

ANALYTICAL CRITERIA for QUALITY CONTROL of MARGARINES in TURKEY



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AGENDA

Fats and Oils business in Turkey

- *Introduction of Besler/ÜLKER company*

Quality Criteria

- *Raw Material – Crude Fats & Oils*
- *Processing – Refining- Modification*
- *Product Properties*
 - **Margarine Quality-** **Fat Blend**
Ingredients
Processing
Sensory Evaluation & Performance Test

Conclusion



- One of the biggest food company in TURKEY
- Established in 1944 (Biscuit Factory)
- Chocolate , Biscuit, Cake, Flour, Powder Products (soups,deserts, etc.), Dairy (milk, yoghurt, etc.) Coffee (Cafe Crown), Baby food, Starch, Cola (Cola Turka) & Soft Drinks , Ice Cream (Golf) Margarine & Fats
- Total turnover, 2006 : 7 billion USD
- 30.000 employee ,
- 1900 product, 200 brands
- 200.000 distribution points



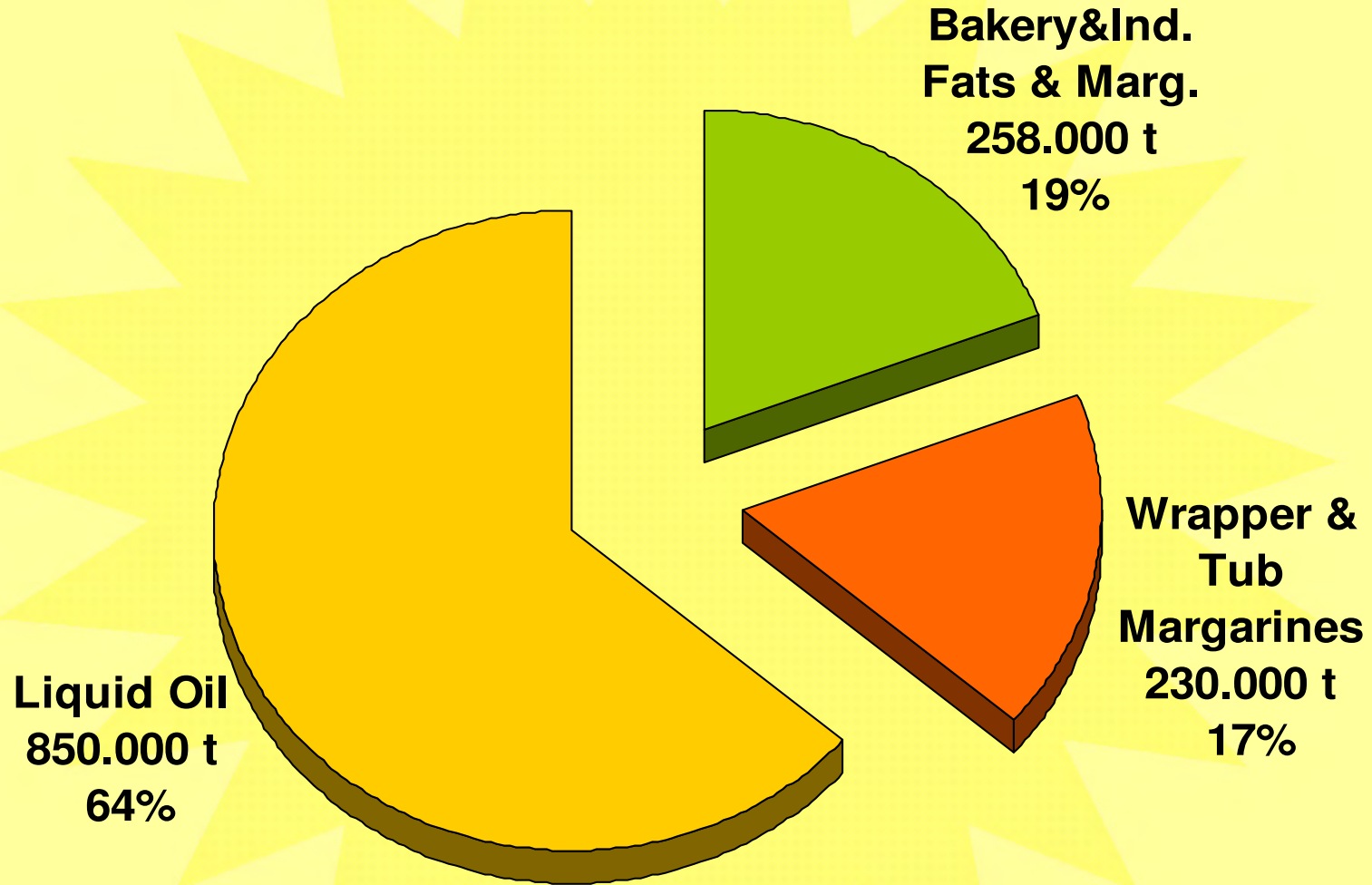
Production capacity : ~350,000 tonnes/year
Total open area : 237.000 m²

