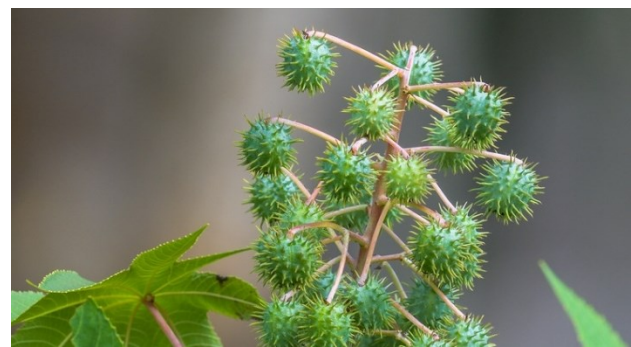


HOBUM.
Natürlich.Innovativ.

Von
Pflanzenölen zu
biobasierten
Bindemitteln

Elisabeth Moshake
Technisches Marketing

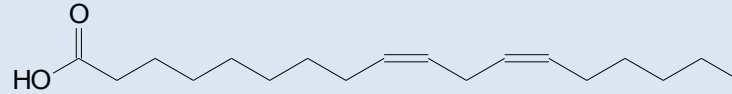




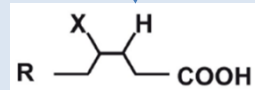
Vielfalt der wichtigsten Fette und Öle

| Pflanzenart | Eigen- schaften | gesättigte Fettsäuren | | | ungesättigte Fettsäuren | | |
|----------------|--------------------|-----------------------|-------------------------|------------------------|-------------------------|----------------------|--------------------------|
| | | | | | Monoenfettsäuren | Polyenfettsäuren | |
| | Iodzahl | C 8:0 - C 14:0 | Palmitinsäure C 16:0 | Stearinsäure C 18:0 | Ölsäure C 18:1 | Linolsäure C 18:2 | α-Linolensäure C 18:3 |
| Kokosfett | 8 | 70-81 | 7-10 | 2-4 | 5-10 | | |
| Palmöl | 50 | | 39-48 | 3-6 | 36-44 | 9-12 | |
| Olivenöl | 83 | | 7-20 | | 55-83 | 3-21 | |
| Rizinusöl | 84 | | | | 85-90 Ricinolsäure | 2-7 | |
| Rapsöl | 115 | | 2-7 | | 51-70 | 15-30 | 5-14 |
| Sojabohnenöl | 130 | | 8-14 | 2-6 | 17-30 | 48-59 | 4-12 |
| Sonnenblumenöl | 130 | | 5-8 | 2-7 | 14-40 | 48-74 | |
| Saflor Öl | 140 | | 2-6 | | 14-24 | 63-79 | <5 |
| Leinöl | 180 | | 4-6 | | 10-22 | 12-18 | 56-71 |

