U·I·C

UIC GmbH

Reference Applications

주식회사 케미스카이
독일 VTA, UIC사 대한민국 공식 파트너

TEL 031-472-0123 FAX 031-472-6910
WEB www.chemisky.co.kr

Content

UIC GmbH
A Company of the BDI Group

- Application Areas
- Basic Distillation Tasks
- Examples
  - Epoxy Resins
  - Synthetic Vitamin E
  - Deacidification of Edible Oil
  - Stripping of PU-Prepolymers
  - Monoglyceride
  - Omega-3 Fatty Acids

Application Areas

UIC GmbH
A Company of the BDI Group

Fine Chemicals and Pharmaceutical Intermediates

- Fatty acid derivatives
- Alkaloids and Derivatives
- Synthetic Vitamins
- UV stabilizers
- Sugar Derivatives

Mineral Oil Products and Renewable Resources

- Paraffines
- PE Waxes
- Waste Oil
- Biodiesel

Plastics and Additives

- Epoxy Resins
- Polyurethane Prepolymers
- Acrylates

Cosmetics and Natural Products

- Wool Waxes
- Squalene
- Fragrances
- Essential Oils

Food and Animal Feed Additives

- Monoglyceride
- Natural Vitamins (Tocopherole)
- ω-3 Fatty Acid Derivatives
- Phytosterole
- Flavours

Basic Distillation Tasks: Stripping of Light Volatiles

UIC GmbH
A Company of the BDI Group

Removal of light volatiles from a main fraction

Typical candidates

- Solvents with boiling temperatures > 150 °C at ambient pressure
- Monomers from polymers or pre-polymers
- Free fatty acids from glycerides

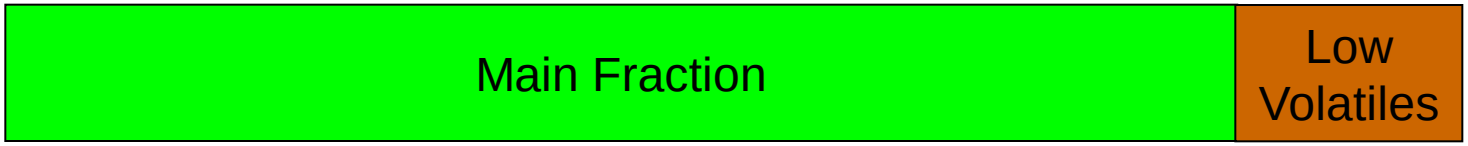
Basic Distillation Tasks: Distillation of Main Fraction

UIC GmbH
A Company of the BDI Group

Purification of main fraction by distillation

Typical candidates:

- Substances with molar mass > 180 g/mol
- Substances with boiling temperatures > 150 °C at 1 mbar



Basic Distillation Tasks: Fractionation

UIC GmbH
A Company of the BDI Group

Separation of multi-component mixtures

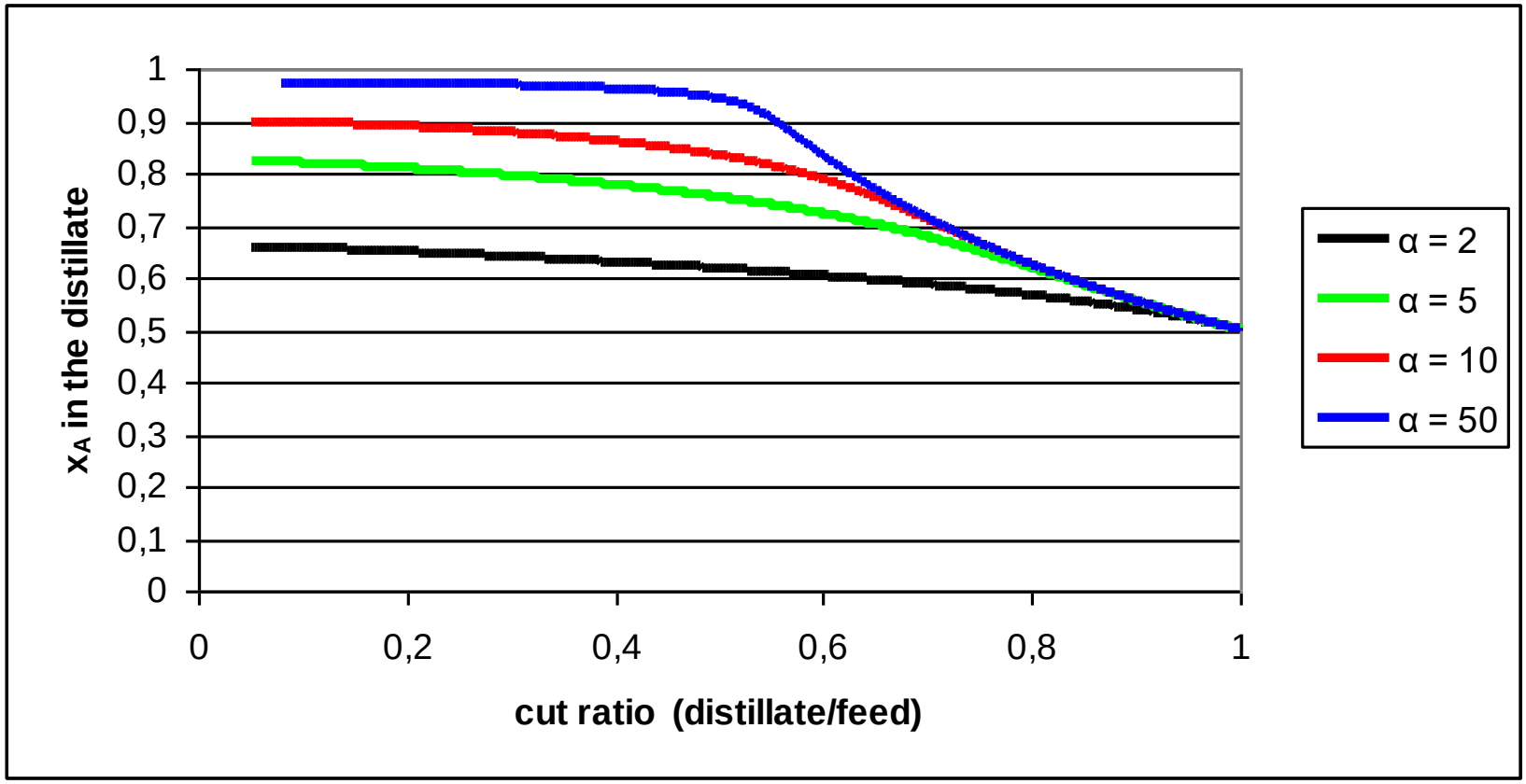
Typical candidates:

