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# RecyclingTimes

For the Industry

## THE WORLD'S FIRST PALM OIL-BASED CHEMICAL TONER

Jadi's KS Liew Develops  
High Quality, Eco-Friendly  
Biotoners

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# THE WORLD'S FIRST PALM OIL-BASED CHEMICAL TONER

JADI'S KS LIEW DEVELOPS HIGH  
QUALITY, ECO-FRIENDLY BIOTONERS

*David Gibbons, Director, Recycling Times Media*





The struggle to produce aftermarket quality toners for printer cartridges is fraught with the same obstacles facing other component parts such as, drums and microchips. Some expect the legal battle between the original equipment manufacturers (OEMs) and the aftermarket players may eventually shift to toner. Yes, the OEMs hold patents on toners too, and remanufacturers ought to ensure the toners they use do not infringe OEM patents.

On top of that, the use of petroleum-derived resins in toners poses a serious threat to environmental sustainability. It is estimated that more than 200,000 metric tons (MT) of toner are produced globally every year. The disposal of waste toner, from spent cartridges and the deinking of recycled papers, is of growing concern. Governments are legislating that eco-friendly consumables, such as ink and toner, must be the preferred choice where available.

Toner manufacturers have to invest heavily into research and development (R&D) on at least two fronts: the production of toners that protect the intellectual property rights of the OEMs, and those that also protect the environment.

#### A Unique Chemical, Color Biotoner

For more than 20 years, Jadi Imaging Technologies Sdn. Bhd. (Jadi)—a Malaysian-based, independent, toner manufacturer, has been actively and innovatively working to achieve both objectives.

Jadi has pursued innovative ways to minimize the environmental impact of printing, a field



ARCHAEOLOGISTS  
DISCOVERED PALM OIL IN  
A TOMB AT ABYDOS EGYPT  
DATING BACK 5,000 YEARS



PALM OIL BECAME A HIGHLY  
SOUGHT-AFTER COMMODITY  
BY BRITISH TRADERS, FOR  
USE AS AN INDUSTRIAL  
LUBRICANT FOR MACHINERY  
DURING BRITAIN'S INDUSTRIAL  
REVOLUTION.



PALM OIL PRODUCTION  
IS SUPPORTED BY THE  
EUROPEAN UNION.

currently dominated, worldwide, by petrotoners made from petroleum-derived resins. The use of palm oil-based derivatives as raw materials replaces at least 25% of the non-renewable, petro-resins which are normally used in preparing the polymeric component of conventional toners. Jadi's efforts culminated in the world's first bio-based chemical toner from palm oil, and called it *Palmitone*, a patented series of environmentally friendly chemical color biotoners that reduce the use of depletable petroleum resources and decrease unfavorable CO2 emission through a carbon neutral process.

*Recycling Times* traveled to Jadi headquarters in the suburbs of Kuala Lumpur, Malaysia to witness first hand how this toner manufacturer is leading the way. There, Mr Kim Siong Liew, whose business associates prefer to call KS Liew, explained, "Yes, to the best of our knowledge, we are the first and only company in the world to develop a quality chemical color biotoner using palm oil,"

Liew founded the company back in 1993. He now serves as Executive Chairman and Group CEO of Jadi Imaging Holdings Berhad, a public company listed on the stock exchange of Malaysia. Jadi owns subsidiaries in Malaysia and China. The Chinese plant has two fully operational lines producing monochrome toners for the Chinese domestic market.

Malaysia is a very small market for printing consumables, so most of the 10,000 MT of toner Jadi develops, formulates and manufactures each year is exported across the globe, and may very





well be the toner you are using today.

Liew also described the life cycle of palm oil used in the manufacture of biotoners. The palm oil resin in these toners is eventually destroyed, emitting CO<sub>2</sub> into the atmosphere. This in turn is absorbed by plants like palm trees ready to bear fruit for harvest. Palm oil is obtained from that fruit, thereby completing the Cycle and ensuring a sustainable resource.

### A Plant Among the Plantations

I also traveled about 30km west of Kuala Lumpur to Jadi's modern, one-year old, production facility in Jalan Kapar, Klang, located logistically close to Port Klang. Liew explained the availability and low cost of locally harvested palm oil is their commercial advantage. Malaysia is the world's largest exporter, having shipped 18 million MT of palm oil products in 2011, primarily to China, Pakistan, the European Union, India and the United States. Palm plantations yield an average of 3.7 MT/hectare (2.47 acres) of oil per year—2.5 times higher than rapeseed and about 7 times more than soy—making it the most productive crop in the world!

