VÉGÉTAL®
BIOTEC

AGROCHIMIE

- Concentrated fluid for cleaning tars
- Free from Volatile organic compound
- Anti-adhesive
- Odourless
- Made from new generation plant esters
- Fully biodegradable

BIO 3010

PERFORMANCES

Equivalent tar removal speed

We compared the dissolution speed of standard tar in BIO 3010, fuel oil and methyl rape ester.

Trial description

- Place about 50mg of 70/100 tar on a 3-bladed turbine
- Rotate the turbine at 400 rpm in the cleaner (100 ml) at 23°C.
- Measure the time taken for all the tar to disappear from the turbine's 3 blades;

Results (average of 10 tests)	
Fioul oil:	**9 min 45**
Methyl rape ester :	**10 min 30**
Bio 3010 :	**10 min 50**

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HYGIENE, SAFETY, ENVIRONMENT & ERGONOMY

Hygiene

Le Fioul is classified as a category 3 carcinogen. It exposes users to the risk of developing skin and broncho-pulmonary cancers. Users can inhale large amounts of its vapours: Fuel oil starts boiling at 150°C and is used in contact with tars at an average temperature of 160°C.

Methyl rape esters are highly unsaturated compounds (iodine index > 100) which means they are very sensitive to oxidation. This oxidation occurs inexorably when they make contact with the air but it is greatly increased by contact with very hot surfaces. Methyl rape esters release, under these conditions, i.e. when in contact with hot tars at 160°C, peroxides that break down into aldehydes and acrylates that are toxic and potentially carcinogenic.

The new plant based BIO 3010 does not contain unsaturated compounds (iodine index = 7.4). Thanks to its high resistance to oxidation it is not subject to any dangerous decomposition. The anisidine index measures the amount of degradation products (aldehydes). It is very low (1.8) for BIO 3010 whilst for methyl rape esters it is greater than 6.0 (high degradation). The RANCIMAT test is even more explicit of the resistance to degradation by air and heat: BIO 3010 resists for over 5.8 hours whilst methyl rape esters are degraded in less than 30 minutes.

Safety

The special temperature conditions associated with laying and making tar macadam require vigilance when using **fuel oil** where the flash point can be as low as 55°C. There is a risk of forming an explosive atmosphere (ATEX) when it is in contact with heat sources at 160°C.

The new plant based BIO 3010 in common with **methyl rape esters**, have an undeniable advantage over Fuel oil in respect of ATEX risks. BIO 3010 is neither inflammable nor explosive even under the temperature conditions used for working with tars (160°C).

Environment

Le Fioul is only slightly biodegradable (< 40% at 28 days). It contains bioaccumulable polyaromatic hydrocarbons (PAH) that migrate and persist in animal fats and contaminate the whole of the food chain. It diffuses very easily in the ground and contaminates the water table. This results in it being classified as environmentally toxic. Fuel oil releases volatile organic compound (VOC) especially when used in contact with hot tars.

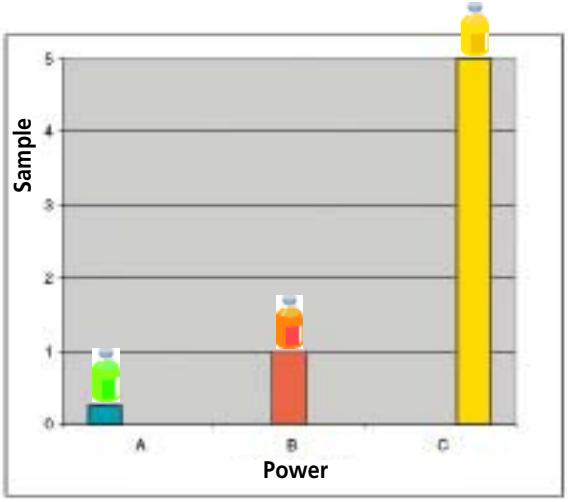
BIO 3010 is not a danger for the environment. It is easily fully biodegraded and does not contaminate the food chain (not bioaccumulable). BIO 3010 does not contain any volatile organic compounds (VOC).

