



**Bio-based Toners and  
bio-based Plastics:  
green innovations by the laser  
cartridges aftermarket!**

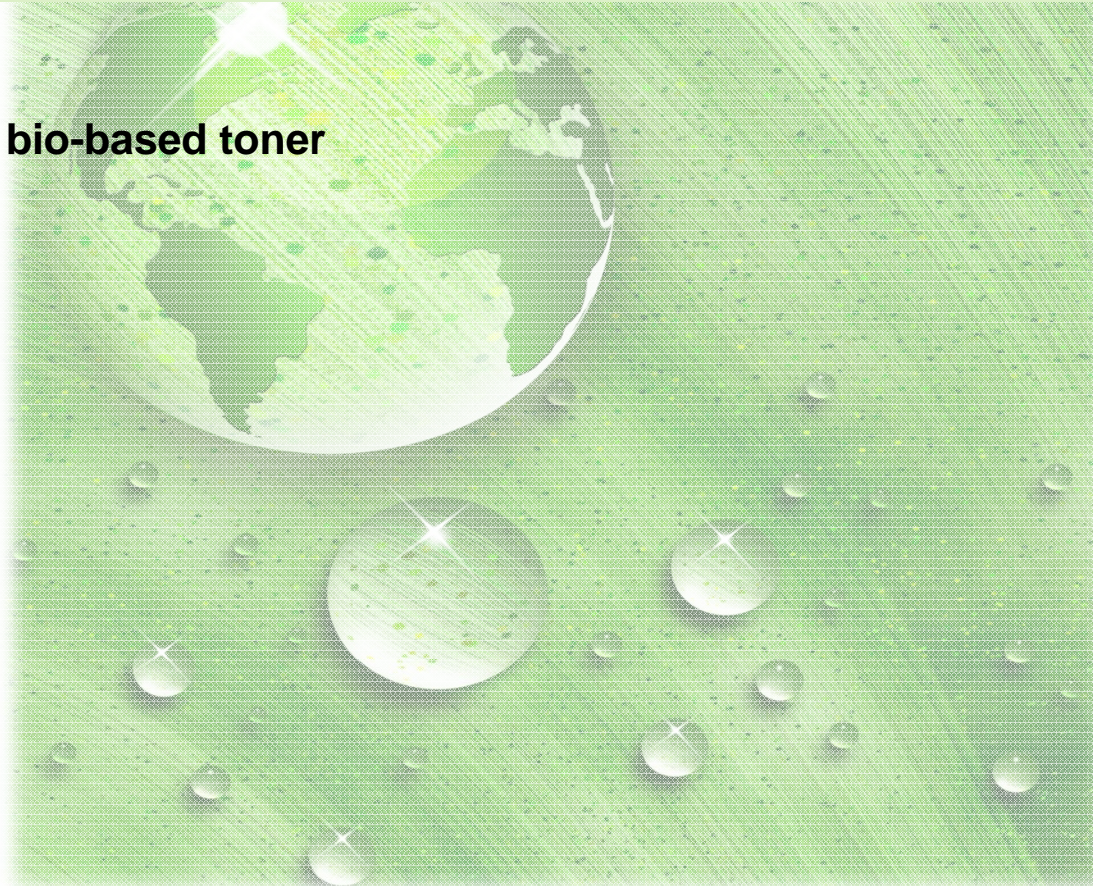
# Agenda



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- **DC BIOSELECT** Bio-based Quality you can trust Bio-based plastics

- **BIOBLACK** bio-based toner





# Sustainability should be important to everybody



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- In December 2006 the EU Competitiveness Council agreed to launch an initiative as a new policy approach aiming at supporting the development of markets with high economic and social value, in which European companies could develop a globally leading role.
- In May 2007 the Competitiveness Council invited the Commission to propose further steps for the creation of lead markets and other measures to enhance market demand for eco-efficient bio-based products, in order to exploit the positive environmental impact of bio-based products.
- Some of the major factors driving the future markets and demand for bio-based products are:
  - Limited availability and increased cost of fossil resources vs. renewable bio-based resources;
  - Policy development, in particular climate change mitigation, sustainable production and consumption, Lisbon agenda, industrial policy and employment growth;
  - A changing consumer demand based on the awareness of the need to ensure sustainable production and consumption.

