Jätkusuutlik (Bio-)Keemia
NordBioChem valik -
Naftavabalt

Sustainable (Bio-)Chemistry
The NordBioChem's way
Out of Fossils

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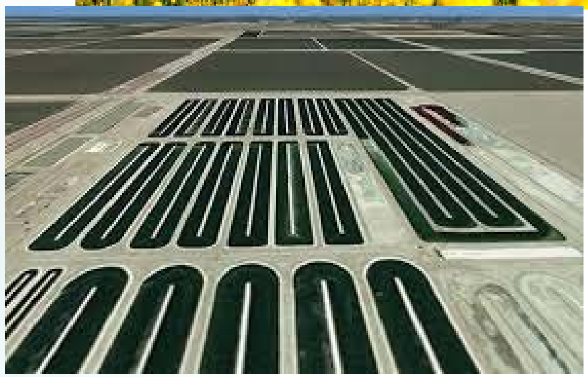
Biokütused ja lähtematerjalid





Etanool
Biodiisel
Metaan
Metanool
Dimethüüleeter
Süngaas
Butanool
Vesinik

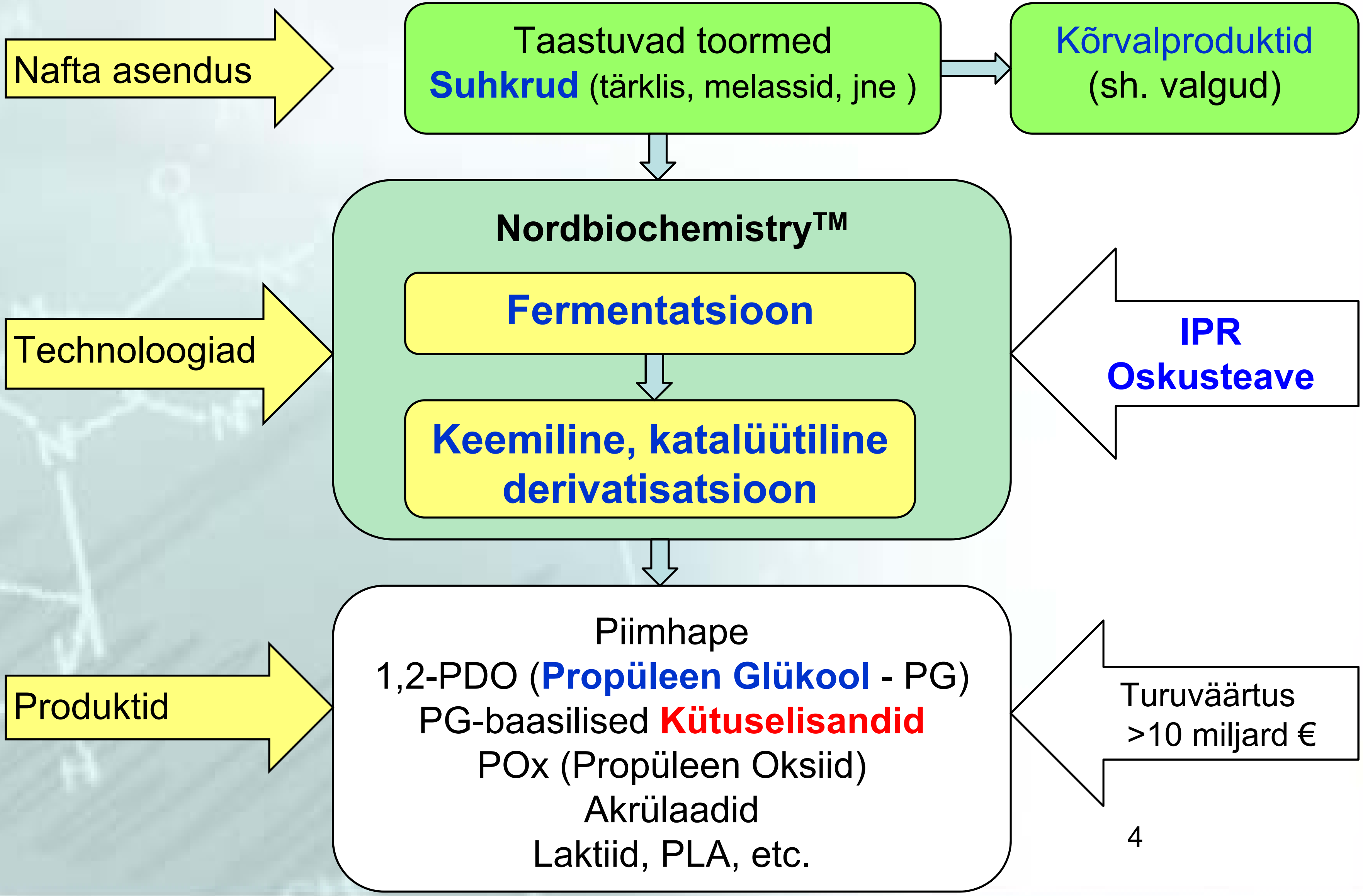



C3 derivaadid

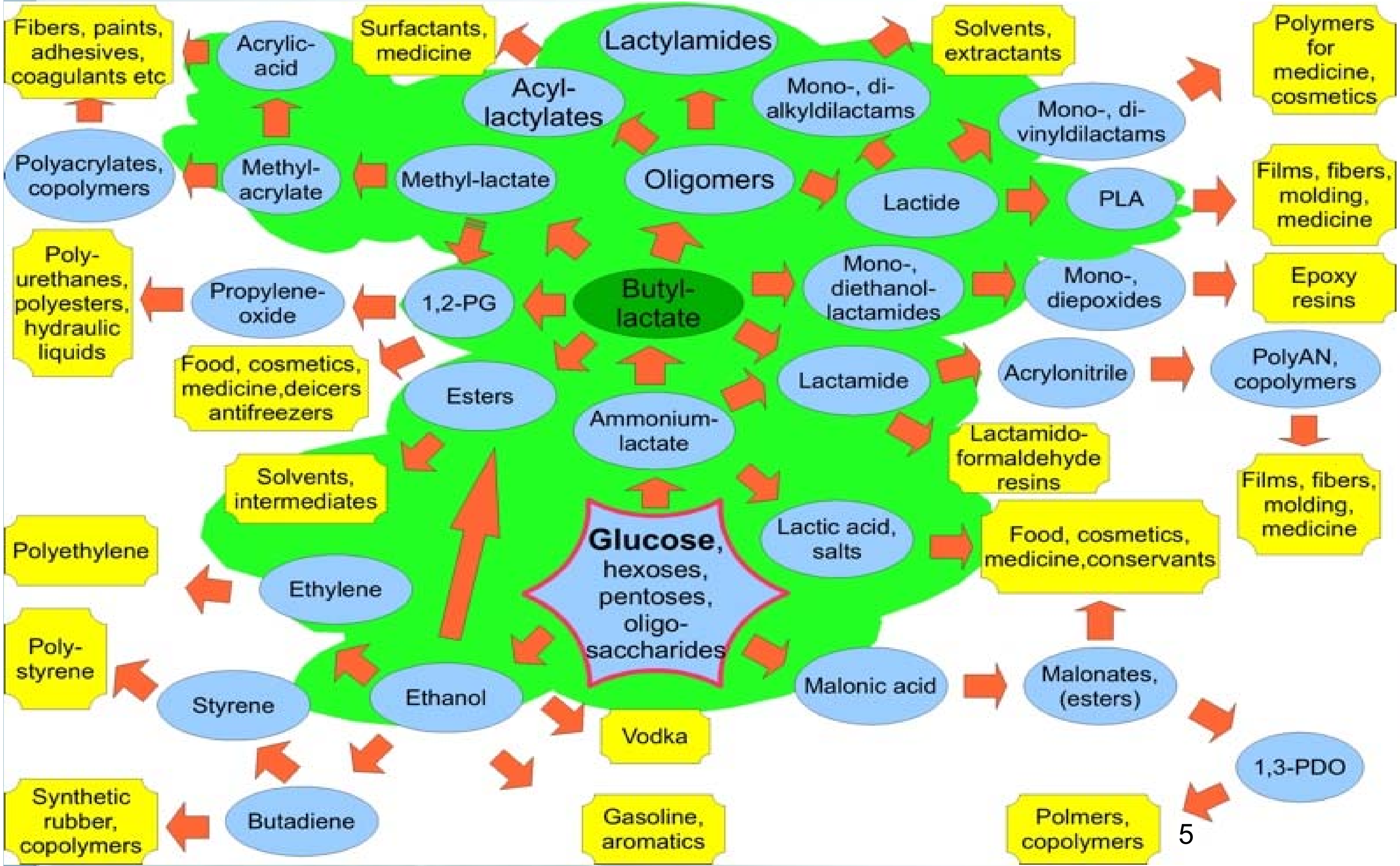
Tänaste biokütuste (lisandite) puudused

- Kõrge hind = dotatsioon
- Heterogeensus
- Kehv segunevus fossiilkütustega
- Toormete tootmise sesoonsus, sõltuvus ilmast
- Toormete hinnakõikumised
- Madal kütteväärtus
- Sobimatus mootorite ja sõlmedega