- Mono-, Di-, Tri- and Oligomers
- Mixtures of homologous substances, e.g.,
  - Paraffin waxes
  - Fatty acid mixtures
  - Fatty acid esters

Separation Efficiency and Yield

UIC GmbH
A Company of the BDI Group

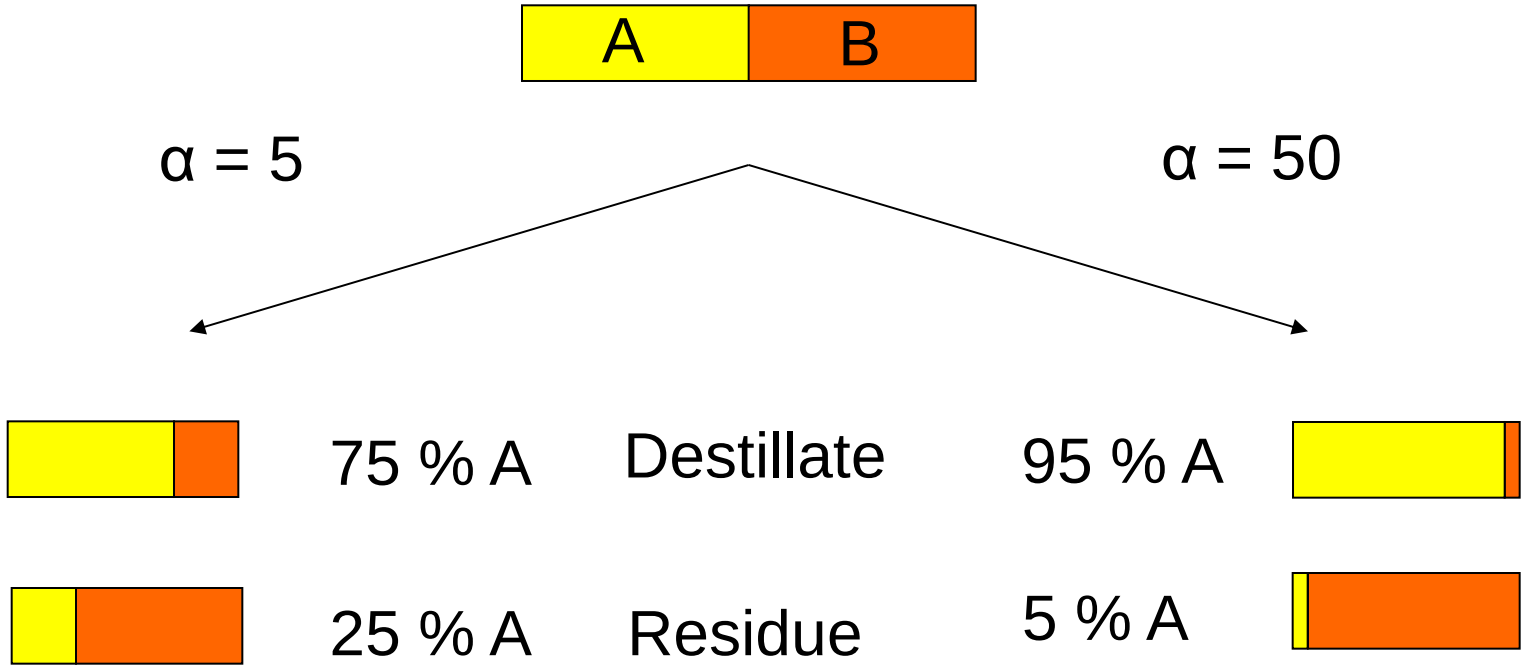
Binary Mixture, Components A and B, $x_A = x_B = 0.5$



Separation Efficiency and Yield: Example

UIC GmbH
A Company of the BDI Group

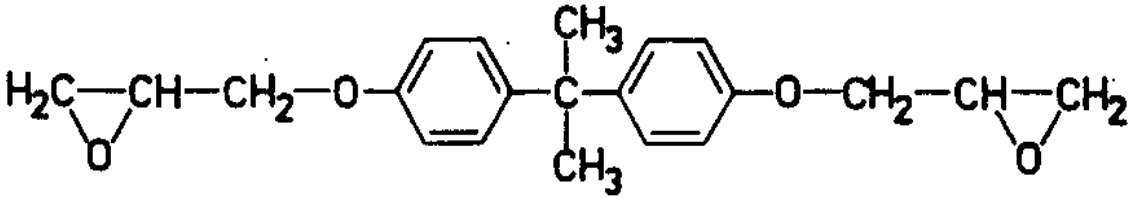
Distillation of 50 % of a binary solution:



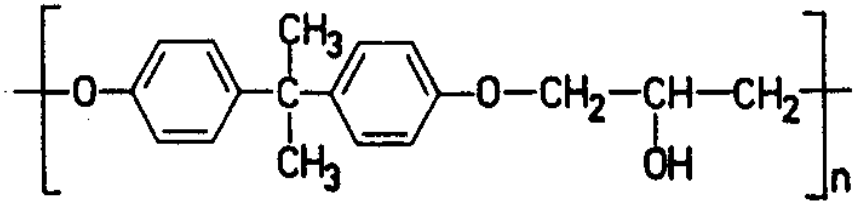
Distillation of Epoxy Resins

UIC GmbH
A Company of the BDI Group

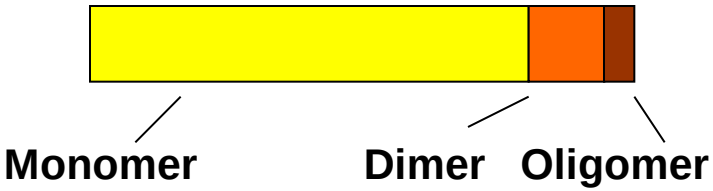
Monomer



Dimer and Oligomers

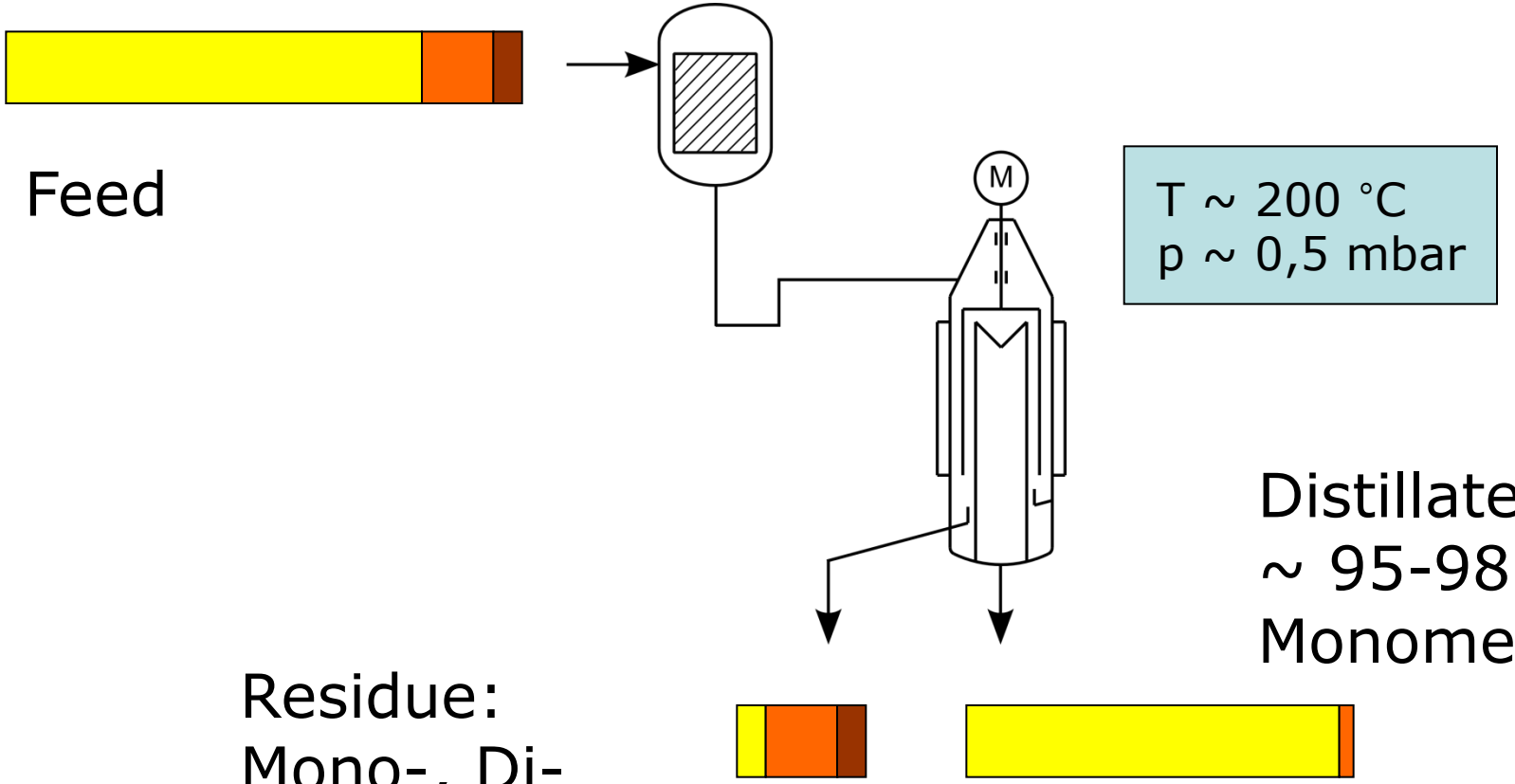


Technical Monomer



Distillation of Epoxy Resins

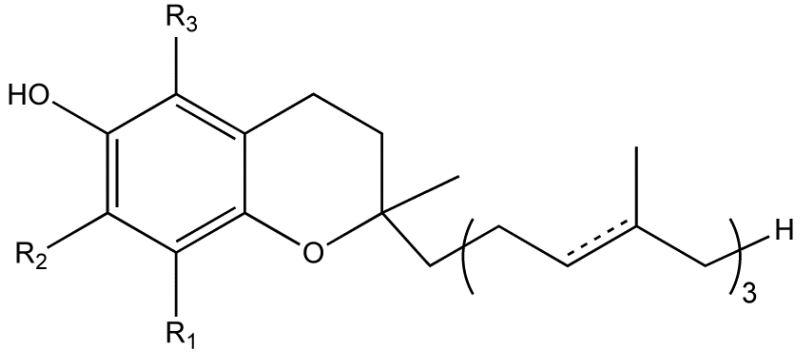
UIC GmbH
A Company of the BDI Group



Distillation of Synthetic Vitamin E (dl-Alpha-Tocopherol)

UIC GmbH
A Company of the BDI Group

General Structure of Tocopherols



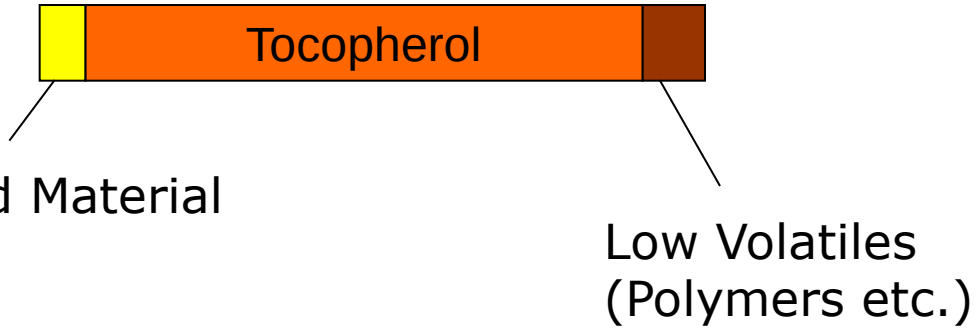
α-tocopherol, $R_1 = R_2 = R_3 = CH_3$
α-tocotrienol, $R_1 = R_2 = R_3 = CH_3$

