



Stabilization of greenhouses films under severe treatment with pesticides:

Trends and new products

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Kafrit Group in a Glance

KafritGroup

Global Player with **32** Production lines, **90,000 MT** Capacity and **460** Employees. Sales 2019: **EUR250** Million



Vancouver, Canada



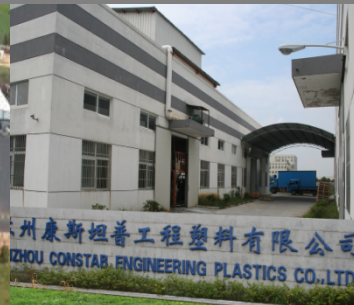
Rüthen, Germany



Kfar Aza, Israel



Suzhou, China



Polyfil, USA



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Mega trends affecting the market: Grow More With Less

- Global population is expected to exceed 9 billion people in 2050.
- Food production needs to increase by 60%
- Water scarcity
 - Water use growing double the rate of population increase
 - Over 40% of people will be affected by water scarcity in 2050
 - Agriculture accounts for 70% of all fresh water consumption (95% in some developing countries!)
- Soil/land
 - Shrinking arable land
 - 1/3 of soil is degraded (erosion, nutrient depletion, acidification, salinization, pollution)

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Market needs and trends

- Longer lasting films
- Maintaining all functional properties of the film (mechanical, optical, hydrophilicity, etc.)
- Energy saving & improved productivity (thermal screens, double cladding, “cooling” films)
- New fumigants. Soil disinfection with chloropicrin. TIF fumigation barrier films should withstand high amount of Cl
- High chemicals stability: Constant growth in Agrochemical usage up to **5,000** ppm Sulfur, **200** ppm Cl, **150** ppm Fe.
Sulfur - “environmentally friendly”
allowed in organic farming
and integrated pest management (IPM)



Kafrit R&D Methodology

- Scientific analysis
 - Wide data base
 - All new formulas are tested in our Lab (accelerated (Xenon Arc, QUV) & outdoor weathering)
 - Since 2009 cooperation with Government experimental farm with full agronomic support for new formulations development
 - Own Field trials & with leading additive suppliers
 - Commercial trials with customers around the globe
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Kafrit NEW products:

Chemical's resistant: S and Cl.

UVA 00701 LD

UVA 07160 LD

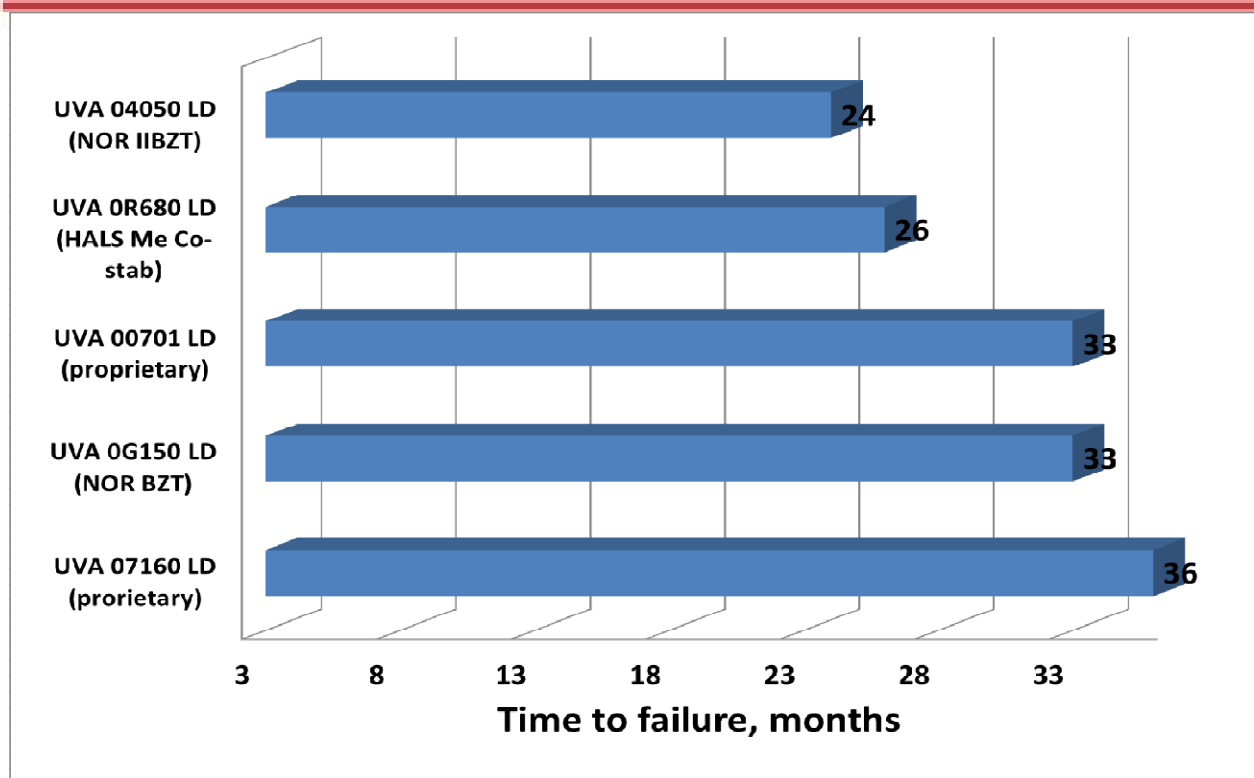
EXP (1990/60) & EXP (1930/60)