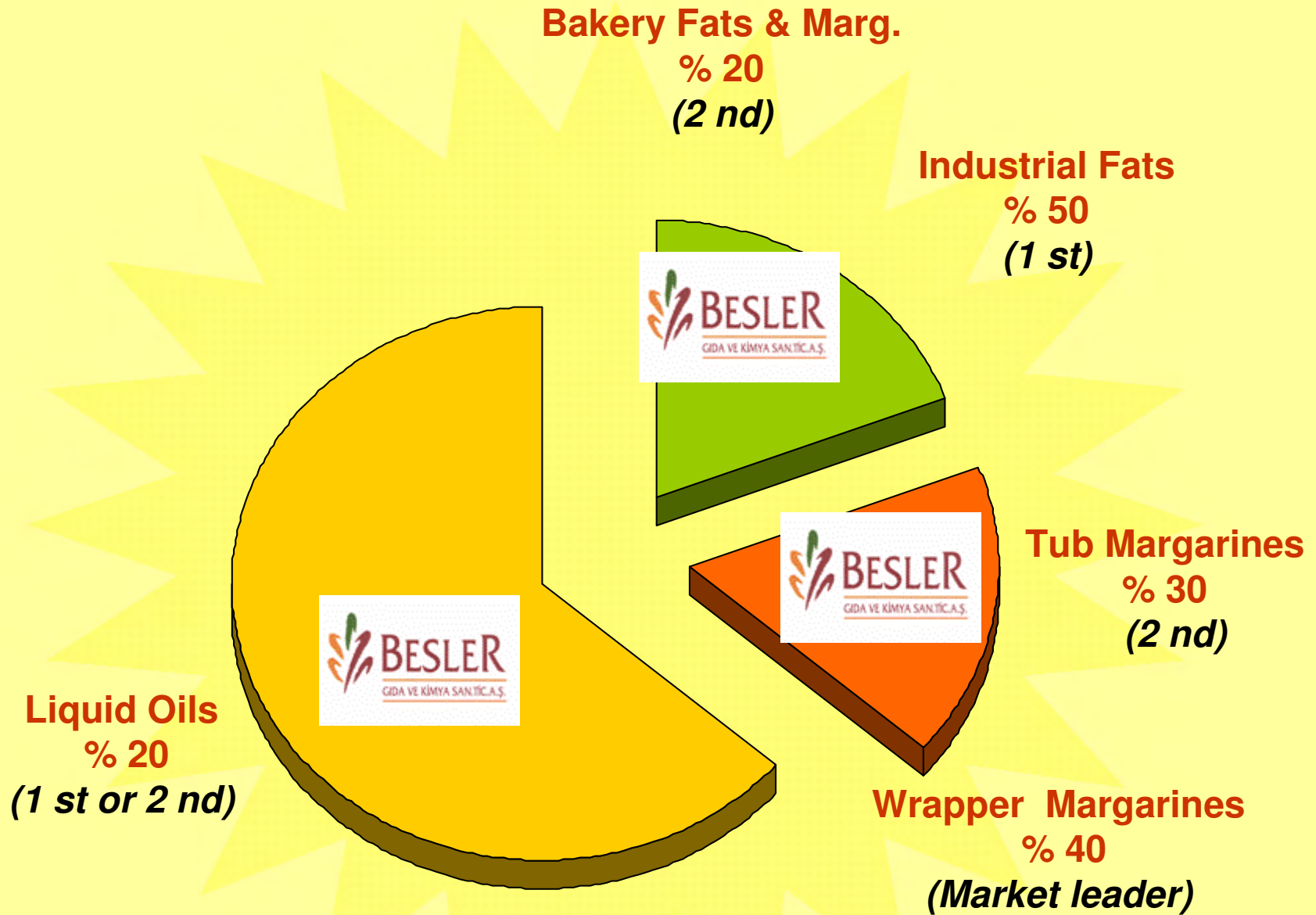
Total Oil Storage capacity : 37.000 tons