05/12/2011

Source: Accelerating the Development of the Market for Bio-based Products in Europe  
REPORT OF THE TASKFORCE ON BIO-BASED PRODUCTS  
Composed in preparation of the Communication  
"Lead Market Initiative for Europe" (COM(2007) 860 final)

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# We need to be active in order to be “greener” than the OEM



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- For the OEM it is still perfectly ok, if certain plastic parts need to be thrown away:
  - On the cartridges itself, the OEM have understood that it gives green credentials and that it will dry out empty supply to the after-market if they do collection programs themselves.
  - On the printer casing OEMs like OKI have started to use some bio-based plastic.

## **BUT:**

- The developer Roller covers and Shipping Locks are still throw-away-articles!
  - The normal and inflatable foil bags are still a throw-away article!
- **We believe that this needs to be changed.**

**If the aftermarket wants to be more green, we should do something against that.**



# Bio-based plastic covers and bags are the green alternative and a true innovation by the after-market



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- **DC BIOSELECT** Bio-based Quality you can trust bio-based developer Roller covers and shipping locks are the green alternative to be used with quality remanufactured cartridges – consequently they should be green instead of being yellow or orange like the ones on the OEM.
- The DELACAMP bio-based Shipping Locks are made up to 99% from bio-based material which is derived from wooden fibers. The balance being the eco friendly green colour.
- The bio-based material is CO<sub>2</sub> neutral.
- The plastic covers are certified by DIN (Vincotte upon request).



- Bio-based foil bags and inflatable foil bags are in development. The bags have the potential of being truly biodegradable because of the minimal mass and the thickness. The thinner the bio-based material, the quicker it degrades.



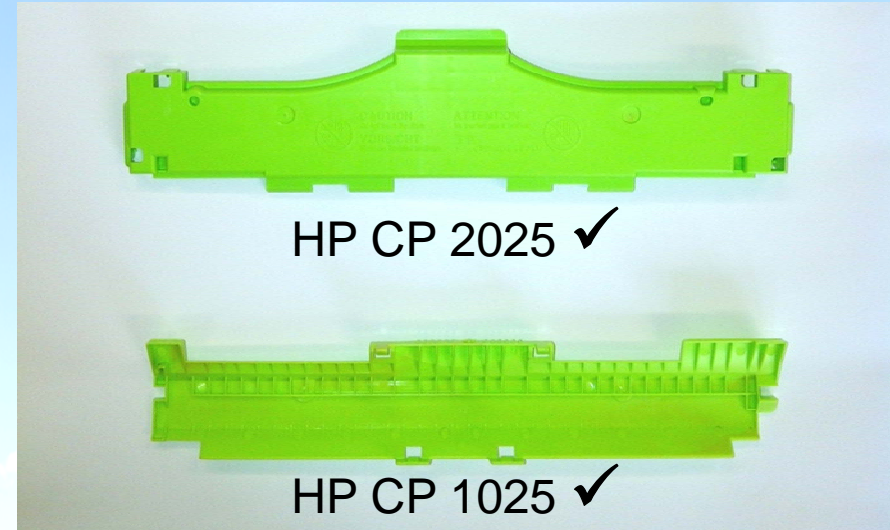
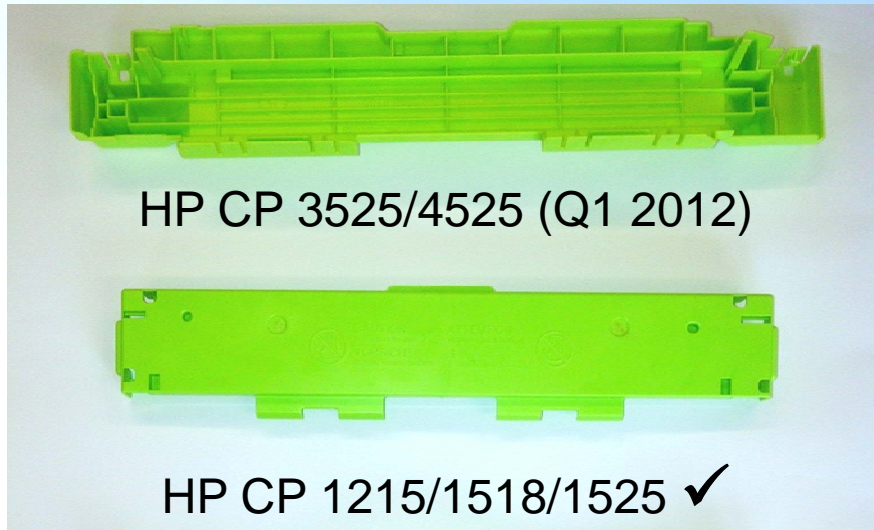
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# What bio-based Covers/Shipping Locks are available and in the pipeline?