Performance of different UVA MBs under sulfur treatment

Extensive field trials

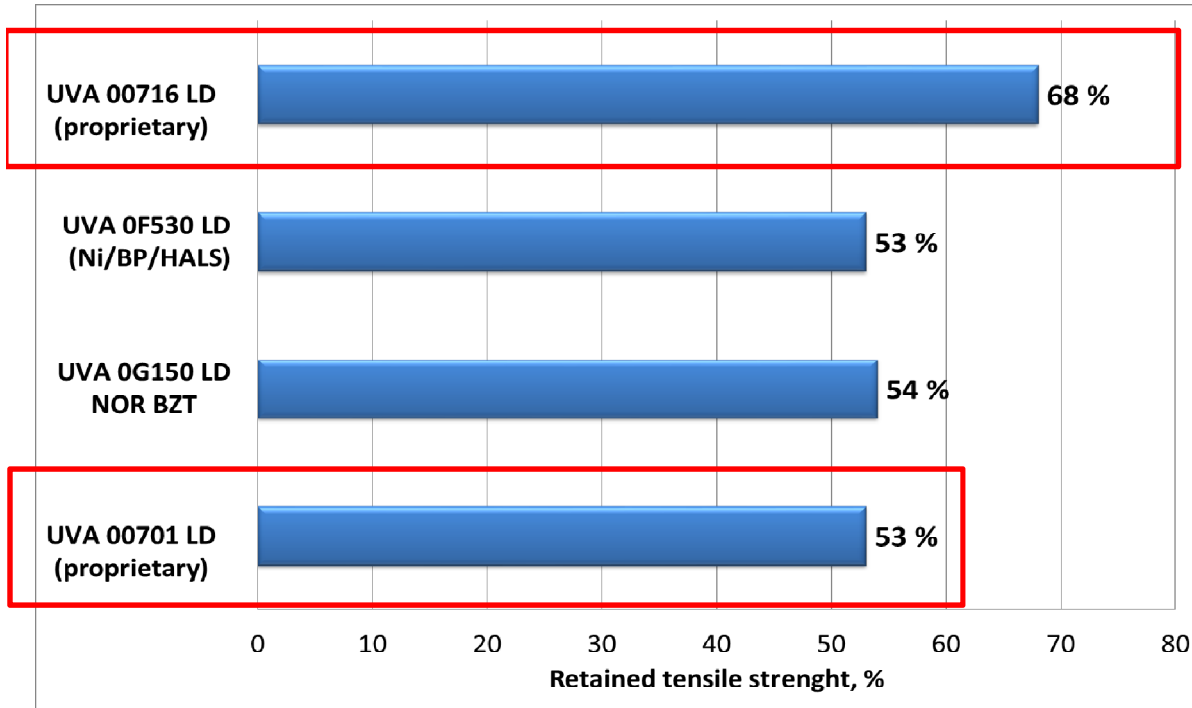
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- Walk in tunnels.
- Experimental farm
- 160 kLy/year
- PE/EVA 3 layers films, 180 μm
- Weekly Sulfur evaporation
- Excellent sulfur resistant of **UVA 00701 LD**, as standard NOR based solution (UVA 0G150 LD)
- Superior Sulfur resistance of **UVA 07160 LD**