278 SKU , 315 employee

TOTAL TURNOVER, 2006 : 395 mio USD

TOTAL CONSUMPTION of FATS & OILS in TURKEY 2006







**ISO 9001
ISO 14001
OHSAS
HACCP
BRC**



***Improve products
Customers satisfaction
Save money***

IMPACT ON THE BUSINESS

Production - No defects

Distribution - On time

Third party & Suppliers - Quality audits

Development - Formulate faults out of products

Operations - Consistent

Customer Service - Handle issues smoothly



QUALITY CONTROL

RAW MATERIAL CONTROL

Oils & Fats
Emulsifiers
Ingredients
Salt
Acids
Preservatives
Antioxidants
Whey/SMP
Flavours

PROCESS CONTROL

Refining
Oil Modification
Blending
Composition
Making
Votator Process
Packaging
Temp.at transport
Temp.at storage
Temp. At Distr.

PRODUCT CONTROL

Hardness
Spreadability
Plasticity
Homogeneity
Creaming
Thinnes, Melt
Coolness, Frying
Antispattering
Baking, Health
Taste, Gloss

Consumer quality parameters

Specifications of the margarines

Specification of the fatblend

Refined oils and fatcomponents

Crude oils and fats



QUALITY CRITERIA for RAW MATERIAL

CRUDE FATS and OILS

MAIN IMPORTED OILS in TURKEY



**PALM
PALM OLEIN
PALM STEARIN
PALM KERNEL**



SUN FLOWER



SOYBEAN OIL



RAPE SEED

In 2006, 1.120.000 tonnes OIL imported

TRANSPORT and STORAGE of CRUDE OIL

Previous cargo	Kosher/Fosfa (Int.list of previous cargos)	
Tropical oils	crude PO	FFA increase / moisture blending with rbdPO origin C12 content diesel oil incident
	dfPOs(53)	POV / stabilisers
Seed oils	crude BO	GMO

CRUDE OIL IMPURITIES & ANALYSES

IMPURITY	SOURCE	ANALYSES	TYPICAL LEVEL
Water	From fruit	Moisture	% 0,2
Waxes	Seed coat	Wax	
Free Fatty Acids	Hydrolised oil molecules	ffa	%0,5-5
Coloured Compounds	Chlorophyl, carotene in seed/fruit	Lovibond	
Oxidised triacylglycerols	Oxidation during processing, storage, transport	POV	10 meq/kg
Trace metals	Naturally occuring & from tanks & processing	Fe, Cu, Ni	10 mg/kg
Gums/Lecithin	Phospholipids from cell membrane	P	10-500 mg/kg
Off Flavours	Flavour comp. from seed or fruit	Taste	Strong

TRADITIONAL CHEMICAL TESTS-1

IODINE VALUE (IV)

Iodine value is the quantity (g) of iodine fixed per a 100 gr. fat under lab. Conditions

***PK: 14-19; PKS: 6-9 ; SF:125–140; PO:50-55; BO:123-139; CS: 98-118
Pos: 48 max., Pof: 56 min.***

SAPONIFICATION VALUE

Saponification value is the quantity (mg) of potassium hydroxide required for saponification of 1 gr. fat.

***Sun Flower Oil(linoleic & oleic acids in large proporiton) SV= 190
Coconut oil (lauric acid in large proportion) SV= 260***

TRADITIONAL CHEMICAL TESTS-2

FREE FATTY ACID (FFA)

Acidity is the % of FFA , expressed according to the nature of fats

*oleic acid, in case of the majority of fats,
palmitic acid in case of palm oil
lauric acid in case of lauric fats (CN, PK)*

PEROXIDE VALUE (POV)

POV is the number of micrograms of active Oxygen of the peroxide contained in a gr. of fat and capable of oxidising potassium iodide to iodine

TRADITIONAL CHEMICAL TESTS-3

ANALYSES of WAX

COLD TEST (AOCS, method C.C. 11-53) : By cooling the oil it aims to bring about the crystallisation of waxes & hence the cloud Formation. The time taken for its appearance at 0 °C; provides information about the wax content.