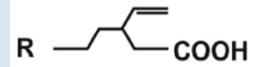
Modifizierung von Ölen und Fettsäuren



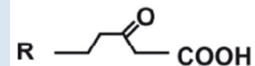
Funktionalisierung



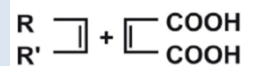
Oligomerisation



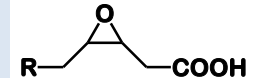
Oxidation



Metathesis



Epoxidierung



-COOR

Fettsäureester

-COCl

Fettsäurechlorid

-CONR₂

Fettsäureamid

-CH₂NR₂

Fettsäureamin

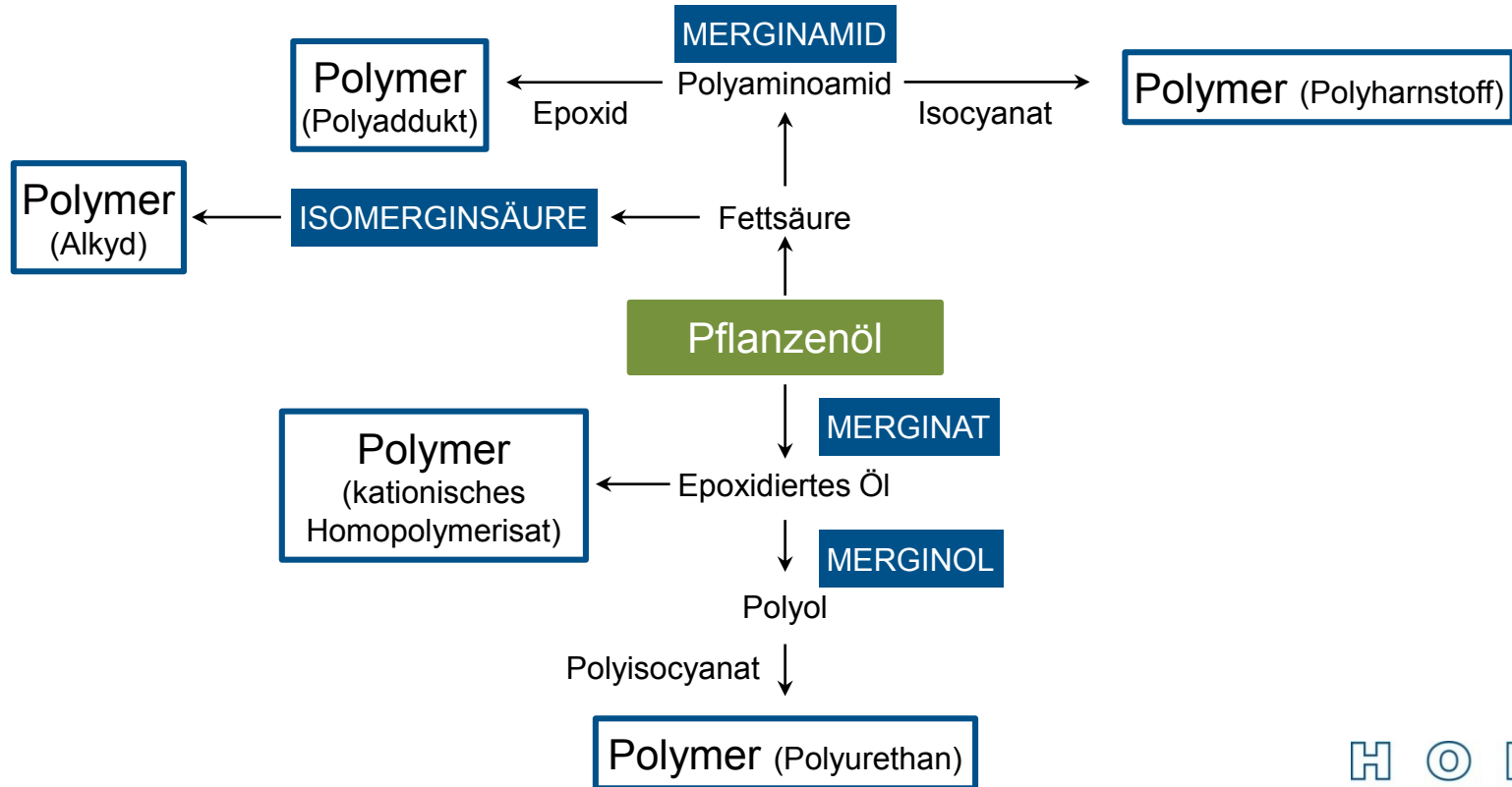
-COOM

Fettsäuresalz

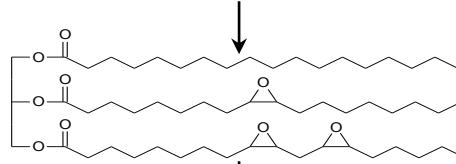
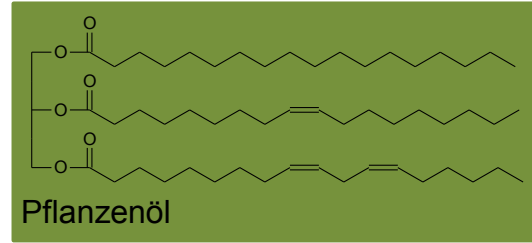
-CH₂OH

Fettsäurealkohol

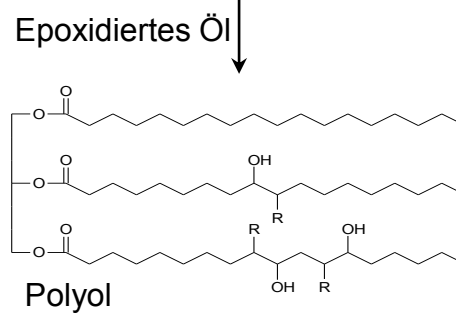
Polymere aus Pflanzenöl



Ringöffnung zu Polyolen



MERGINAT



MERGINOL

Polymer
(Polyurethan)

