

Biodegradable Plastics

These days, being able to come up with effective solutions quickly and easily is a key success factor for a company. Standardized processes and systems play a major role in this respect and are therefore frequently adopted. In the course of our current rapid expansion, we at Sukano are also addressing these issues.

However, it is not possible to define a uniform standard as a general rule to be applied to all our customers. We prefer to apply the exception rather

needs to be economically viable. This is where we see our task and consequently gear “our standard” – that is, drawing up creative solutions – towards this objective. Thus Sukano’s participation at the K Trade Fair in Dusseldorf was characterized by our new guiding principle, “Creative Solutions”.

Thanks to the individual-oriented nature of our customer service, we are continually able to successfully launch new products on the market



than the rule and measure ourselves by its creative implementation in our endeavors to meet our customers’ individual requirements. Naturally, this procedure also needs some kind of framework, for besides functioning efficiently, every solution also

after only a short development time. One example of this is the SUKANO masterbatches for biodegradable plastics, which are now commercially available all over the world. This issue of NewsLetter is specially devoted to this topic.

Contents

- *Poly lactide Acid PLA*
• *Why PLA?*

Page 2+3
- *Properties of PLA*

Page 3
- *SUKANO Product focus PLA*

Page 4
- *Review K Trade Fair*
• *Sukano Polymers USA*

Page 5
- *Sukano Business Partners*
• *Events*

Page 6

In addition to developing new and improved products and services, Sukano is continuing its expansion measures in North America and Asia. The new production plant in South Carolina commenced operations last fall and serves the US market. In Asia, new customer relations were developed in the course of last year. Here, too, Sukano is pursuing its pragmatic approach of doing things step by step.

We wish you and your family an enjoyable summer.

*Thomas Weigl/Managing Director
Sukano Products Ltd*

Polymers from Renewable Resources – Polylactide Acid (PLA)

Polylactide acid is a polymer derived from lactide acid. This means that it can be fabricated using renewable resources and is also biodegradable.



Polylactide acid has long since been used in the field of medicine in the manufacture of surgical sutures.

However, in particular the high cost of the material has prevented it from being used in other spheres. But now latest technological advances have given rise to polylactide acids that are commercially viable and can compete with petrochemical plastics. These polymers are increasingly being used in the manufacture of food packaging. The application areas for PLA are agricultural films, degradable rubbish bags, packaging for hygiene articles, thermoformed trays for fruit and vegetables, cold drink cups and toys. Other articles, such as CDs, telephone packaging, PC and Walkman casings, and overhead transparencies and document folders are shortly to be launched on

the market. The starting material for PLA is lactide acid, which is derived from corn by means of biochemical processes. The lactide acid is then polymerized into polylactide acid (PLA). PLA has a glass transition temperature of between 55 and 65° C and a density of 1.25 g/cm³, and is only slightly less transparent than polystyrol or PET. Apart from the fact that PLA is compostable and can be manufactured from renewable raw materials, it is also excellent for printing on, is highly transparent and has a low density. Moreover, it has great tensile strength, which means that the thickness can be reduced, thus minimizing both weight and cost.

Why PLA?

1. Renewable

Conventional plastics are made from petroleum, whereas PLA is derived from cornstarch. Thus the use of the inexhaustible energy source, sunlight, preserves the global resources.

2. CO₂-neutral

The same amount of carbon dioxide (CO₂) that is given off when PLA is incinerated or decomposed is absorbed from the atmosphere by the raw product corn. Therefore, PLA does not result in an increase of CO₂ and does not contribute to greenhouse gas emissions.

3. Biodegradable

In damp soil or on the compost heap, PLA is decomposed by microorganisms, without leaving any residue or giving rise to toxic byproducts. Thus pollution caused by packaging material that is deposited in the environment is also significantly reduced.

4. Competitive

Thanks to PLA, the tremendous ecological advantages offered by biodegradable plastics are now available at a competitive price.

PLA is biodegraded in an initial step by means of hydrolytic decomposition, whereby the polymer is degraded into monomers. These are then decomposed biologically by microorganisms. The decomposition process greatly depends on the environmental conditions. In commercial composting facilities, complete decomposition can be achieved within between 30 and 50 days.

Poly lactide acid has enormous potential and can contribute greatly towards such issues as sustainability and the protection of the climate and



natural resources. We can therefore assume that we shall increasingly be seeing PLA in the shops and supermarkets in the near future.