β-tocopherol, $R_1 = R_3 = CH_3$; $R_2 = H$
β-tocotrienol, $R_1 = R_3 = CH_3$; $R_2 = H$

γ-tocopherol, $R_1 = R_2 = CH_3$ $R_3 = H$
γ-tocotrienol, $R_1 = R_2 = CH_3$ $R_3 = H$

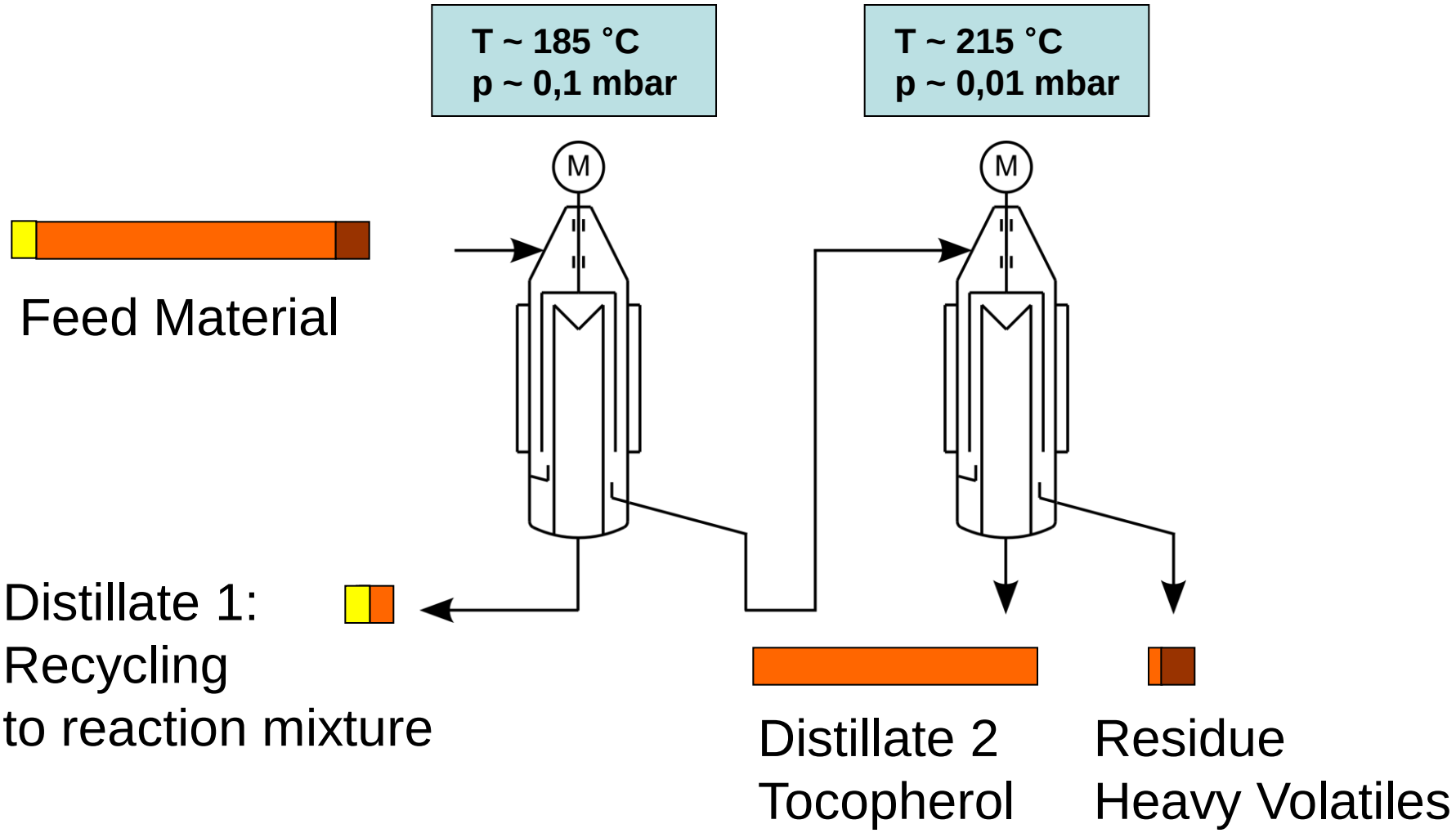
δ-tocopherol, $R_1 = R_2 = R_3 = H$
δ-tocotrienol, $R_1 = R_2 = R_3 = H$

Reaction Mixture



Distillation of Synthetic Vitamin E (dl-Alpha-Tocopherol)