Ergonomy

BIO 3010 has a very slight odour and is much more comfortable to use than methyl rape ester or fuel oil where the residual effect and strength are particularly high. VEGETAL BIOTEC AGROCHIMIE has used a nose to define the olfactive characteristics for these 3 tar removal fluids. They were smelled by a panel in the following order BIO 3010, Methyl rape ester, Domestic fuel Olfactive description for :

A • **BIO 3010** : Milky, fat, cereals humid, very weak
B • **Methyl rap ester** : Cereals, light, slightly green, oily, seeds, wheat, walnut, linen, not very strong
C • **Domestic fioul** : Hydrocarbons, fat, petrol, very dominant, very powerful.

Classification by the intensities produced



COMPATIBILITY paintwork

We have compared the effect of the most widely used vegetable oil ester (methyl ester of rape fuel oil - domestic fuel oil) and the new plant based BIO 3010 on finisher paintwork (binary polyurethane paint PU 701 + hardener L900 from MONOPOL SA).

Domestic fuel oil
Compatibility paintwork
25/09/07

Methyl rape ester
Compatibility paintwork
25/09/07

New plant based BIO 3010
Compatibility paintwork pintura
25/09/07

Trial description

Metal samples were covered with paint (dry film thickness about 100 microns) then polymerised for 10days before being immersed in the tar removal fluid for 7 days and a constant temperature of 40°C.

Results

Fioul oil
After immersion in fuel oil we saw neither swelling nor blistering of the paint.

Methyl rape ester
Swelling of the paint occurred accompanied with blistering indicating the start of stripping. The commercially available tar removal products are all based on methyl esters. They are used on all surfaces, whether or not they are painted. As they are not volatile, they stay in permanent contact with paintwork and progressively destroy it.

New plant based BIO 3010
The new plant base developed specifically by VEGETAL BIOTEC AGROCHIMIE which is the main ingredient in BIO 3010 does not cause any swelling or blistering of paintwork in trials.

Conclusion

Methyl esters of rape which are widely used in products of plant origin may provide significant progress in the fields of hygiene, safety and environment but they are also the cause of numerous cases of damage to paintwork as the studies described above demonstrate on a polyurethane coating reputed to be resistant and insensitive to external agents.

Domestic fuel oil
Compatibility paintwork
25/09/07

Methyl rape ester
Compatibility paintwork
25/09/07

New plant based BIO 3010
Compatibility paintwork pintura
25/09/07

COMPATIBILITY plastic materials

Domestic fuel oil
Compatibility
plastic materials
25/09/07

Methyl rape ester
Compatibility
plastic materials

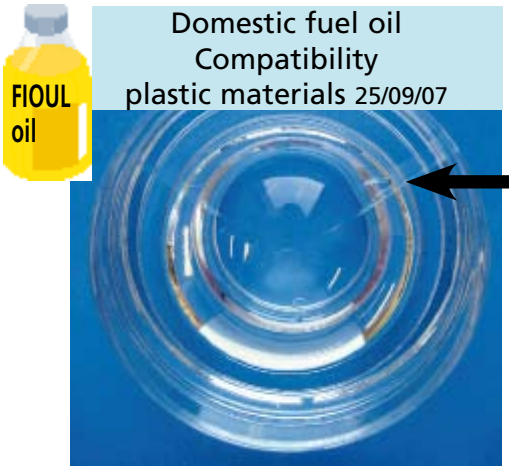
New plant based
BIO 3010
Compatibility
plastic materials 25/09/07

Trial description

Plastic (PMMA) samples used to manufacture worksite machinery lights and indicators were immersed in the tar removal fluid kept at 40°C to intentionally accelerate any degradation. The trial conditions are deliberately made more severe than real conditions.

Results

The condition of the plastic samples was evaluated after 5 days.