3 years filed trials with roses and peppers growers. 180 μm , LD/EVA

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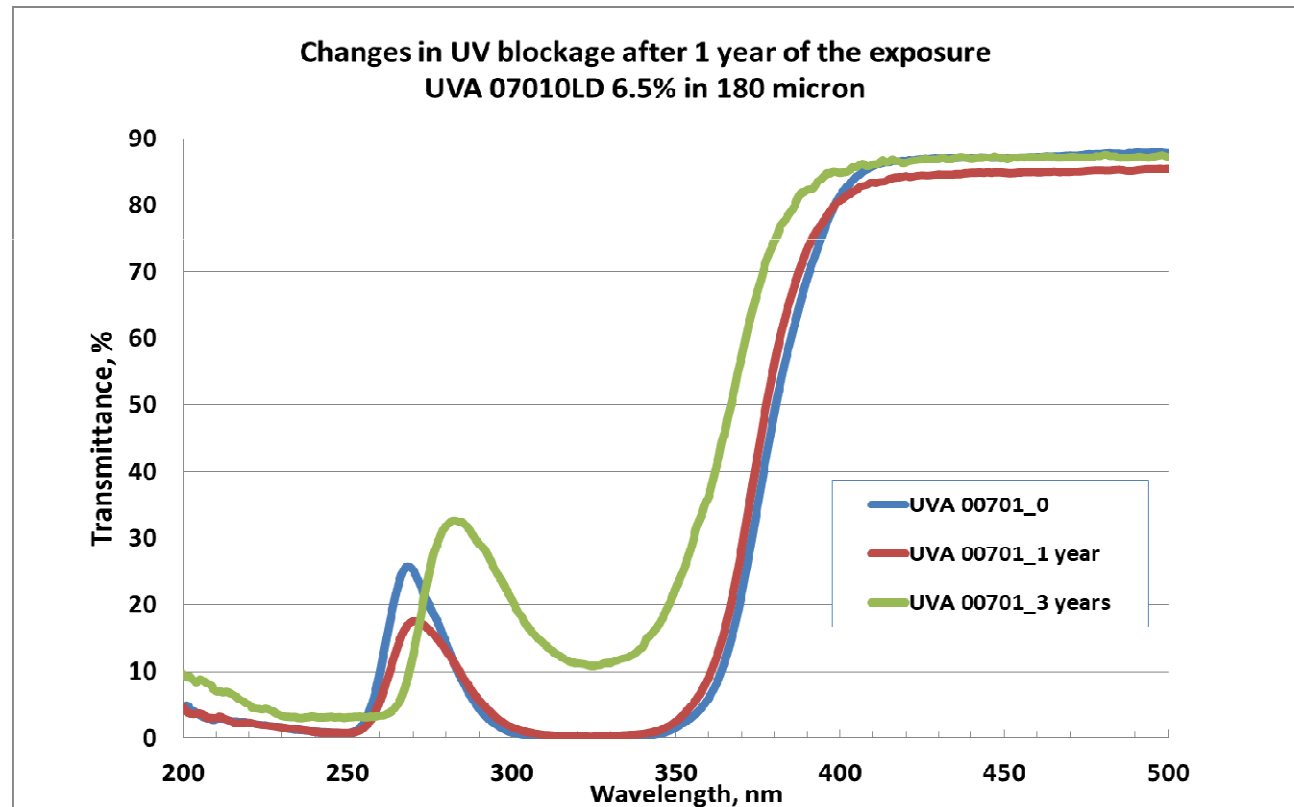


- Excellent sulfur resistant of **UVA 00701 LD**, as standard NOR based solution (UVA 0G150 LD)
- Superior performance of **UVA 07160 LD** compares to standard NOR and Ni based solutions. **70%** retained strength after **36 months** at the field. 2700 ppm S