Christian Schanzer

Quality Manager, Certified Chemist FH,
Sukano AG

Properties of PLA

Sukano has developed the masterbatch, **SUKANO PLA dc S511**, which eliminates the following disadvantages:

PLA exhibits many properties that are comparable to PET and polystyrol. Besides its ecological advantages, PLA offers a viable alternative to many packaging applications. While

a number of first-class applications have already been implemented, PLA does have some disadvantages that must be taken into account when processing this material. Although not immediately visible, PLA has a marked yellow coloring and a slight milky. During the manufacture of films, PLA has a

strong tendency to adhere to the rollers, and its brittleness means that cutting and punching are also critical factors.



Willy Frei

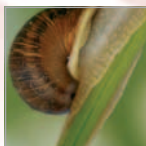
Head of R&D, Certified Chemist FH,
Sukano AG

Technical advantages of PLA

- **High transparency**
Haze of 2.1%
- **Twist effect**
Approx. 25% better than that of Cellophane
- **Flavor and odor barriers**
Excellent resistance vis-à-vis most of the oils and fats found in foodstuffs
- **Heat sealability**
*Processing temperature: 80° C
Heat seal strength: > 0.13 bar*
- **Good printability**
Numerous ink blends are ideally suited for printing on PLA
- **Stiffness**
Enables the production of hard packaging and injection-blow molded products
- **Crease resistance**
Same as with Cellophane, but approx. 20% better than all other films currently on the market

creative
SOLUTIONS

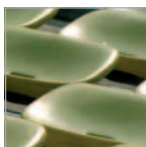
SUKANO® Portfolio



SUKANO® Slip/Antiblock Masterbatches
reduce the coefficient of friction of PET, PETG, PLA of extruded films, cut sheets, heavy gauge sheets, thermoformed and oriented films.



SUKANO® Matting Agents
create a rough surface during the extrusion as well as a very good contact transparency without the need for special matting rolls.



SUKANO® Mold Release and Processing Aid
enable an improved filling and demolding of injection molded parts made from PET, PETG, PCTG, PC.



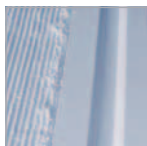
SUKANO® UV Inhibitors/Absorbers
protect light-sensitive, pre-packed products, as well as polymers that are exposed to sunlight.



SUKANO® Antistatic Masterbatches
prevent the static loading of extruded films, heavy gauge sheets and injection molded parts.



SUKANO® Color Masterbatches
encompass a wide variety of transparent and opaque colors. The colors are optimized for use with PET, PETG, PCTG, PC and PLA.



SUKANO® White Masterbatches
comply with the highest quality requirements in terms of purity, dispersing power, opacity and printability when used with films, cut sheets, blow molded bottles and biaxially oriented films.



SUKANO® Nucleating Masterbatches
allow controlled crystallization, thus achieving shorter cycle times, as well as improved mechanical, thermal and optical properties for PET or PP.



SUKANO® Impact Modifiers
offer an optimal combination of toughness and stiffness for plastics with high-impact applications and molded parts with complex, sharp edges.



SUKANO® Flame Retardants
are PET-based, halogen-free masterbatches or compounds that comply with international fire protection standards.



For detailed information:
www.sukano.com/produkte_en.php

SUKANO® PLA Masterbatches



1 Slip/Antiblock

PLA dc S511

- excellent slip/antiblock properties for the extrusion of films
- qualified for thermoforming applications
- no sticking at the rolls during the processing
- adjusting the yellowish color of PLA
- can be used as clarifier
- improving the impact strength

PLA dc S511-Natural

- same as PLA dc S511 but with natural yellowish color

2 Colors/Optical Brighteners

PLA cc S513

- highly loaded white masterbatch

PLA cc S514

- black colored masterbatch

PLA ob S515-N

- slightly bluish brightened masterbatch, provides a neutral color tone

PLA ob S515-BL

- results in visible brightened, obvious bluish colored product

3 Nucleating Agent

PLA na S516

- for an enhanced thermal stability

creative SOLUTIONS

“Creative Solutions” Sukano at the K Trade Fair



K 2004 in Dusseldorf was marked by a positive upswing in the economy. The optimism arising from this economic recovery could be clearly felt among exhibitors and visitors alike and gave rise to an excellent ambience. At the fair, Sukano presented its brand new corporate look under the motto, “Creative Solutions”. The striking exhibition booth in the

new Hall 8 proved to be a popular meeting place. At the beginning of the fair, Sukano introduced its brand new company brochure and its updated website, both of which met with an enthusiastic response on the part of the visitors. The well-ordered booth offered plenty of space and a convivial ambience, with the result that some of the visitors returned several times.

