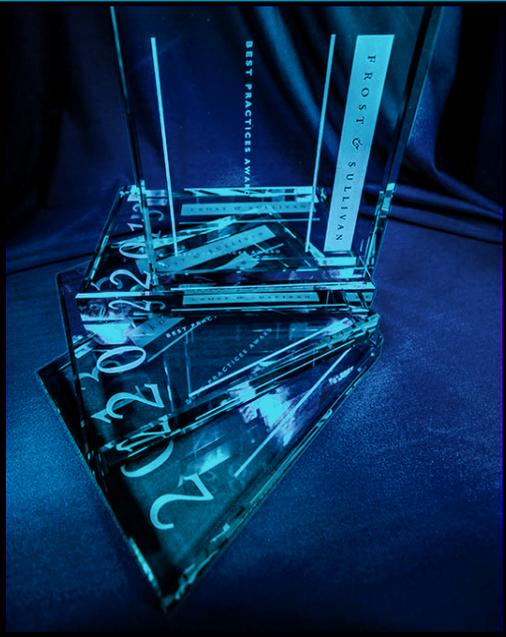




## 2016 African Food Processing Visionary Innovation Leadership Award



FROST & SULLIVAN

BEST  
2016 PRACTICES  
AWARD

AFRICAN FOOD PROCESSING  
VISIONARY INNOVATION LEADERSHIP AWARD

2016  
**BEST PRACTICES**  
AWARDS

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## Background and Company Performance

### *Industry Challenges*

Approximately R60 billion is lost in the South African economy every year due to food waste. This equates to approximately 2% of the country's gross domestic product (GDP). Fruit and vegetables account for 44% of the waste. According to OXFAM (UK), 13 million people go to bed hungry each night, while approximately a third of the food processed in South Africa is dumped as waste. The Council for Scientific and Industrial Research (CSIR) notes that more than 9 million tonnes, or 30%, of local agricultural production is wasted each year in the country.

Frost & Sullivan points out that these numbers are not only staggering in terms of the global concern for food security, but also indicate an additional environmental concern, as the dumped food is left to rot in landfill sites. The disposal of food waste at landfill sites affects the environment through atmospheric (specifically greenhouse gas) emissions, leachate, and pests. In addition, the atmospheric emissions caused by food production, processing and the distribution of food to consumers are highly wasteful if the food is not consumed, which may happen with blemished fruits and vegetables. Additionally, a vast amount of water is lost during the food processing phase. In a country that suffers from water shortages, Frost & Sullivan notes that this is a serious and grave concern.

According to the CSIR, food waste occurs at several points along the food value chain — on farms, in storage, in the manufacturing and distribution process, and in stores. The most costly food waste occurs during food distribution, amounting to a R19.6-billion loss, followed by processing and packaging that account for a R15.6-billion loss and agricultural production, with a R12.5-billion loss. This waste is triggered in part by consumers who will only purchase the 'nicest' looking food and ignore food in irregular shapes or strange colours, regardless of edibility and taste. The South African Department of Trade and Industry cites South Africa as having a R49-billion agro-processing sector. However, food security is of concern, with production barely keeping up with demand and companies constantly searching for ways to reduce the waste incurred during the processing phase and improve output and nutritional content.

### *Focus on the Future and Best Practices Implementation*

#### **Focus on unmet needs**

Green Cell Technologies® (GCT®) is a biotechnology and intellectual property development company for the pharmaceutical, nutraceutical, cosmeceutical, functional food, agricultural, and biofuel industries. The company focuses on formulating and building advanced solutions to ensure world nutrition sustainability.

Despite increased consumer and manufacturer awareness regarding food security, traditional food manufacturing processes still lead to an exceptional amount of food waste

as described above. There is a lack of processing solutions that reduce waste and ensure that the nutritional content of food is maintained - despite large food manufacturers spending thousands of US dollars each year to solve the problem. In response, GCT has developed revolutionary technology that can be used as ultra efficient food processors (called the Disruptor™) that makes use of GCT's patented process, Dynamic Cellular Disruption® (DCD®). The Disruptor and DCD are sold under license to manufacturers and processors around the world. Primarily used as a food processor, the Disruptor is also able to make extracts from plant materials to be used in pharmaceuticals and nutritional foods, as well as cosmetics and numerous other applications.

The DCD® process is a non-chemical, non-harmful, non-heat extraction method whereby all organic material is reduced to molecular level and can be used in a variety of applications. Applications include pulping; blending products; making purees, juices, powders, and sauces; manufacturing nut/seed butters and milks, and creating water-soluble powders for use in smoothies, health bars, and creams. The Disruptor machines process whole fruits, vegetables, or organic materials by breaking down the plant cellulose structure without overheating the plant material or using harmful chemicals, while releasing all of the actives within the plant and increasing overall product yields. To achieve this, the Disruptor accelerates the biomass volume to speeds in excess of 500 km/h, after which it is rapidly slowed down. At this point, the Disruptor breaks open the plant cell structures and releases the cell contents. This process enhances plant extracts (as required) and reduces them to molecular level. The DCD process does not alter or harm the molecular make-up of the original cell content, thereby ensuring an improved nutritional content compared to traditional food processors that use excessive heat and denature and denude the nutritional content of the food.