Persistent UV absorption with UVA 00701 LD and UVA 07160 LD



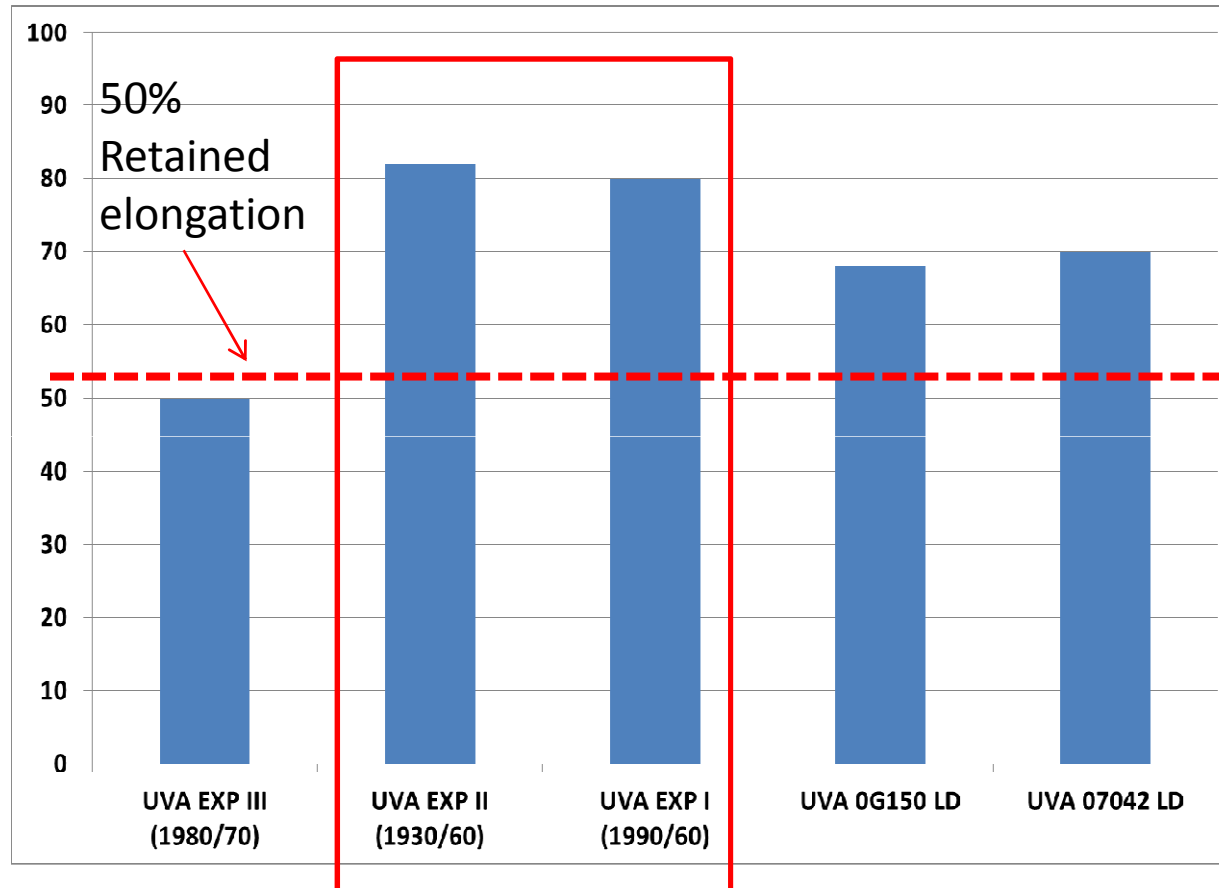
UVA 00701 LD keeps on ca. 70% UV blocking even after 3 years at the field.



140-160 kLy/year, 2700 ppm S.

Outdoor weathering with chemical treatment Chlorine based insecticide

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100 micron LD PE films
140 kLy/year
2 years outdoor
weathering
Monthly acetamiprid or
hypolchlorite spraying



- **UVA EXP I (1990/60) and EXP II (1930/60)** significantly outperforms standard solutions in Chlorine environment. (more than 500 ppm of Cl)
- Samples are available for trials with customers.

Kafrit NEW products:

UVA MBs with no influence on pollination & color development

UVA 07920 LD



UV stabilizers' MB with Partial UV absorption and "UV open" **Kafrit**

- Plants that need UV light for color development (eggplants, red salad, nectarines, flowering pot plants).