For a concentration exceeding 100 ppm of wax, an oil clouds over 1hr.

SEPERATION of WAXES by GAS CHROMOTOGRAPHY

BUYING SPECIFICATIONS

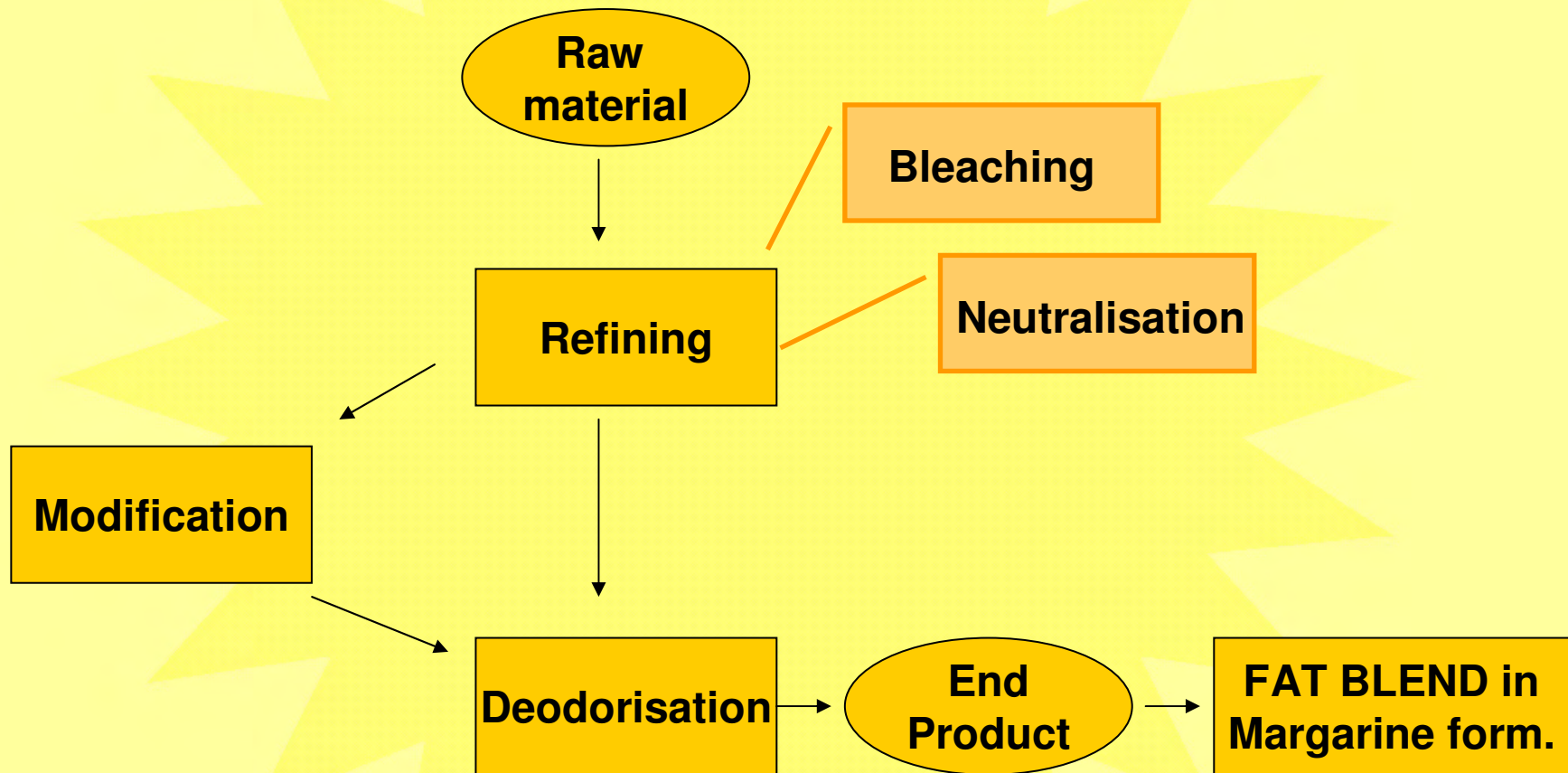
RBD OIL	FFA Max (%)	M&I Max (%)	Colour	Melting Point	IV Max (%)	P Max (ppm)
BO	0,75 (oleic)	0,3				200
MZ	5	1				300
SF	3.0	0.5				
PK	5.5	0.5				
Pof	0,1	0,1	3-6 R max.		56 min.	
PKO	0,1	0,1	1,5 R max.		15-19,5	
PKS	0,1 (lauric)	0,15	1,5 R max.	31-34	7,5	
POS	0,2	0,15	3-6 R max.	44 min.	48	