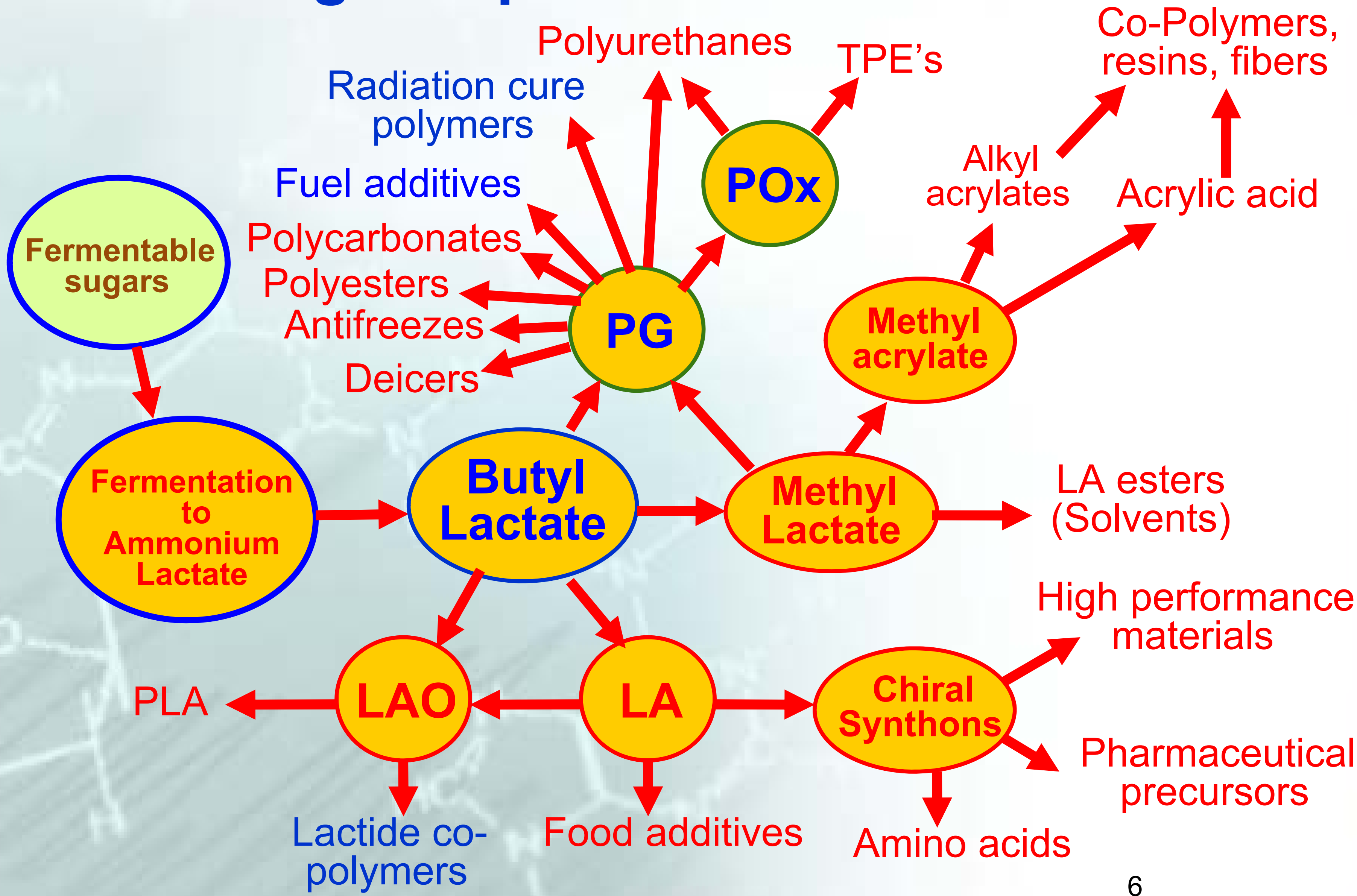
Nordbiochemistry™



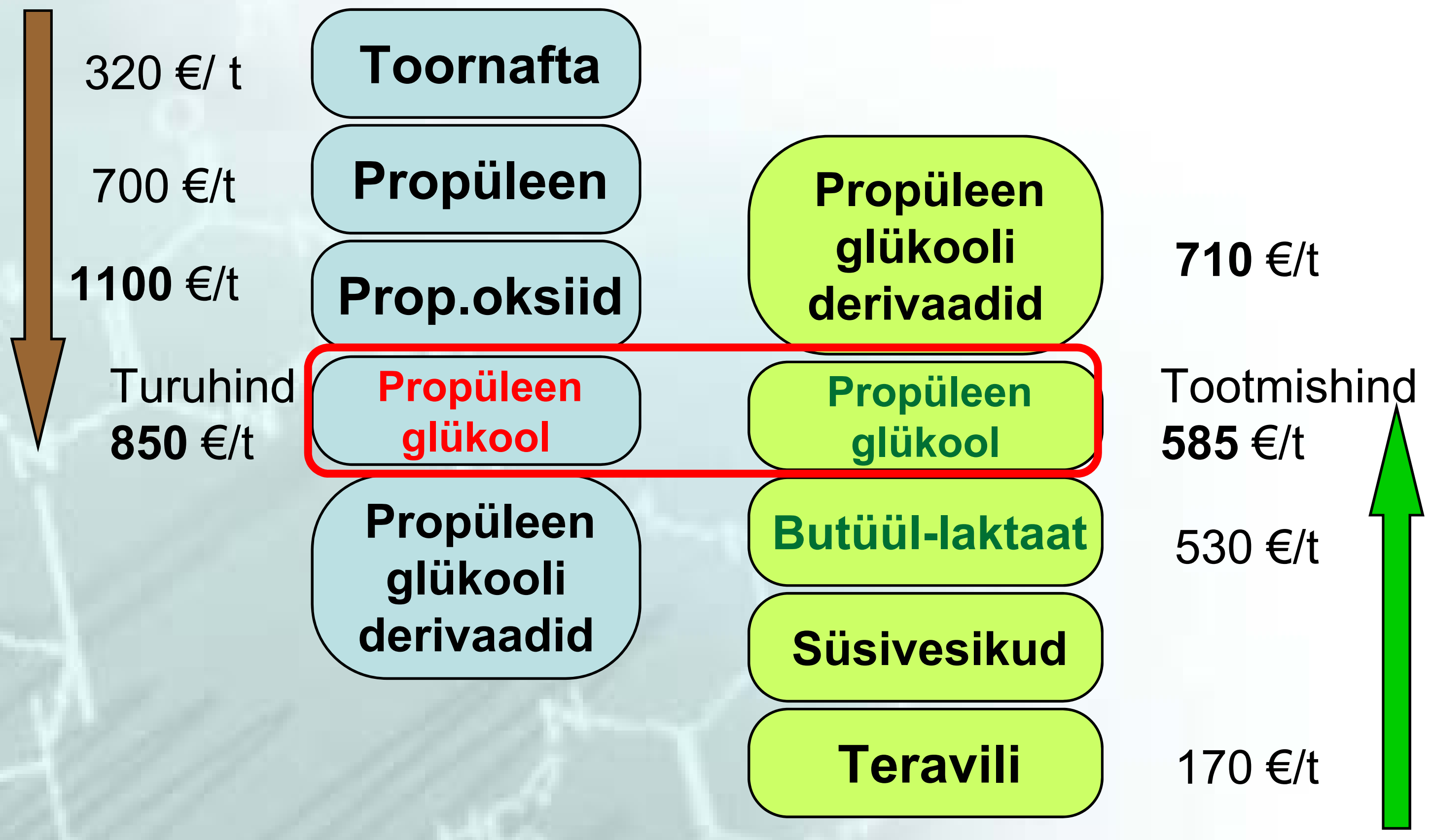
Tehnoloogiline platvorm



Tehnoloogiline platvorm 2



C3: Petro- *versus* Nordbiochemistry™



Hinnavahe (kalkulatiivselt): 850 - 585 = 265 €/t = -30%

Kütuselisandite alased uuringud

Nordbiochem LLC

Oxygenates for Advanced Petroleum-Based Diesel Fuels

INTERIM REPORT
TFLRF No. 357

by

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DAAK-70-92-C-0059 (WD69 of SwRI Project No. 03-5137)

February 2001

Kütuselisandite alased uuringud 1

Table 14. Fuel Property Analysis and Engine Emissions Measurements

Proposed Ranking & Label	Oxygenate – ALS Blend	Relative Emissions				Added Cost c/gal	Predicted Biodegradability Relative to Benzene	Elastomer Compati-bility Ranking	Oxyg. Vol.%	Flash Point °C