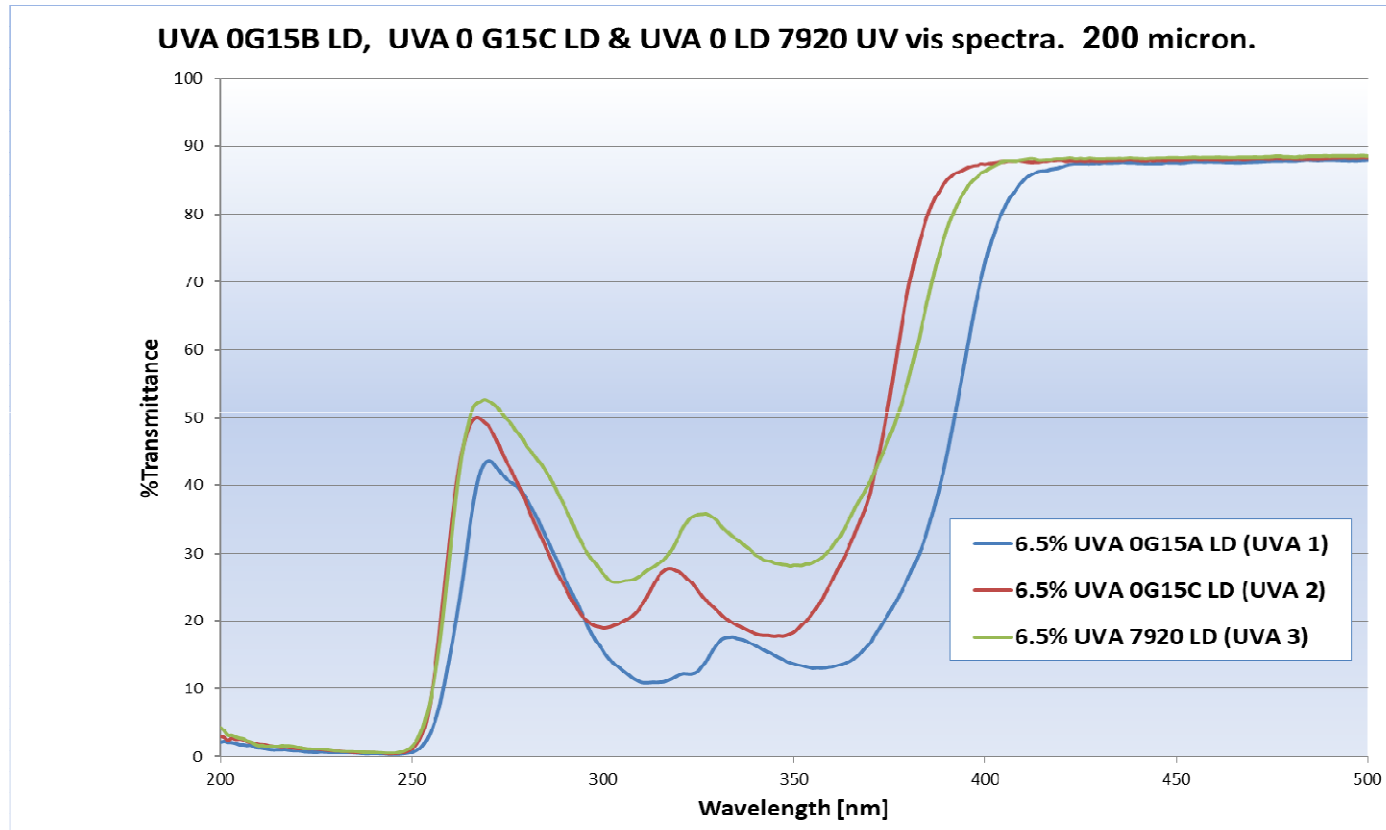


- Greenhouses where pollination by bumblebees or honeybees is used
- Integrated Pest Management