Liew claims that despite containing a 25% biocontent, *Palmotone* chemical biotoner is able to deliver equivalent or better performance and image quality than petroleum-based chemical toners when used in color applications.

I asked Liew how he could be so sure his products exceed the OEM standard. He said, "We examine the OEM toners for image density, page yield, backgrounding, scattering as well as grey

scale. We find we can exceed the OEM standards in many of those aspects."

### Touring the Toner Plant

After telling me, he showed me. In the lab, I saw how *Palmotone* is built from the ground up using submicron raw materials. The average size, shape and surface chemistry of each toner particle can be adjusted depending on the printing requirement. Liew claims *Palmotone* allows remanufacturers to achieve crisp, print quality from particles in the range of 5.0 to 6.0 microns. The technical staff showed me how the waxes enhance toner adhesion and glossiness. Jadi claims it can provide uniform density as a result of narrow particle size distribution, high transfer efficiency and a page yield equivalent to OEM toner to reduce printing cost.

Liew continued to emphasize that quality control must take place at every phase of manufacturing—from the initial development and formulation, to testing and production. "Our quality is built-in and assured through stringent monitoring of the manufacturing process, materials inspection, tests on work-in-progress and the finished product." Jadi tests in-coming raw materials to determine their properties are within specifications.

In line with the fast-changing technology, Jadi has invested heavily in the latest knowledge and equipment to develop more innovative products to meet the remanufacturing needs of the aftermarket imaging industry. They have spent in excess of \$30 million USD on R&D and the



ABOUT 80% OF GLOBAL PALM OIL PRODUCTION IS USED AS FOOD AND IS TOUTED AMONG THE HEALTHIEST OF THE EDIBLE OILS IN THE HUMAN DIET.



PALM OIL FORMS THE BASIS OF SOAP PRODUCTS, SUCH AS UNILEVER'S SUNLIGHT SOAP, AND AMERICA'S PALMOLIVE BRAND.



provision of capital to ensure their wide range of toners and resins meet or exceed the OEM quality standards.

### Jadi's Patent Portfolio

Since 2011, Jadi had been awarded its own portfolio of toner and resin patents focused on the natural oil-based CPTs used in laser printers, photocopiers and multi-function devices. These holdings cover methods for synthesizing the natural oil-based polyester resins used in *Palmotone* CPT. (See Table 1 Patents Awarded).

According to Liew, research and development is a part of the culture, and has been a key priority for Jadi since its beginnings in 1993. So in 2005, it came as no surprise for Jadi to collaborate with the Chemistry Department of the University of Malaya to jointly develop environmentally friendly chemical toners. It was a landmark year in many ways, as approval was granted by the Chinese government to set-up a plant in Suzhou Industrial Park, China. That same year Jadi was named among the *Enterprise 50* by the national Malaysian government. (See Table 2 Brief History and Milestones).

In order to produce its own, patented toner, Jadi established two comprehensive R&D facilities in Malaysia. Research on melt pulverized toner (MPT), or conventional toner, is conducted at its R&D Centre in the Hicom-Glenmarie Industrial Park, in Shah Alam. The other R&D laboratory—the one I visited in Jalan Kapar, Klang—is dedicated to R&D on chemically produced Toner



JADI'S CEO KS LIEW HAS HAD 30 YEARS EXPERIENCE IN THE COPIER AND TONER INDUSTRIES, AND HOLDS BACHELOR AND MASTERS DEGREES IN BUSINESS HE EARNED IN SCOTLAND.



JADI IS THE ONLY TONER MANUFACTURER IN MALAYSIA AND THE LARGEST IN ASIA- PACIFIC.

(CPT) using the environmentally friendly palm oil-based starting materials.







### Customer Satisfaction Rules Every Decision

Ms Susan Eu—who has been at Jadi for 17 years and served as its General Manager for the past 10—told me there are also other considerations. Yes, the race to research, develop and produce non-infringing, environmentally friendly toners demands leadership and investment. However, being highly respected, visible and customer friendly, she sees customer satisfaction as being critical for the longevity of the business.

“To continue to be a world-class toner manufacturer, toner quality has to be the topmost goal,” asserted Ms. Eu. “Customers must have seamless matching and excellent print results with every batch they use. Healthy, long-term relationships are not just a dream, but a reality at Jadi. Many of our global customers have been with us for more than 15 years.” Indeed, Jadi’s customers—component distributors and cartridge remanufacturers—come from more than 70 countries.