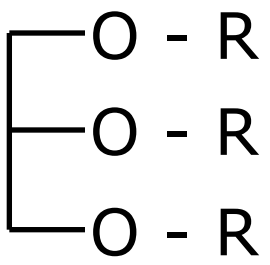
UIC GmbH
A Company of the BDI Group



De-Acidification of Edible Oils

UIC GmbH
A Company of the BDI Group

Generic Structure of Triglycerides



$R = -COC_xH_y$

$x \geq 13$

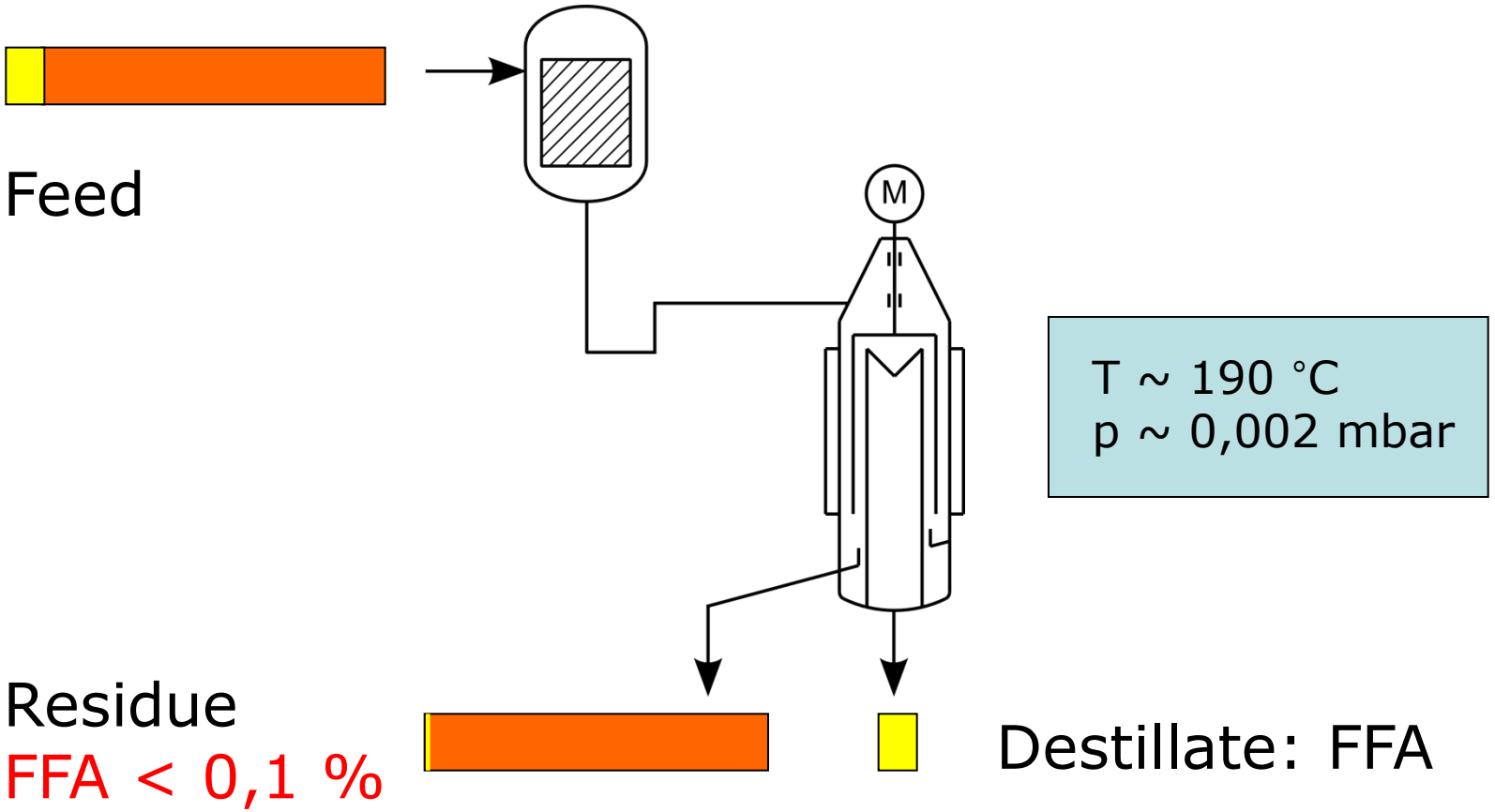
Free Fatty Acid (FFA)