		Total PM	Dry PM	NOx	Toxicity					
9-A	ALSD Base Fuel for Reference	100	100	100	LR*	0	NA*	1	0	88
8-D	Di-propylene glycol mono-methyl ether	75	62	96	LR	30	NR*	NR	19	77
7-C	1-Methoxy-2-propanol	70	43	112	LR	27	NR	6	18	35
6-E	2-Ethoxy ethyl acetate	75	67	95	SC*	26	1.25	7	17	62
5-G	Diethyl adipate	74	62	111	SC	76	1.35	8	19	91
4-F	2-Ethoxy ethyl ether	75	68	106	LR	43	0.73	3	22	78
3-H	Tributyrin	78	56	111	LR	29	1.36	4	18	91
2-I	Di-butyl maleate	74	56	119	SC	33	1.33	5	22	93
1-B	Tri-propylene glycol mono-methyl ether	70	52	113	LR	30	0.21	2	20	90

* LC=Lower risk based on limited data, SC=Some concern, ND=No data, NA=No analysis, U=Unknown, NR=No result

Table 14. Fuel Property Analysis and Engine Emissions Measurements (Continued).

Proposed Ranking & Label	Oxygenate - ALS Blend	Lubricity, µm HFRR, 60°	Cetane Number	Viscosity CSt at 40°C	T90 °C	Density g/cc	Surface Tension Dynes/cm
9-A	ALSD Base Fuel for Reference	483	65.5	2.94	346	0.8169	30.3
8-D	Di-propylene glycol mono-methyl ether	545	61.4	2.54	342	0.8403	30.4
7-C	1-Methoxy-2-propanol	495	57.2	2.19	343	0.8321	30.8
6-E	2-Ethoxy ethyl acetate	490	61.3	2.10	344	0.8397	31.0
5-G	Diethyl adipate	443	56.0	2.55	340	0.8506	30.9
4-F	2-Ethoxy ethyl ether	670	86.4	2.09	342	0.8342	31.0
3-H	Tributyrin	375	52.6	3.06	342	0.8550	30.6
2-I	Di-butyl maleate	268	57.7	2.78	340	0.8537	31.1
1-B	Tri-propylene glycol mono-methyl ether	505	65.0	2.73	342	0.8416	30.5

The two oxygenates given the highest rating are tripropylene glycol monomethyl ether and di-butyl maleate.