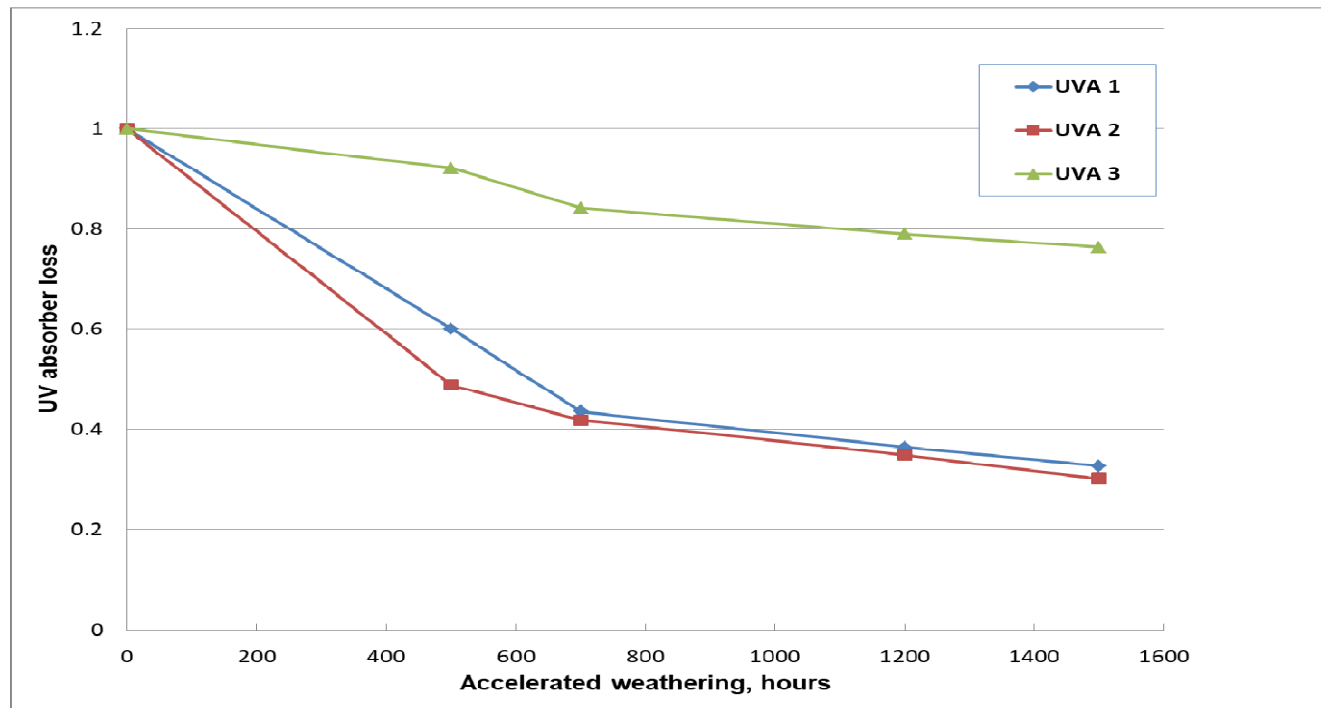
UV vis transmittance spectrum, 200 micron **KafritGroup**

6.5% UV MB. Transmittance between 300nm to 380nm



	%T 300-380 nm
UVA 0G15B LD	17%
UVA 0G15C LD	21 %
UVA 07920 LD	32%

QUVA exposure: UV absorber loss rate, after 1500 hours



- **UVA 07920 LD (UVA 3)** permit high transmission in UVA region (more than 30% in 200 micron at 6% dosing)
- **UVA 07920 LD (UVA 3)** has excellent photo-stability (less 15% after ca.1500 hours at QUV)
- **UVA 3** is not listed as potential candidate in SVHC list (as vPvB), therefore safety to use. **No regulatory restrictions.**

Chemicals resistant UV MBs by Kafrit

Product	Chemicals resistance	Features	
UVA 0J810 LD	Up to 1500 ppm	Blocks UV at high concentration and thickness	
UVA 00K050 LD	Up to 2000 ppm	Blocks UV at high concentration and thickness	
UVA 00U970 LD	Up to 2000 ppm		
UVA 00021 LD	Up to 2000 ppm	Partially UV blocking at high concentration and thickness <i>"bee friendly"</i>	NEW
UVA 00G15C LD	Up to 3000 ppm	Blocks UV at high concentration and thickness	
UVA 00701 LD	Up to 3000 ppm		<i>Extended field trials since 2016</i>
UVA 07920 LD	Up to 3000 ppm	Partially UV blocking at high concentration and thickness <i>"bee friendly"</i>	<i>No possible regulations restrictions</i>
UVA 07160 LD	3000ppm ++		
UVA EXP I (1990/60) EXP II (1930/60)	Improved chlorine resistance	Experimental products	Samples available NEW

Come grow with us

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Thank you for your attention



Growing Success
with Kafrit Group
Masterbatches & Compounds

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