Fioul oil

The first crack is seen **after 5 days of immersion.**

Methyl rape ester

The samples have literally melted
after only 1 hour of immersion.

New plant based BIO 3010

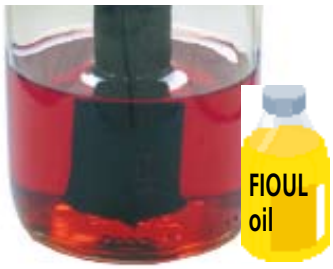
Even after 5 days of immersion
the samples are still intact.

Conclusion

It is now recognised that standard methyl esters of vegetable oils are generally the cause of damage to the optics of lights or indicators found on this machinery. Whilst this type of problem has never been seen when using fuel oil, the trial conditions in the above trial were very severe and using BIO 3010 provides extra insurance.

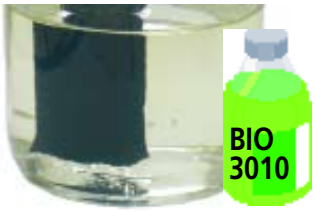
COMPATIBILITY rubbers and elastomers

Domestic fuel oil
Flexible compatibility
26/09/07



Methyl rape ester
Flexible compatibility
26/09/07

New plant based
BIO 3010
Flexible compatibility
26/09/07



Trial description

Samples were made using pieces of hydraulic hose (Berflex SAE 100 - R2AT - diam: 3/8") and they were immersed for 7 days in tar removal fluid at 40°C.

Results

Fuel oil
Swelling = 4.3%
Elasticity is not changed (no softening or hardening).

Methyl rape ester
Swelling = 14.1%
The elasticity is greatly changed visually (much softer rubber).

New plant based BIO 3010
Swelling = 1.0%
Elasticity is not changed (no softening or hardening).

Conclusion

The compatibility trial with synthetic rubber shows that BIO 3010 is completely neutral and even much better than fuel oil. Standard methyl plant esters result in an especially fast degradation of hoses

Damage observed after using a standard tar removal product based on methyl rape ester.

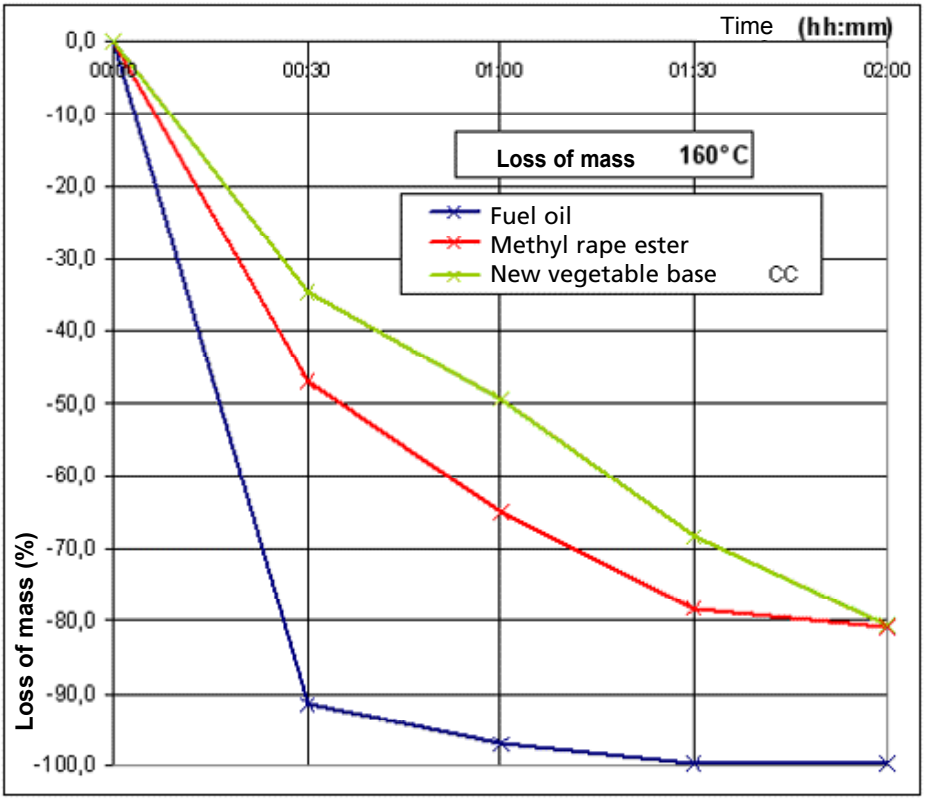
Tar removal or non-stick, increased effectiveness when hot !