← + Polyisocyanat

→ + Fettsäure

Polymer
(Polyester)

Produktgruppen

- **MERGINAT**
Epoxidierte Pflanzenöle und Ester
- **MERGINAMID**
Epoxidharzhärter (Polyaminoamide)
- **MERGINOL**
Polyole auf Basis nachwachsender Rohstoffe
- **ISOMERGINSÄURE**
konjugierte - ungesättigte Fettsäuren
- **SPEZIALITÄTEN**
Reaktivverdünner, UV-härtende Öle



Kennzahlen

| | | |
|----------------------------------------------------------------------------------|-------------------|-------------------------------|
|  | Umsatz 2018: | EUR 21 Mio. |
|  | Absatz 2018: | 11.000 t davon ca. 40% Export |
|  | Mitarbeiter 2018: | 52 |
|  | Service Partner: | |



GOLDMANN



LAVOLLÉE
ALLIANCE LEL

VALPLAST



KORROSIONSSCHUTZ

BAUCHEMIE



BESCHICHTUNG



KLEBSTOFF



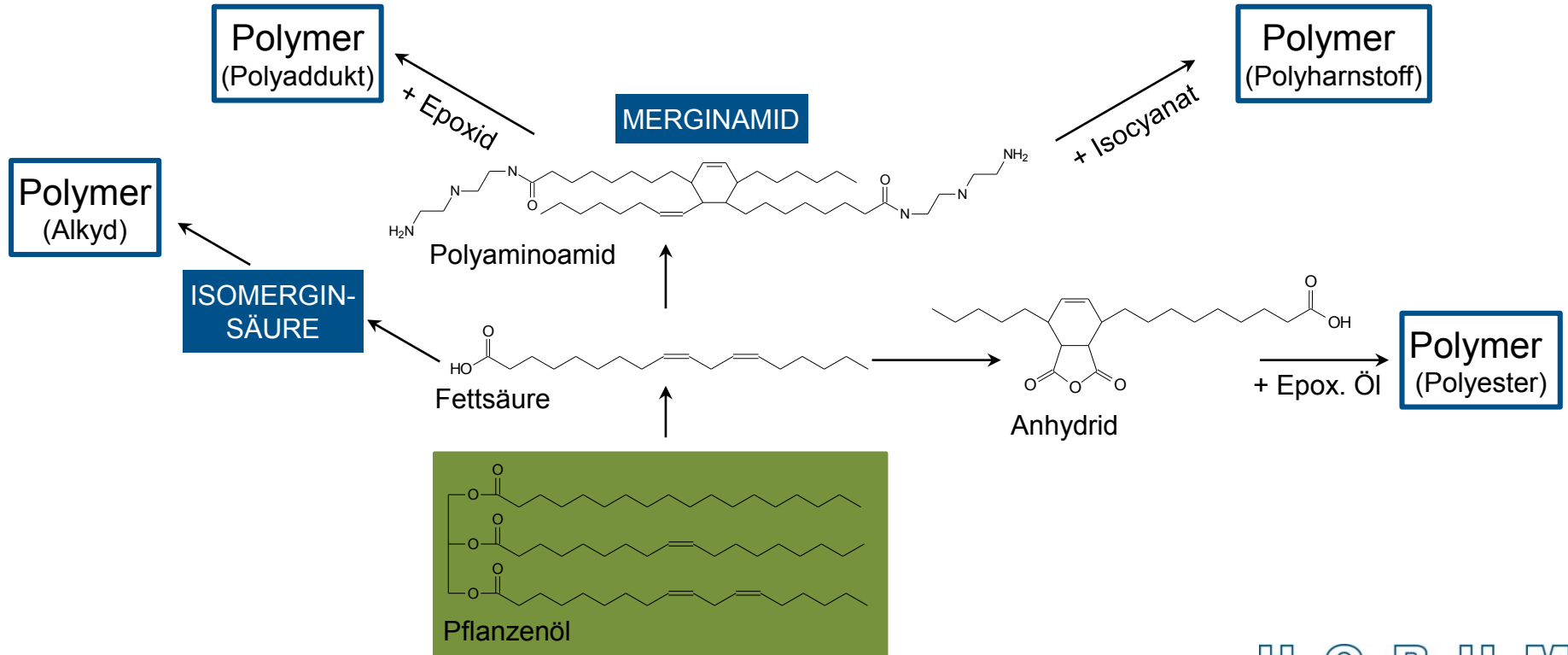
SCHAUM



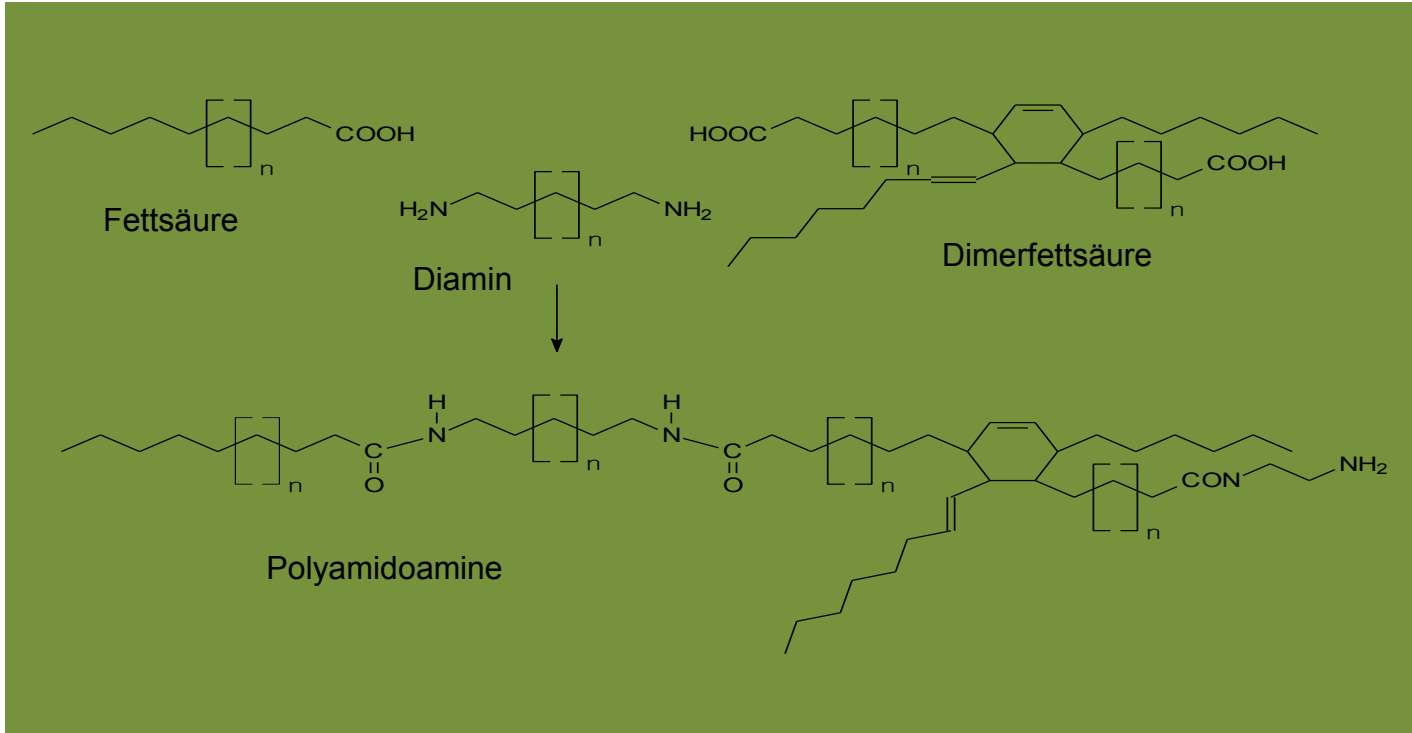
LACK



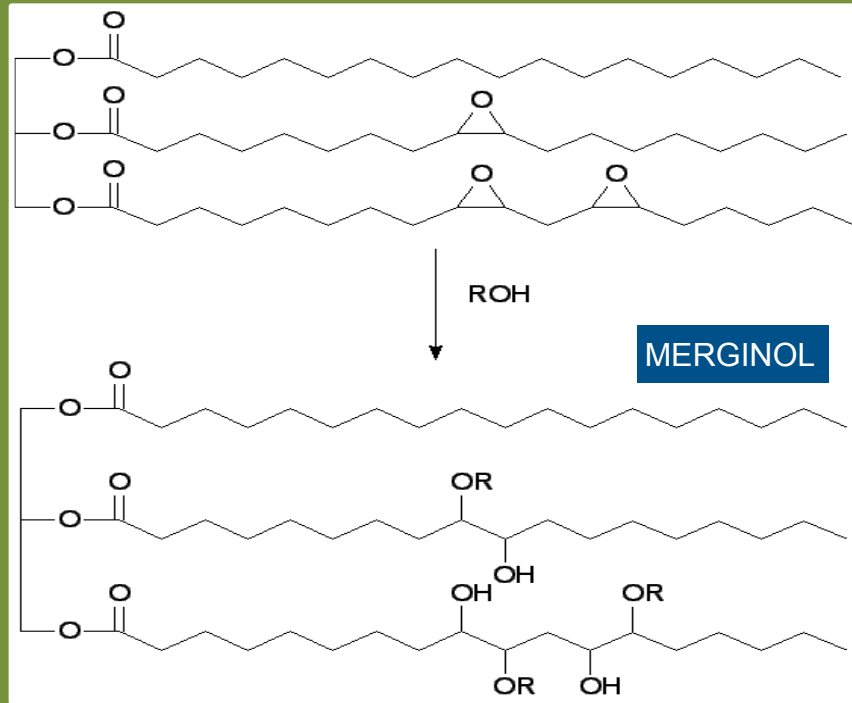
Fettsäurebasierte Produkte



Herstellung von MERGINAMIDEN



Biobasierte Polyether-Glycerid-Polyole



Vorteile:

- Vielfältige Modifikationsmöglichkeiten
- Hohe Hydrolyseresistenz
- Weit einstellbare Viskositäten
- Hohe Chemikalienbeständigkeit
- Gute Alterungseigenschaften
- Hohe Hydrophobizität
- Gute Kompatibilität
- Hohe UV-Stabilität möglich
- Tailor Made

Anwendungseigenschaften – MERGINOL

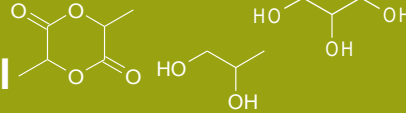
| Hydrophobicity | Chemical resistance | Flexibility | Adhesion (metal) | UV stability | Scratch resistance | Gloss | Transparency | VOC | bio C-content (calc.) |
|----------------|---------------------|-------------|------------------|--------------|--------------------|-------|--------------|-----|-----------------------|
| ✓ | ✓✓ | ✓ | ✓✓ | ✓ | ✓ | ✓✓ | — | ✓✓✓ | 100% |
| ✓✓ | ✓ | ✓✓✓ | ✓✓ | ✓✓ | — | ✓✓ | ✓✓ | ✓✓✓ | 99% |
| ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓✓ | 98% |
| ✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓ | ✓✓ | ✓✓ | ✓✓✓ | 94% |
| ✓✓ | ✓ | ✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓✓ | ✓✓ | ✓✓✓ | 92% |
| ✓✓✓ | ✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | 91% |