Significant waste for fruit and vegetables occurs in processing and packaging, and then in distribution (R14 billion in 2012). However, because the plant material is broken down by the Disruptor, blemished or bruised fruit and vegetables can be used instead of being put aside as waste. This game-changing technology will significantly reduce food waste in agro-processing.



The Disruptor. Image courtesy of GCT

## **Visionary Scenarios through Mega Trends**

As defined by Frost & Sullivan, Mega Trends are global, sustained, and macro-economic forces of development that impact business, economy, society, cultures, and personal lives, thereby defining our future world and its increasing pace of change. Mega Trends have diverse meanings and impacts for different industries, companies, and individuals.

Agriculture plays a significant role in African economies and accounts for a sizeable portion of its GDP. Frost & Sullivan forecasts that by 2020, unlike production, the demand for staple food in Africa is expected to have doubled from its 2000 level. By 2050, Africa will comprise 24% of the world population and still be unable to feed itself if crop yields do not improve. At the same time, reducing postharvest losses by 1% would feed 480,000 Africans for a year. Postharvest losses waste scarce inputs and aggravate hunger and poverty in Africa and can be reduced through training and innovation, as well as developing infrastructure to aid the transportation of produce.

DCD technology and the Disruptor sit at the pinnacle of this Frost & Sullivan-identified Mega Trend. The technology preserves the integrity of the plant material. For example, when processing butternut using current manufacturing methods, approximately 40% of it, in the form of skins and seeds, is removed upfront and therefore lost to human consumption, and is either fed to cattle or pigs, or sent to landfill. The Disruptor enables all the available nutritious skins and seeds to be used, thereby increasing the yield and improving nutrition. The Disruptor breaks down the insoluble fibre substantially to anywhere from 10 – 150 micron in one step, unlike conventional processing that uses numerous steps. Furthermore, the environmental impact is diminished, as waste is significantly reduced. Frost & Sullivan firmly believes that this technology is set to disrupt the food-processing industry.

## **Blue Ocean Strategy**

Food processing companies spend millions of dollars each year to find new ways to reduce or reuse food waste. Frost & Sullivan believes that GCT has properly envisioned a blue ocean strategy by removing the need to create waste in the first place. Furthermore, by reducing many processing steps to one, the company has cut manufacturing costs and provided enormous efficiencies to manufacturers. Any insoluble fibre that is generated during the process can be used to augment fibre content in other foods. GCT is also experimenting with the Disruptor to process meat products and make wine, beer and many more.

## **Operational Efficiency**

Faced with poverty, disease, and food insecurity, it is obviously important to benefitiate food resources reliably, reduce waste, and ensure nutritional content. Currently, GCT manufactures sauces for a South African manufacturing company, Fynbos Fine Foods, in order to prove concept and show commercial application. The first sauce to be launched is a chili sauce, and the Disruptor has improved the yield by about 20% to 30% and removed the need for long fermentation. In addition, Fynbos Fine Foods has been able to use 100% of the chili -

instead of the usual 50% with the rest going to waste. It has also significantly reduced cooking time and improved nutritional content, as lengthened heating is no longer needed to break down the food. As waste is reduced and the whole chili is utilised, output is increased while costs are lowered. Furthermore, Fynbos Fine Foods has experienced significant water savings, as there are fewer steps in the processing of the sauce. Another GCT customer, an American-based producer of fruit pulps, juices, and powders, has confirmed a 50% improvement in output during trial periods, coupled with a significant reduction in waste.

### **Process Design**

The Disruptor and the DCD process spent eight years in research and development (R&D) before being launched commercially in 2015. The technology is mostly being supplied to food manufacturers, but there are plans to target the pharmaceutical, cosmeceutical, nutraceutical, biofuel, and agricultural industries.

The Disruptor has been purpose-built, incorporating electric pumps, hydraulics, and electronics. It comes in several sizes and can be retrofitted into an existing factory or built to fit a new factory. GCT employs a process engineer to assist its clients in creating a bespoke process that matches the desired end results, be it a puree, powder, or juice. The Disruptor machine is sold to clients, but the technology inside it is leased in order to protect the patent. Given that the Disruptor is sold internationally, GCT has partnered with a European engineering firm with offices worldwide to fit the Disruptor in the client's factory and provide maintenance. GCT has granted patents for DCD in South Africa, Israel, Japan, Canada, Mexico and Australia thus far, with several other regions currently in process.

### **Vision Alignment**

GCT was founded by Roy Henderson and Jan Vlok with the aim of finding real-world solutions to energy challenges, such as human energy (food, beverage and supplements), mechanical energy (fuel) and earth energy (cattle, crops and earth). Given the global financial squeeze, food processing challenges have been their immediate focus, thereby ensuring the food security for future generations. As an entrepreneurial company the founders self-funded the research and development (R&D), laboratory testing, and numerous verification processes and after eight years in R&D, the technology was released commercially in 2015.