We have observed and measured the behaviour of methyl rape ester when hot, fuel oil and the new plant base of BIO 3010 in order to evaluate their heat tolerance when used as tar removers or non-stick agents. The trials were done at 160°C, the normal working temperature for tar macadam when laying it

Trial description

- Place about 1 g of tar in a metal cup
- Monitor weight loss in an incubator at 160° for 2 hours

Results



Conclusion

We saw that the loss of weight of the fuel oil was very fast and almost immediate. We conclude from this that the quantity that has to be used to obtain a result must be much greater.
The loss of weight for methyl rape esters is much slower and ensures that a smaller quantity is used but also demonstrates less volatility that significantly reduces vapour emissions and thereby considerably improves hygiene conditions.
The new VEGETAL BIOTEC AGROCHIMIE plant base used in BIO 3010 improves working conditions even more.

PHYSICAL-CHEMICAL CHARACTERISTICS

CHARACTERISTIC	VALUES	UNITS
Appearance	Fluid	
Colour*		
Odour	Very slight	
Density at 25°C	860	Kg/m3
Flash point Closed vessel	> 185	°C
Spontaneous combustion point	> 300	°C
Freezing point	< -18.5	°C
Minimum storage temperature	-10	°C
Lower explosibility limit	Non explosive	% (v/v)
Upper explosibility limit	Non explosive	% (v/v)
Vapour pressure	<0.01	kPa at 20°C
	<0.01	kPa at 50°C
Iodine index	7.4	gl2/100g
Peroxide index	9.39	meq 02/kg
Anisidine index	1.8	-
Accelerated oxibility test (RANCIMAT test)		
- Flow rate	20	l/h
- Temperature	100	°C
- Time	5.8	h
VOC (volatile organic compound) content	0	% (w/w)
Solvent content	0	% (w/w)
Hydrocarbon content	0	% (w/w)
Aromatic content	0	% (w/w)
Benzene content	0	ppm
Chlorine content	0	ppm
Fluorine content	0	ppm
Bromine content	0	ppm
Iodine content	0	ppm
Sulphur content	0	ppm

*This product is made of esters of natural vegetable oil whose origins can not specify a constant color. This may vary according to place of production and weather conditions before harvest. A difference of even extremely large color does not affect the product performance.

METHOD OF USE

In the event of an accidental spill on a surface that has just been laid, because the primary function of the product is to eliminate tars, it should be immediately rinsed with copious amounts of water.

PRECAUTIONS DURING USE

Do not spread large quantities of the product
Do not use a can to spread the product. Only use with a sprayer or there is a risk of overdosing.
Do not spray over tar macadam *(especially when spraying on tools, shoes...)*
Do not dilute the product
Do not use in compacters *(risk of marking tar macadam)*
Do not mix the product with other liquids such as fuel oil
Do not use any solvent or fuel oil
Do not spray when the finisher is loaded
Do not apply to the finisher's skids
Do not split

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AGROCHIMIE

Staying ahead of the future

Site certification :

ISO 9001 VERSION 2000 (1993)
OHSAS 18001 VERSION 1999 (2005)
ISO 14001 VERSION 2004 (2006)
Integrated Management System (2007)
Compliant with ISO 14040 - Life Cycle Assessment

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