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- In the future:
  - All relevant covers and shipping locks
  - Bio-based foil bags and inflatable foil bags

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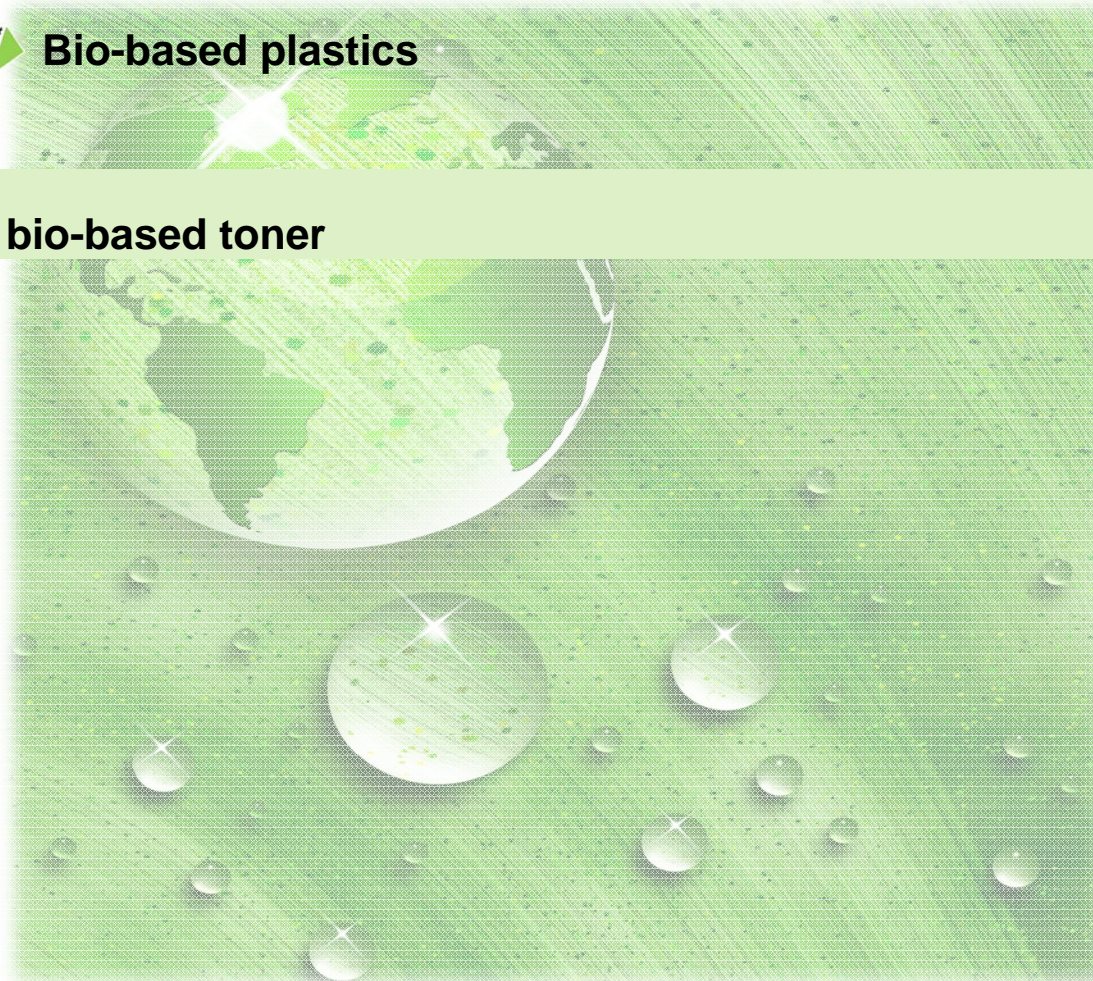
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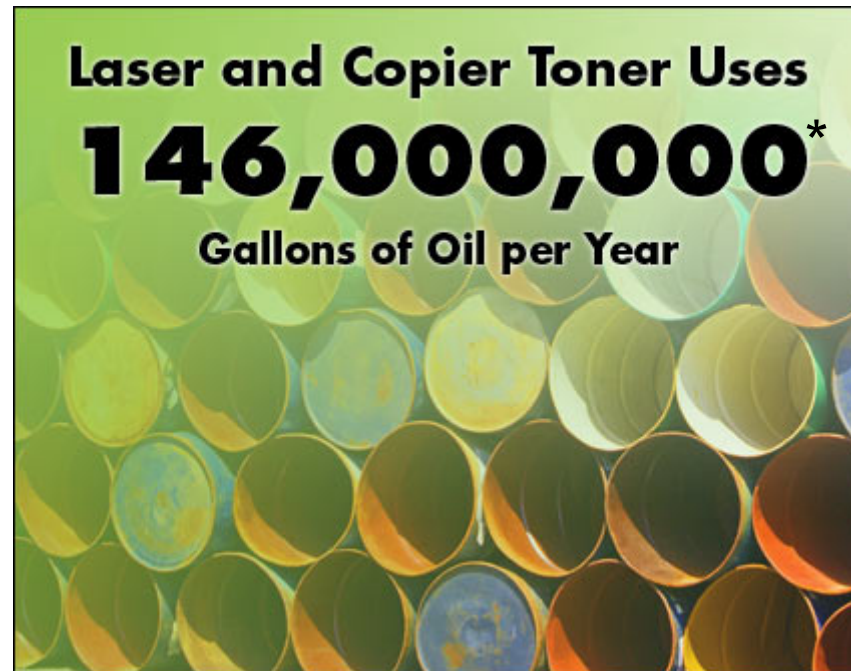
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- **DC BIOSELECT** Bio-based Quality you can trust Bio-based plastics