| ✓✓✓ | ✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓ | ✓✓✓ | ✓✓ | ✓✓✓ | 90% |
| ✓✓ | ✓✓✓ | ✓ | ✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | 80% |
| ✓✓ | ✓ | ✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓ | ✓✓✓ | 80% |
| ✓✓ | ✓ | ✓ | ✓✓ | ✓ | ✓ | ✓✓ | — | ✓✓✓ | 75% |
| ✓ | ✓ | ✓ | ✓✓ | ✓ | ✓ | ✓✓ | — | ✓✓✓ | 75% |
| ✓ | ✓✓✓ | — | ✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | 74% |
| ✓ | ✓ | ✓✓ | ✓✓ | ✓ | ✓ | ✓✓ | — | ✓✓✓ | 72% |
| ✓ | ✓ | ✓ | ✓✓ | ✓ | ✓✓ | ✓✓ | — | ✓✓✓ | 60% |

✓ good ✓✓ very good ✓✓✓ excellent

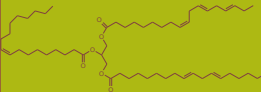
Konzept für biobasierten strukturellen Klebstoff

Project-based research
with  **Fraunhofer**
IFAM

Lactide + bio
based alcohol

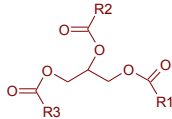


Vegetable
oil

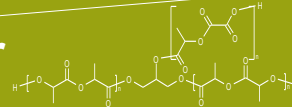


Polymerization

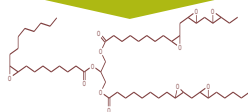
99% bio
based
adhesive



Biobased polyester



Epoxidation



Formulation

Cationic curing UV or
thermally initiated