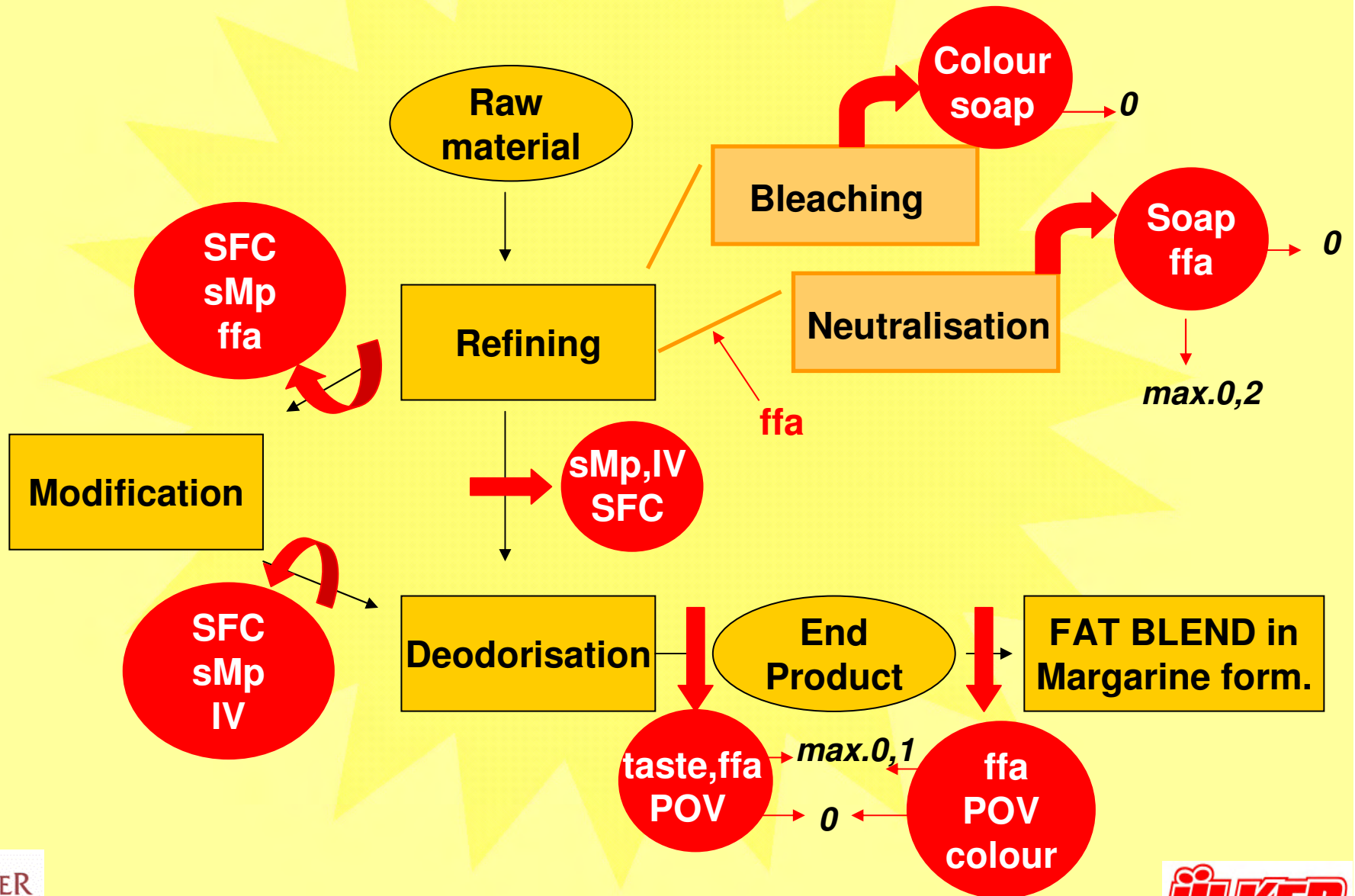
QUALITY CRITERIA in PROCESSING

REFINING – MODIFICATION - BLENDING