- **BIOBLACK** bio-based toner



Sad, but true. . .



**\* 552.670.120 liters per year!**

That is about as much as the BP drill hole would spill into the gulf in one and a half year.



# What are the ecological benefits of **BIOBLACK™**?



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The use of 1 kg of BioBlack™ toner saves ~0.6\* liter of petroleum\*\*

The use of 1 kg of BioBlack™ toner reduces ~450\* g of CO<sub>2</sub>\*\*

\* DISCLAIMER: This amount is an estimate obtained using a series of assumptions that may prove to be inaccurate or are difficult to substantiate, and actual results may be materially different. The estimate is meant to be illustrative in nature only and may not represent that such estimate will be achieved in the future. No warranties or representations, express or implied, are made as to the accuracy of the estimate, and we accept no responsibility or liability for any consequences arising from the use of this estimate.

\*\* Compared to the use of the same amount of petroleum-based toner.



# Key Assumptions on the calculated savings



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## Key Assumptions: Oil Savings

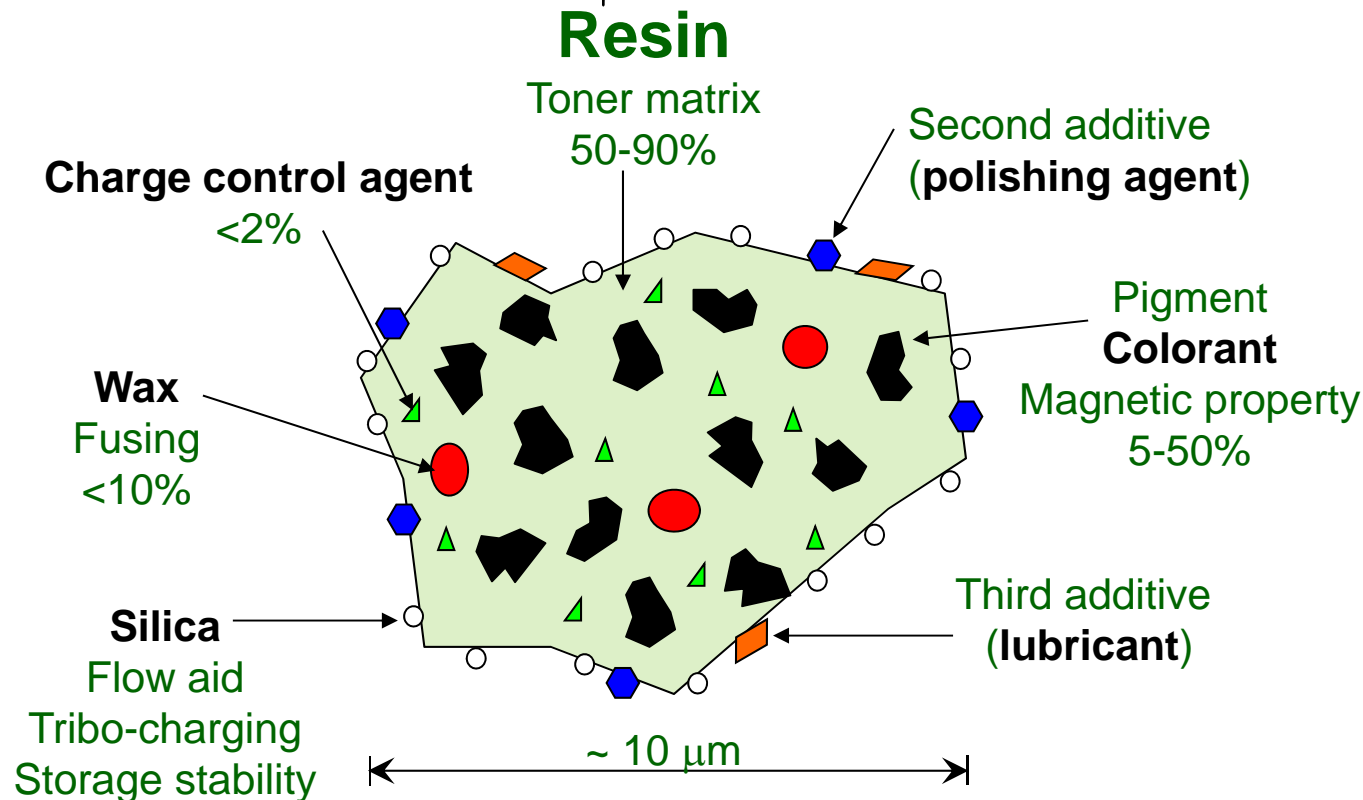
- 1 kg of BioBlack™ toner contains 513 g of plastic / organic material
- Biobased content of 34% (ASTM D6866)
- All plastic / organic materials used in BioBlack™ toner have the same weight % of carbon
- 3.5 liter of naphtha (a distillation product from petroleum) is needed to make 1 kg of plastic / organic material (Wada, Uchida, *Journal of Advanced Science*, 19, 65 (2007) )
- The amount of petroleum used to grow, harvest, transport and process corn, soy, or other plants into 1 kg of bio-based resin, and the amount of petroleum used to drill, extract, transport, and process petroleum into 3.5 liter of naphtha are the same