One important factor was that the entire team was present throughout the fair. This enabled us to answer questions competently and also to react immediately to matters than required further action. Another highlight was the showcases displaying the market-specific end applications. By means of these exhibits, Sukano was able to convey the typical features of Sukano’s products in a clear and comprehensible manner.

Sukano’s objective of presenting itself as an internationally effective partner for compounds and masterbatches was well and truly achieved. Sukano would like to thank all its visitors and everyone involved for this success! The company’s participation in the next K Trade Fair in Dusseldorf from October 24-31, 2007 is already assured.



Marina Yousofi

Key Account Manager
marina.yousfi@sukano.com

Sukano Polymers USA

In 2003, Sukano decided to set up a subsidiary in the USA. The decisive factor that prompted the first “physical” expansion step in Sukano’s history was once again the requirements of our customers. Our goal of establishing a modern production plant with its own warehousing facility and a sales office with a technical customer service was pursued with great enthusiasm. Shortly afterwards, the new company, Sukano Polymers Corporation USA, was founded.

Parallel to these construction activities, during the second half of 2003, Jeffrey Best set about working the US

market and potential customers. With the support of the Swiss parent company, the new facility in Duncan, South Carolina, was completed in August 2004, and shortly afterwards the staff took up residence. The infrastructure was set up according to the same principle used in Switzerland. The machinery was designed in such a way that the same prerequisites for the manufacture of Sukano products could be guaranteed. Thus we have achieved our objective of being able to provide our US customers with the Sukano “product and service standard” on their home ground. Further activities

are planned in the near future that will continue to increase Sukano’s reputation as a flexible and reliable business partner for tailor-made solutions.



Jeffrey Best

Sukano Polymers Corporation USA
jeffrey.best@sukano.com



Sukano's New Business Partners

Since February 2005, Sukano has been working together with a new marketing partner, the firm Ultrapolymers in Turkey. Ultrapolymers is distinguished by its first-class technical customer service and its own warehousing facilities, and is renowned throughout the Turkish plastics industry as a reliable development partner.

In Asia, too, Sukano has succeeded in enlisting the services of new sales partners. The geographical, cultural and political circumstances in China and Taiwan require that this business

region is divided among 3 partners, YuFang, Jin Da and Jim Shin, in order that the individual customer requirements can be met. A further step planned for this year is the construction of an intermediate warehouse in China.

Since spring 2004, we have been successfully collaborating with the company Peter Holland in Benelux. This firm offers a top-quality customer service, and thanks to its many years of experience in the field of masterbatches and additives is a very valuable partner for Sukano.

Events

- **CHINAPLAS 2005**
Hall 1E, Booth E870
June 21 - 24, 2005
Guangzhou, China
- **Business Partner Meeting 2005**
International Sales & Marketing Meeting
August 31 - September 2, 2005
Vitznau, Switzerland
- **SPE Conference USA**
Thermoforming Conference & Exhibition, Booth 224
September 24 - 27, 2005
Milwaukee, Wisconsin, USA

Sukano Business Partners

NEW

Benelux

Peter Holland, Zwijndrecht

Northern China

YuFang Trading Co. Ltd., Shanghai

Southern China

Jin Da Trading Co. Ltd., Guangzhou

Taiwan

Jim Shin Trading Co. Ltd., Taipei

Turkey

Ultrapolymers, Istanbul

Australia

Multichem Pty Ltd., Melbourne

Austria, Southern Germany

ATI Industriegütervertretung, Salzburg

France

Tracym SAS, Paris

Greece

Abbatis – Liokis S.A., Athens

India

Jayvee Pvt Ltd., Mumbai

Israel

Sorpol 2000, Tel Aviv

Japan

Kanematsu KGK Corp., Tokyo

Middle East

Marji Technology Corp., New Zarka

New Zealand

Polychem Marketing Ltd., Auckland

Russia, Poland

Steslowicz, Basel

South Korea

Woorin Inter-Corporation, Seoul

Spain

Quimigranel S.A., Barcelona



Please find detailed information about our Business Partners and their contacts on our website:

www.sukano.com/unternehmen_businesspartner_en.php

Pictures: Courtesy of IBAW, BASF AG, Treofan GmbH, Huhtamaki and Nature Works™ LLC. We wish to thank the above mentioned companies for their support.

Sukano Products Ltd and its marketing affiliates shall not be responsible for the use of this information, or of any product, method, or apparatus mentioned, and you must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. No warranty is made of the merchantability or fitness of any product; and nothing herein waives any of the Seller's conditions of sale. SUKANO, is a registered trademark of Sukano Finance AG, Switzerland.