Liew agrees. “Our success over the years does come from an underlying principle—‘Customer Satisfaction Rules Every Decision’. Every step we make is only taken after considering what the customers need,” Liew explained the right pricing of quality toners, backed by dedicated, technical and customer support is what Jadi’s customers have come to expect and what we have learned to deliver! ■

**Table 1: Patents Awarded**

Polymerized Toners (CPT)	2011	Jadi was awarded a World IPO № WO 2011/037446 A1 for research in natural oil-based CPT for use in laser printers, photocopy machines and other similar applications, as well as the method for synthesizing natural oil-based polyester resins used in Palmotone chemically produced toner.	
	2014	Jadi was granted the patent № 8,647,801 B2 by the U.S. Patent & Trademark Office for research on natural oil-based chemically produced toner.	
Resin	2009	Jadi obtained a World IPO № WO2009/005335 A2 for environmentally friendly natural oil-based toner resin for research on a method to produce toner resin derived from vegetable oils such as palm oil, coconut oil, bio-based resources, or a combination thereof.	
	2011	In recognition of Jadi's research effort, the company has been awarded a patent in the U.S. by the US Patent & Trademark Office. The Patent № 7,968,647 B2 discloses technology of making Environmentally Friendly Natural Oil-based Toner Resin derived from bio-based sources which may include various vegetable oils such as palm oil.	
	2012	Jadi was granted patent № ZL200880005740.7 from the China Patent & Trademark Office for research on environmentally-friendly natural oil-based toner resin.	
	2013	Jadi Imaging Technologies Sdn. Bhd. (Jadi), was granted patent № 5303800 from the Japan Patent Office on the research of Environmentally-Friendly Natural Oil-based Toner Resin. Jadi sets a high internal benchmark on quality, and the acceptance of this proprietary technology to Japan's exacting standards is another validation of Jadi's commitment towards the research and development of toners and resins, as well as of eco-friendly printing solutions.	

**Table 2 Brief History and Milestones**

2014	Jadi was granted the patent № 8,647,801 B2 by the U.S. Patent & Trademark Office for research on natural oil-based chemically produced toner.
2013	Japan patent № . 5303800 for Environmentally Friendly Natural Oil-based Toner Resin was granted by the Japan Patent Office.
2012	Commercial production of world's first palm oil bio-based chemical toner, Palmotone®. Patent № . ZL200880005740.7 was granted by the China Patent & Trademark Office for Environmentally Friendly Natural Oil-based Toner Resin.
2011	Jadi was awarded the 2010 Industry Excellence Award (Merchandise Export) by the Malaysian government. United States patent US № . 7,968,647 B2 received for research on environmentally-friendly natural oil-based toner resin. World IPO № . WO 2011/037446 A1 (application pending in individual countries) received for natural oil-based Chemical Produced Toner.
2010	The 7th production line was installed in Jadi Suzhou. New factory in Jalan Kapar began operations. The 8th production line was installed in Jalan Kapar factory, giving the Group a total annual production capacity of 9,000MT. 2009 – World IPO № . WO2009/005335 A2 for environmentally-friendly natural oil-based toner resin.
2008	Second colour production line was installed to meet the increasing demand for the Group's colour toners. Jadi acquired a freehold industrial land in Jalan Kapar, Malaysia to further expand its operations.
2007	First production line dedicated to colour toners was installed in Hicom-Glenmarie Industrial Park
2006	The 4th production line in Jadi Suzhou commenced commercial production. A new factory was acquired in Hicom-Glenmarie Industrial Park, Malaysia, to house a new R&D Centre and production facilities. The 5th production line was installed in the new factory, giving the Group a total production capacity of 5,000MT.
2005	Jadi went into collaboration with the Chemistry Department of University of Malaya to conduct a joint R&D on environmentally friendly chemical toners. In the same year, approval was received from the Chinese government to set-up a wholly-owned subsidiary, Jadi Imaging Technologies (Suzhou) Co., Ltd., in Suzhou Industrial Park, China. Jadi was awarded the 2005 Enterprise 50 by the Malaysian government.
2004	The 3rd production line was installed, thus increasing our total annual capacity to 3,000MT
2002	2nd production line with capacity of 1,250MT was installed to manufacture toners for laser printers. Jadi received its ISO 9001:2000 Quality Management System certification.
1999	Jadi was restructured with a change of name to Jadi Imaging Technologies Sdn Bhd.
1993	The joint-venture company Technitone (M) Sdn Bhd was started to manufacture copier toners with an annual production capacity of 500MT in Hicom-Glenmarie Industrial Park, Malaysia.