HO - R

Degummed crude Edible Oil

De-Acidification of Edible Oils

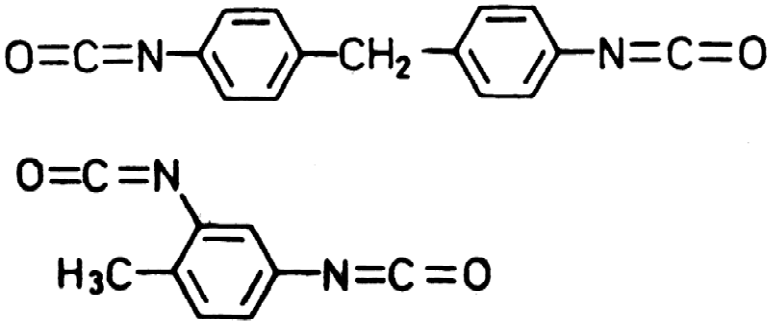
UIC GmbH
A Company of the BDI Group



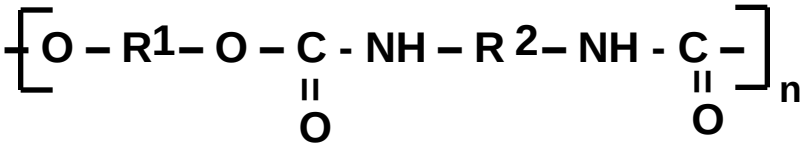
Stripping of PU Prepolymers

UIC GmbH
A Company of the BDI Group

Monomers, e.g.,
MDI and TDI

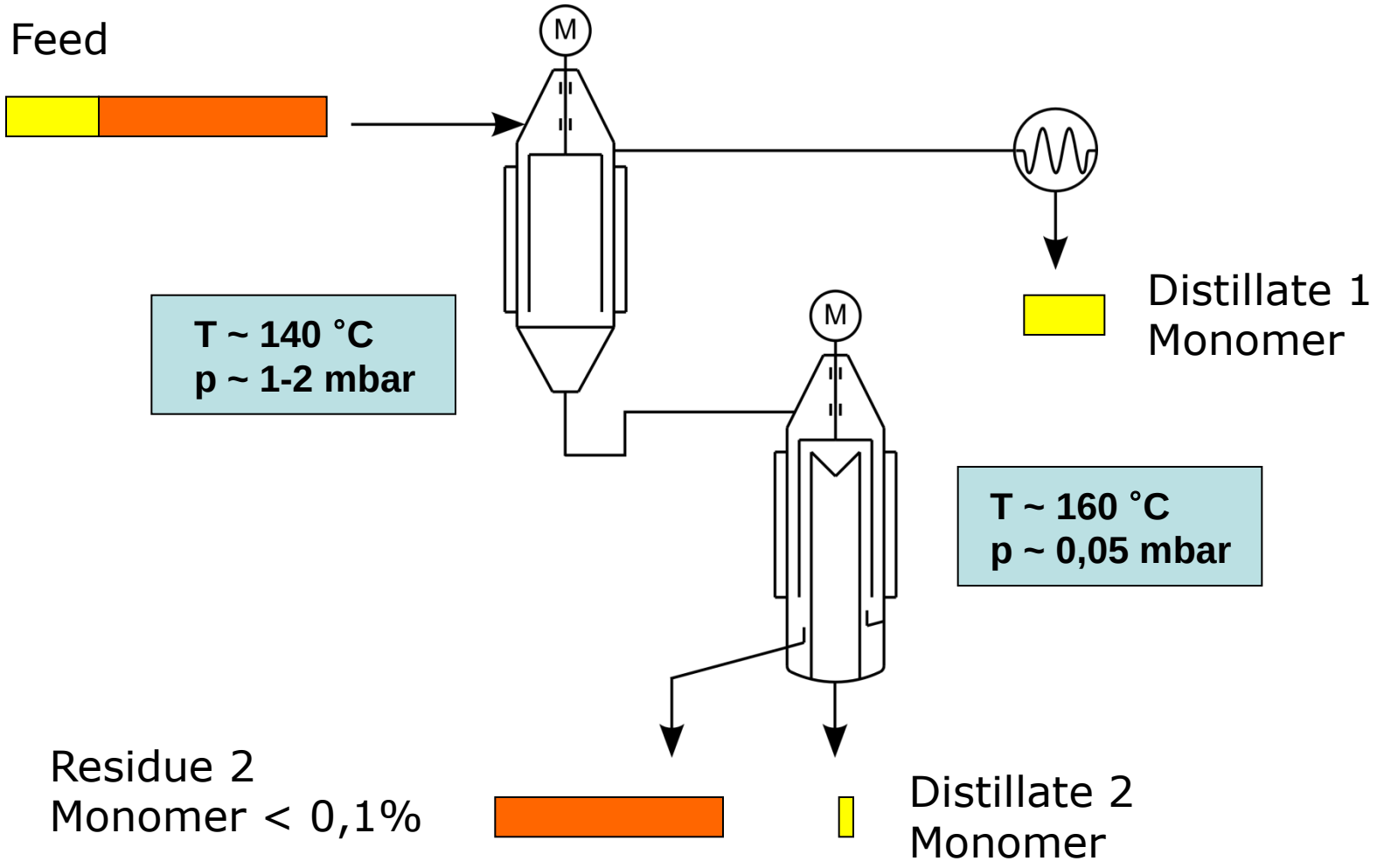


Polyurethane (PU)