DCD technology has been independently verified by external institutions such as the University of Cape Town and Cape Peninsular University of Technology, as well as Brunswick Laboratories and Microchem Laboratories to mention just a few. GCT is also in the final stages of obtaining approval from the US Food and Drug Administration (FDA) in order to supply to the US market. External international accreditation indicates the diverse applicability and high quality of the Disruptor and aligns with GCT's vision of impacting the food processing industry worldwide and improving food security.

## Conclusion

*Green Cell Technologies has created a unique solution to overcome the challenges of food security and the need to reduce the excessive amount of waste generated during the food processing cycle. The game-changing Disruptor, using Dynamic Cellular Disruption, provides manufacturers with a compact and cost-saving technology to process their food more expediently, reduce waste, and improve nutritional quality. Frost & Sullivan firmly believes that the company is a visionary leader, addressing one of the most pertinent issues facing modern society.*

*With its strong overall performance, Green Cell Technologies has earned the 2016 Frost & Sullivan Visionary Innovation Leadership Award for Food Processing.*

## Significance of Visionary Innovation Leadership

A visionary innovation leadership position enables a market participant to deliver highly competitive products and solutions that transform the way individuals and businesses perform their daily activities. Such products and solutions set new, long-lasting trends in how technologies are deployed and consumed by businesses and end users. Most important, they deliver unique and differentiated benefits that can greatly improve business performance as well as individuals' work and personal lives. These improvements are measured by customer demand, brand strength, and competitive positioning.



## Understanding Visionary Innovation Leadership

Visionary Innovation is the ability to innovate today in the light of perceived changes and opportunities that will arise from Mega Trends in the future. It is the ability to scout and detect unmet (and as yet undefined) needs and proactively address them with disruptive solutions that cater to new and unique customers, lifestyles, technologies, and markets. At the heart of visionary innovation is a deep understanding of the implications and global ramifications of Mega Trends, leading to correct identification and ultimate capture of niche and white-space market opportunities in the future.



## Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 <b>Monitor, target, and screen</b>	Identify Award recipient candidates from around the globe	<ul style="list-style-type: none"> <li>• Conduct in-depth industry research</li> <li>• Identify emerging sectors</li> <li>• Scan multiple geographies</li> </ul>	Pipeline of candidates who potentially meet all best-practice criteria
2 <b>Perform 360-degree research</b>	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> <li>• Interview thought leaders and industry practitioners</li> <li>• Assess candidates' fit with best-practice criteria</li> <li>• Rank all candidates</li> </ul>	Matrix positioning all candidates' performance relative to one another
3 <b>Invite thought leadership in best practices</b>	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> <li>• Confirm best-practice criteria</li> <li>• Examine eligibility of all candidates</li> <li>• Identify any information gaps</li> </ul>	Detailed profiles of all ranked candidates
4 <b>Initiate research director review</b>	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> <li>• Brainstorm ranking options</li> <li>• Invite multiple perspectives on candidates' performance</li> <li>• Update candidate profiles</li> </ul>	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 <b>Assemble panel of industry experts</b>	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> <li>• Share findings</li> <li>• Strengthen cases for candidate eligibility</li> <li>• Prioritize candidates</li> </ul>	Refined list of prioritized Award candidates
6 <b>Conduct global industry review</b>	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> <li>• Hold global team meeting to review all candidates</li> <li>• Pressure-test fit with criteria</li> <li>• Confirm inclusion of all eligible candidates</li> </ul>	Final list of eligible Award candidates, representing success stories worldwide
7 <b>Perform quality check</b>	Develop official Award consideration materials	<ul style="list-style-type: none"> <li>• Perform final performance benchmarking activities</li> <li>• Write nominations</li> <li>• Perform quality review</li> </ul>	High-quality, accurate, and creative presentation of nominees' successes
8 <b>Reconnect with panel of industry experts</b>	Finalize the selection of the best-practice Award recipient	<ul style="list-style-type: none"> <li>• Review analysis with panel</li> <li>• Build consensus</li> <li>• Select winner</li> </ul>	Decision on which company performs best against all best-practice criteria
9 <b>Communicate recognition</b>	Inform Award recipient of Award recognition	<ul style="list-style-type: none"> <li>• Present Award to the CEO</li> <li>• Inspire the organization for continued success</li> <li>• Celebrate the recipient's performance</li> </ul>	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 <b>Take strategic action</b>	Upon licensing, company may share Award news with stakeholders and customers	<ul style="list-style-type: none"> <li>• Coordinate media outreach</li> <li>• Design a marketing plan</li> <li>• Assess Award's role in future strategic planning</li> </ul>	Widespread awareness of recipient's Award status among investors, media personnel, and employees

## About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages almost 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.