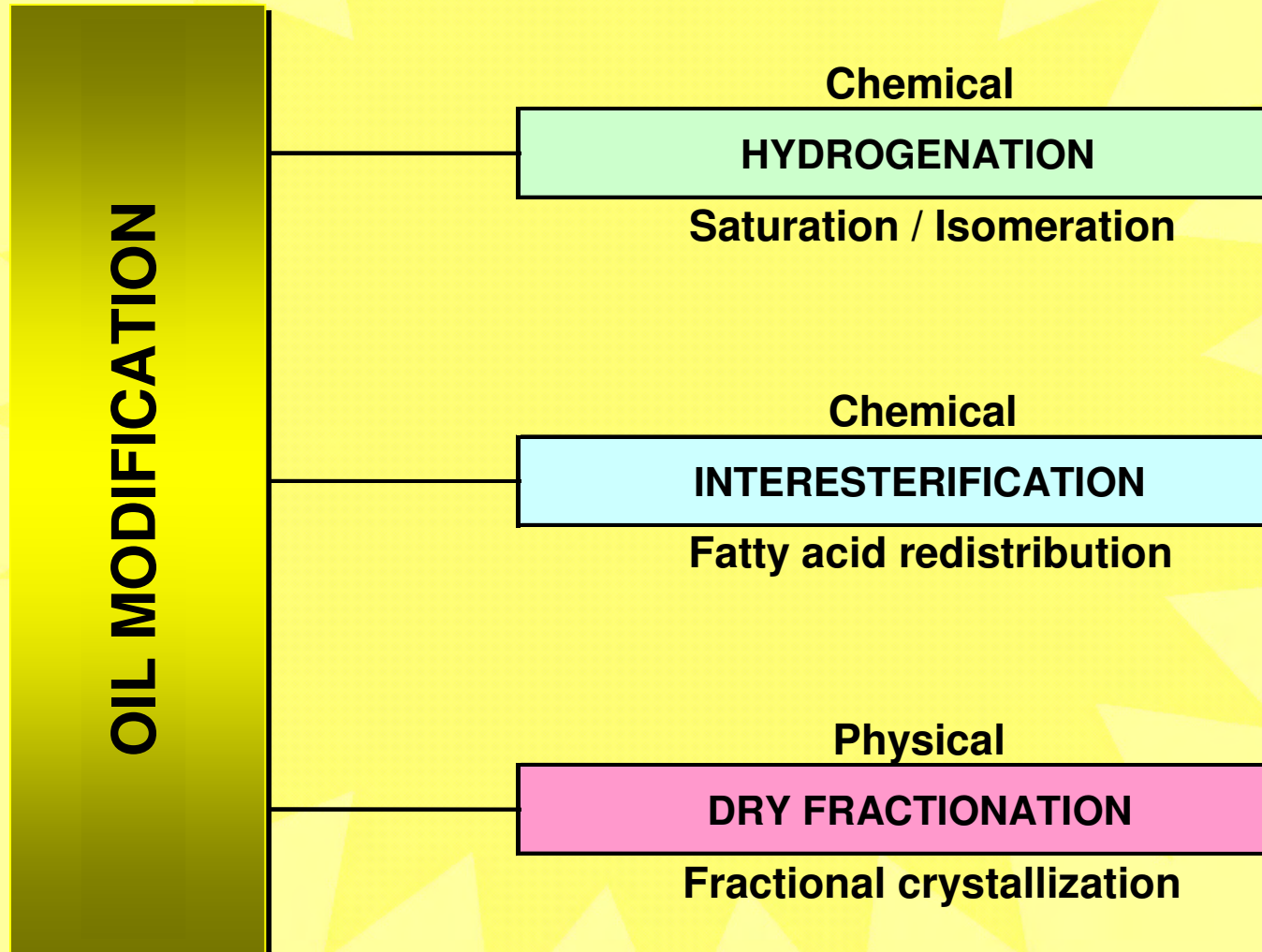
PROCESSING of OILS



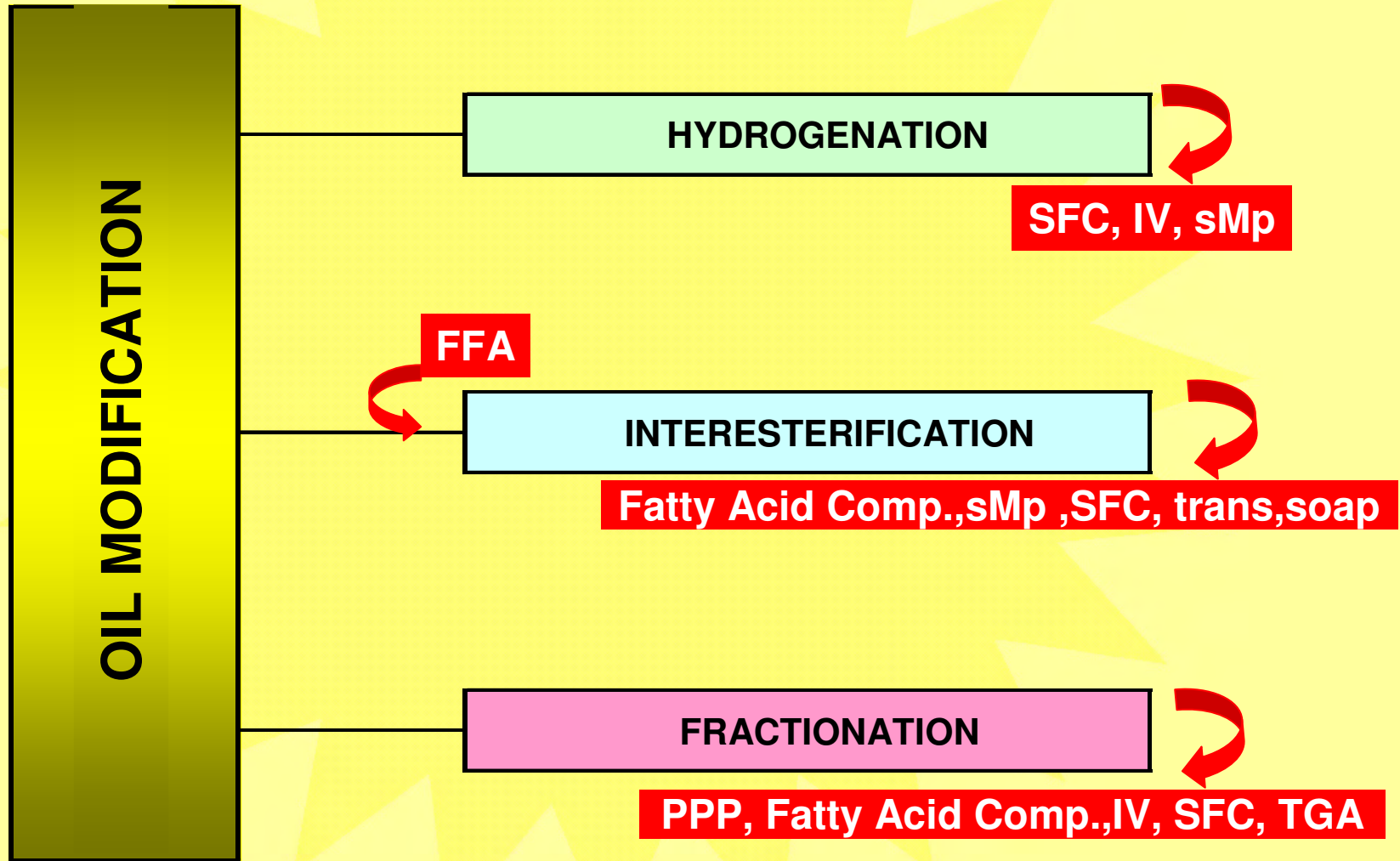