Kütuselisandite alased uuringud 2

Test 1	96,5% (volume) low-sulfur Diesel fuel + 3,5% (volume) Thiophen (to simulate high sulfur content diesel fuel, as used in marine engines)
Test 2	Test 1 with **5 % (v/v) Di-Propylene-Glycol** content
Test 3	Test 1 with **10 % (v/v) Di-Propylene-Glycol** content

Test engine: One-cylinder diesel engine „Ricardo Hydra“ with undivided combustion chamber
Engine speed n = 2000 min^{-1}

Parameters	Test-method	Units	Measured results				
			Test 1	**Test 2** (5% DPG)		**Test 3 (10% DPG)**	
			Value	Value	Difference in %	Value	Difference in %
Sulphur content	EVS-EN ISO 20846	Mass-%	1,65	1,59	-3,6	1,50	-9,1
Exhaust gas emission							
CO_2		Mass-%	2,23	1,59	-28,7	1,49	-33,2
CO		ppm	43	21	-51,2	18	-58,1
NO		ppm	189	154	-18,5	137	-27,5
NO_x		ppm	199	162	-18,6	144	-27,6
SO_2		ppm	134	123	-8,2	99	-26,1
H_2S		ppm	42,5	34,3	-19,3	23,3	-45,2
Engine key figures							
Effective power		kW	3,4	3,6	5,9	3,8	11,8
Specific fuel consumption	GOST 18509	g/(kW h)	387,2	380,0	-1,9	356,4	-8,0

Kütuselisandite alased uuringud 3

Kasutati mootoridünamomeetriga ühendatud 4-silindrilisse 4-taktilisse 1998 ccm töömahuga Mercedes Benz M102 ottomootorit.

Katsetati iga kütuseseguga viiel erineval väntvõlli pöörlemissagedusel vastavalt – 1700, 2200, 2700, 3200 ja 3700 min^{-1}. Mootori töötamisel erinevate kütusesegudega püüti maksimiseerida mootori eelsüütenurka.

Katsetuste ajal registreeriti mootori poolt arendatav efektiivvõimsus [kW] ja pöördemoment [Nm] valitud reziimil, kütuse erikulu [g/KWh], heitgaaside protsentuaalne koostis (CO, CO_2, HC, O_2 ja λ) ja kütusesegu tihedus.

Piimhappe estrite mõju järjestus:

- Metüül-laktaat
- Propüül-laktaat
- Etüül-laktaat
- Butüül-laktaat
- Etüülheksüül-laktaat

Nisu biorafineerimine

KOORIKU ERALDAMINE

Teriste ümbrise eraldamisel saadav tselluloos kasutatakse energeetiliste vajaduste katteks

VALKUDE ERALDAMINE

Proteiin (15%) on tooraineks nii inim- kui loomatoitudes

Tärklis (65%) glükolüüsitakse ning kasutatakse toorainena mikrobioloogilise sünteesi protsessides

NBC C3-Fermentatsiooni eelised

1. Protsessi kiirus on 50-90 g/l/h võrrelduna 2-5 (max10) g/l/h (10-kordne vahe!) üldlevinud meetoditega.
2. Ca. 60 kg jääke toodetud piimhappe tonni kohta, *versus* ca.1400 kg/t (enamikus $CaSO_4$ = kips) (25-kordne vahe)
3. „*Asünkroonne-läbivoolu*"- tüüpi fermenter NBC-lt *versus* konventsionaalne (üldiselt) „*Batch*"-tüüpi.
4. Nordbiochemistry võimaldab hakkama saada 10-15 korda väiksema seadmepargiga, sama tootmismahu juures. See omakorda tähendab väiksemaid investeeringuvajadusi.

Propylene

Propylene is produced primarily as a by-product of petroleum refining and of ethylene production by steam cracking of hydrocarbon feedstocks. Propylene is a major chemical intermediate. The most important derivatives of chemical and polymer grade propylene are **polypropylene, acrylonitrile, propylene oxide, isopropanol and cumene**. Use of polypropylene in plastics (injection molding) and fibers (carpets) accounts for over one-third of global consumption. It is also used in the production of **synthetic rubber and as a propellant** or component in aerosols. Today, propylene was ranked seventh to tenth (regionally differ) among the top 50 chemicals produced all over the world.

•Demand of the Propylene – 96 million t/y
•Growth of the markets – 4,5% annually
•Market size – 106 billion EUR/y

Tänan tähelepanu eest!