Crude Prepolymer

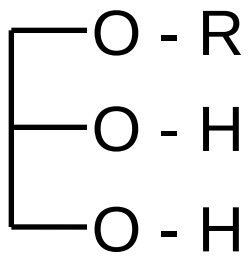
Stripping of PU Prepolymers



Distillation of Monoglycerides

UIC GmbH
A Company of the BDI Group

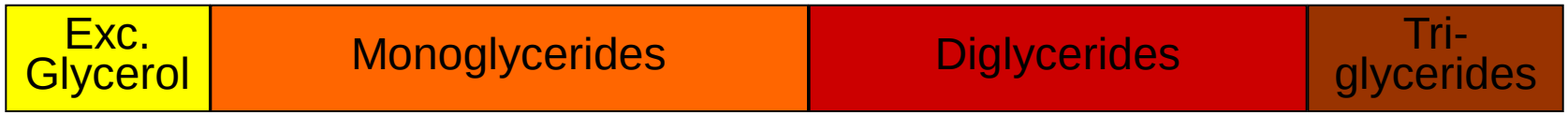
Generic Structure
of Monoglycerides



$R = -CO-C_xH_y$

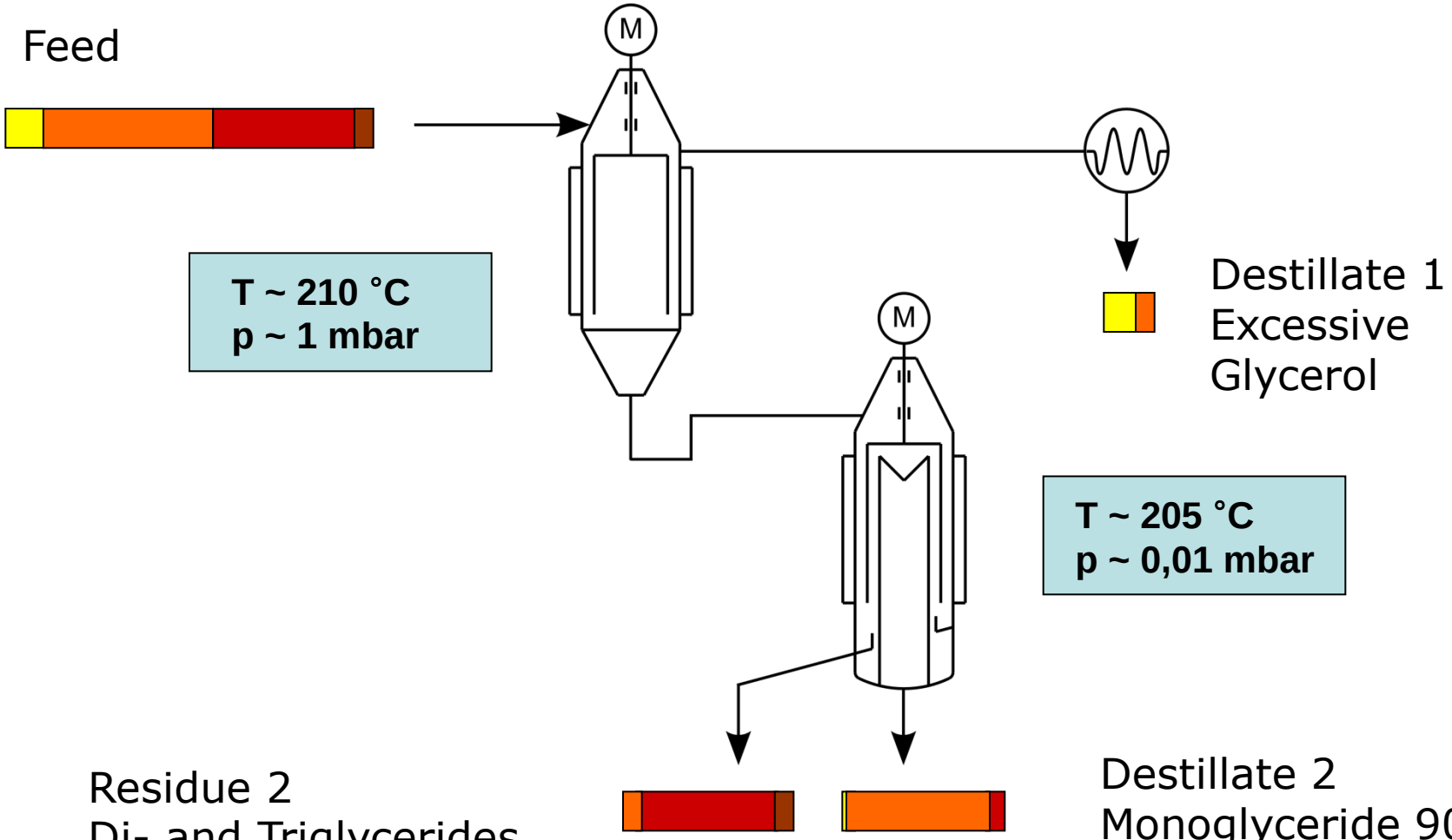
$x \geq 13$

Crude Monoglycerides



Distillation of Monoglycerides

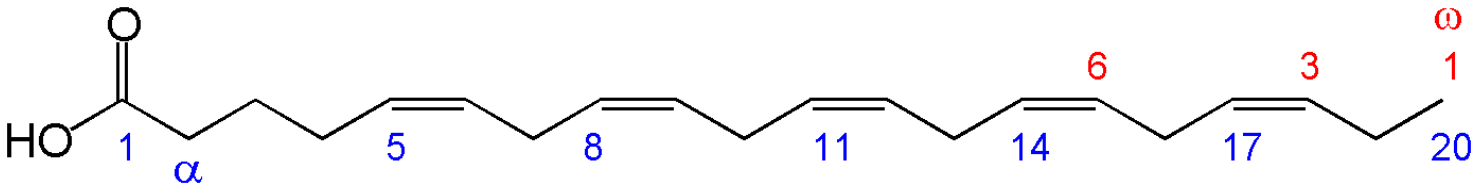
UIC GmbH
A Company of the BDI Group



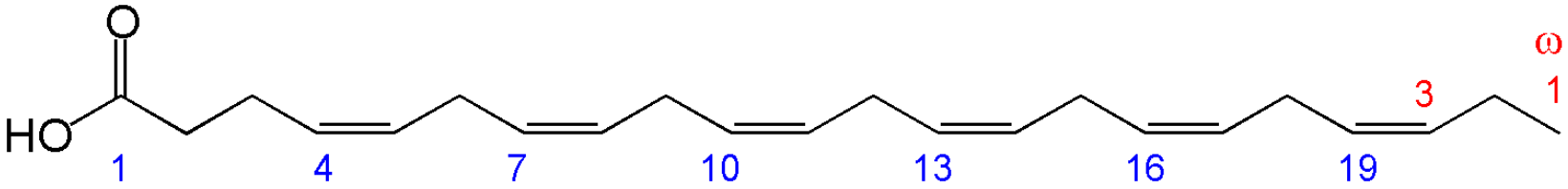
Distillation of ω-3 Fatty Acids

UIC GmbH
A Company of the BDI Group

5,8,11,14,17 Eicosapentaenic acid (EPA)