- Saving 1 liter of naphtha is equivalent to saving 1 liter of petroleum
- It takes the same amount of energy to produce 1 kg of bio-based toner and 1 kg of petroleum-based toner from their respective toner raw materials

## Key Assumptions: CO<sub>2</sub> Savings

- Biobased content of 34% (ASTM D6866)
- Total carbon content of 37% (ISO 10694)
- The amount of carbon fixation in leaves and stems that are not used for bio-based resin production is not taken into account - this assumption would lead to an underestimation of the reduction of CO<sub>2</sub>
- The amount of CO<sub>2</sub> generated while growing, harvesting, transporting and processing corn, soy, or other plants into 1 kg of bio-based resin, and the amount of CO<sub>2</sub> generated while drilling, extracting, transporting, and processing petroleum into 1 kg of petroleum-based resin are the same
- The same amount of CO<sub>2</sub> is generated while producing 1 kg of bio-based toner and 1 kg of petroleum-based toner from their respective toner raw materials



Resin can consist of up to 70% of crude oil. With BioBlack up to 34% of the crude oil can be substituted by bio based materials.



## Conventional Toner

Mixing of  
Raw Materials

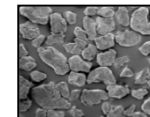
Extrusion  
(melting together)

Cooling

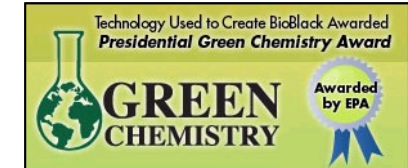
Crushing  
(e.g. jet- or  
Hammer mills)

Classification

Additive  
Blending



- Bio based product, which consists to a certain degree of renewable raw materials.
- **BIOBLACK™** is made using various agriculturally derived materials, which may include corn, cottonseed and soy.
- Mitsubishi Kagaku Imaging manufactures **BIOBLACK™** Toner in Virginia.
- The manufacturing and raw material costs for **BIOBLACK™** are much higher than those for conventional toner.





- **BIOBLACK™** Toner are LGA tested for contaminants.



Toner BioBlack™ UT19H1 Certification No. B 10-037-A

- **BIOBLACK™** is the first officially bio based certified toner in the world (UT19H1 and UT19H2).



Toner BioBlack™ UT19H2 Certification No. B 10-052-A



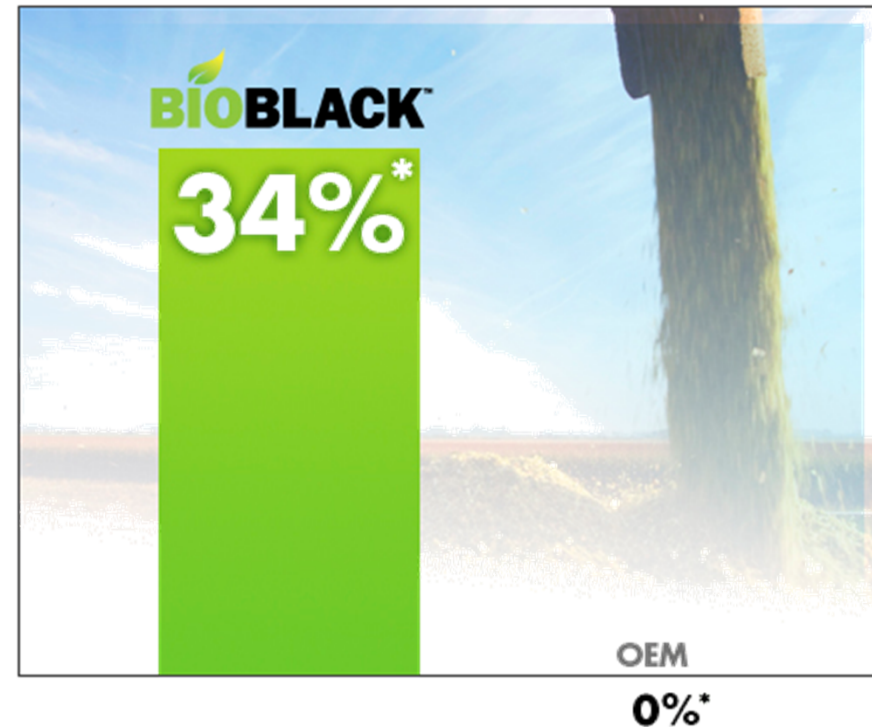
## more bio-based resin than any current competitor



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- The Toner is made using a bio-based resin with a proprietary patent-pending toner formulation.
- Toner made in the USA.
- The Toner should be in an ecological competition with the OEM and not with conventional aftermarket cartridges.
- The Toner should be part of a Complete Recycling Solution.
- „Biotoner“ from the world wide leader.

### BIOBASED CONTENT



\* While the ASTM-D6866 method cites a precision of +/-3%, these results indicate that the amount of bio-derived carbon in BioBlack™ toner is far greater than a competitive toner (and infinitely greater than the OEM) for the same amount of carbon in toner.

\*\* The ASTM-D6866 method is similar to the radiocarbon dating method, which measures the amount of carbon-14, which exists in bio-based materials, but is non-existent in fossil-based materials such as petroleum.



# What bio-based Toners are in the pipeline?



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- **Available:**
  - UT19H1: >30 % bio based resin for use in HP1010
  - UT19H2: >30 % bio based resin for use in HP 4000/4100
  - UT19H3: >20 % bio based resin for use in HP 4200/4300.
- **soon:**
  - LGA test reports for all new UT19Hx Toner (already available for UT19H1 and UT19H2).
  - “okbiobased” Certification for all new UT19Hx Toner (already done for UT19H1 and UT19H2).
- **Q4 2011:**
  - UT19H4: for use in HP 1160, 1320, 2400er series, P2015, P3005
  - UT19H64: for use in Lexmark T630 and T640 series
- **Q2/2012:**
  - UT19HFx: For Kyocera Engines

**Remanufactured toner cartridges using BioBlack™ are available from reputable manufacturers.**



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**Thank you**

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