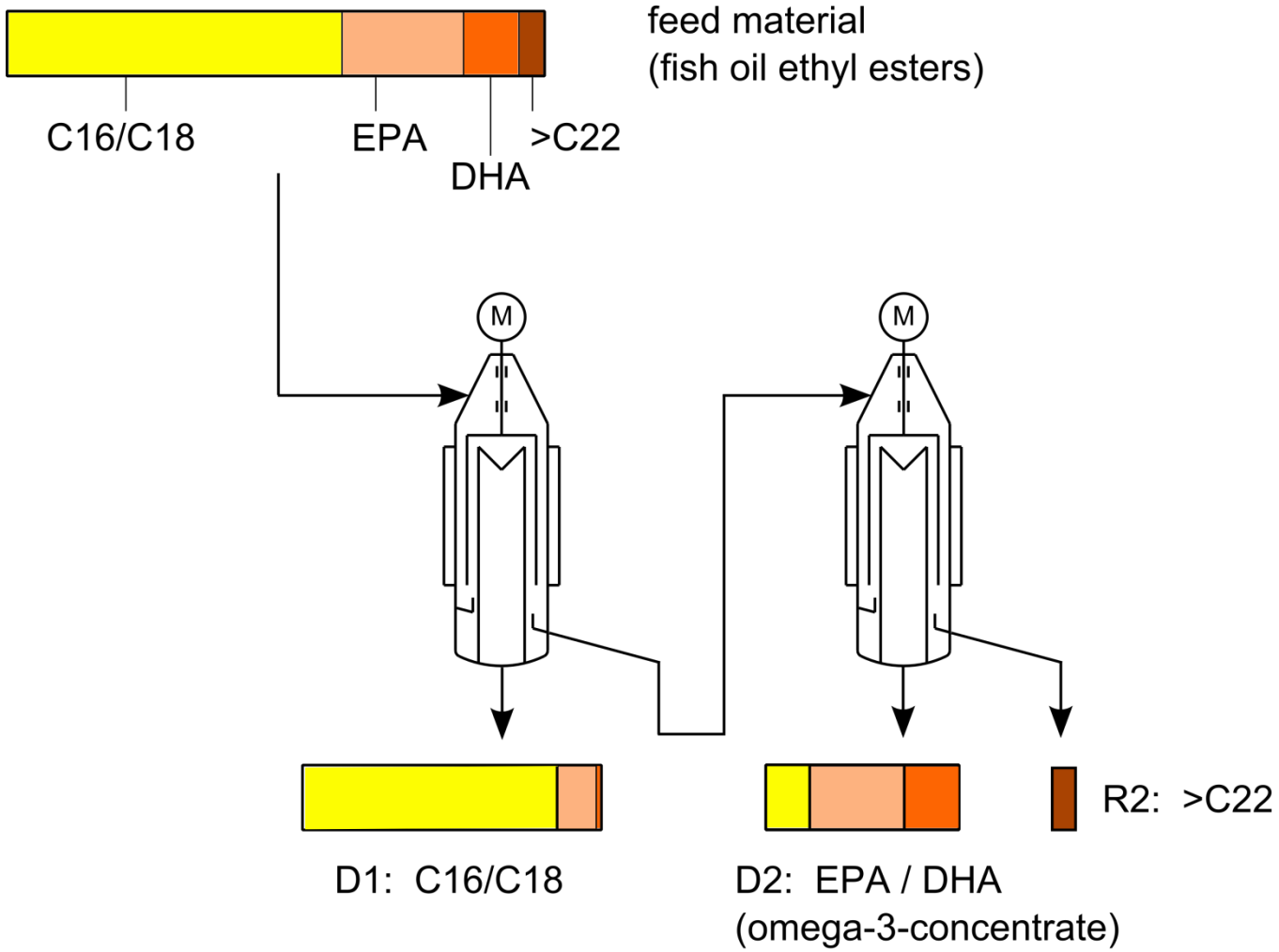


4,7,10,13,16,19 Docosahexaenic acid (DHA)



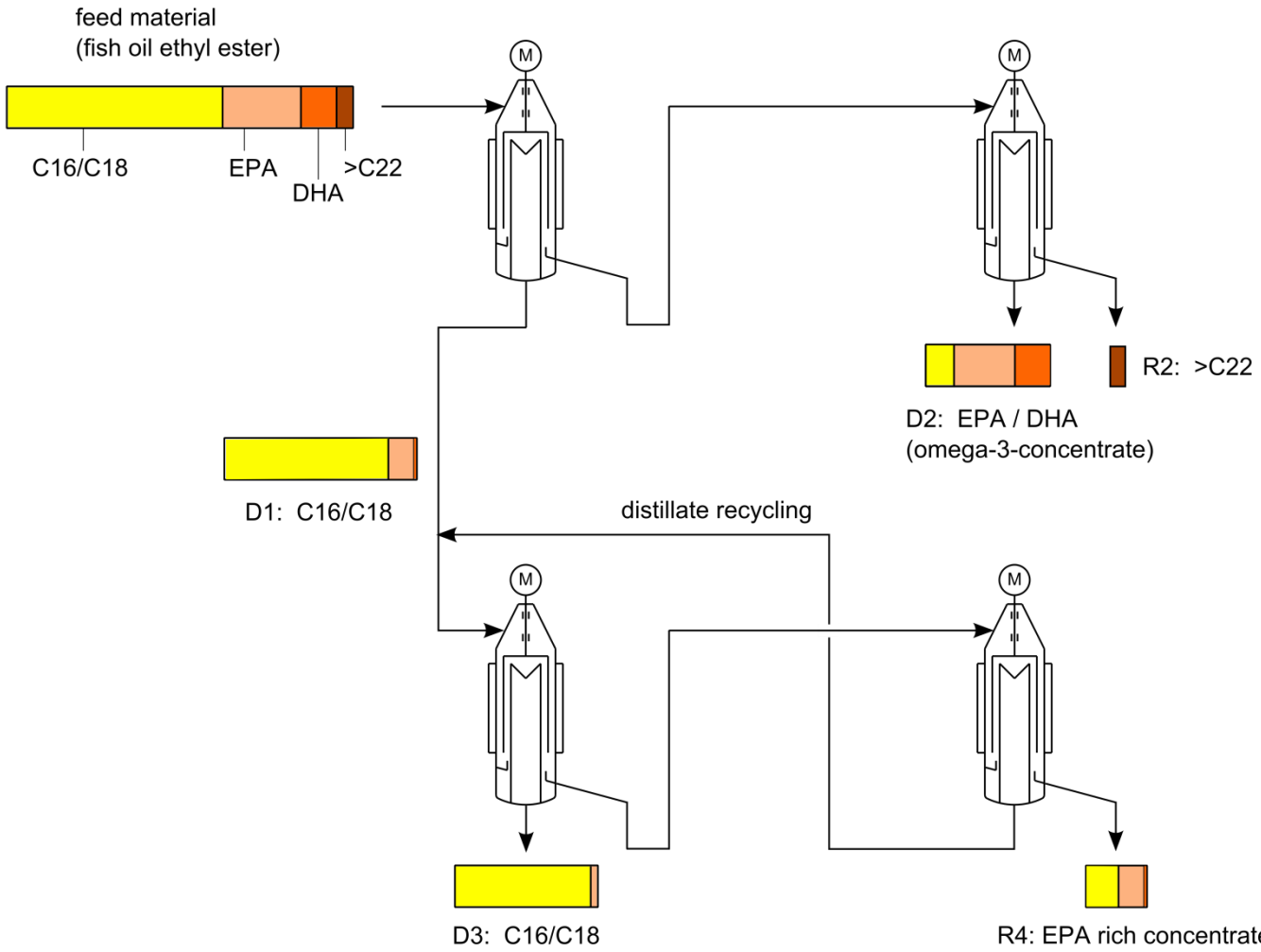
Distillation of ω-3 Fatty Acids

UIC GmbH
A Company of the BDI Group



Distillation of ω-3 Fatty Acids

UIC GmbH
A Company of the BDI Group



U·I·C

UIC GmbH

A Company of the BDI Group

Thank you for your kind attention!

주식회사 케미스카이
독일 VTA, UIC사 대한민국 공식 파트너

TEL 031-472-0123 FAX 031-472-6910
WEB www.chemisky.co.kr