PROCESSING of OILS



FATS AND OILS PROCESSING



FATS AND OILS PROCESSING



TYPICAL SPECIFICATIONS

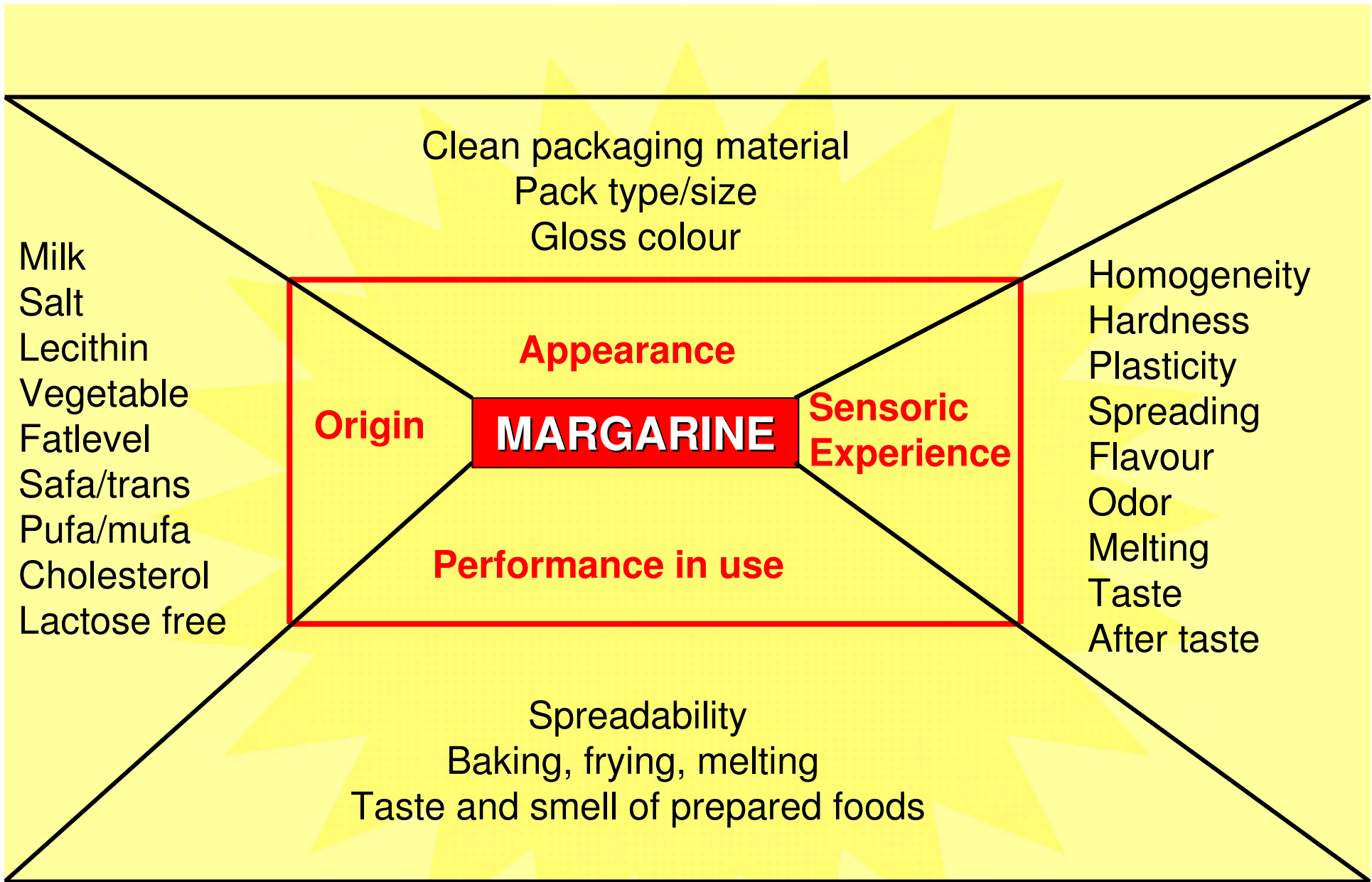
FULLY REFINED OILS

FFA	0.05 - 0.10%
Peroxide value	max. 0.8 meq/kg
Moisture	max. 0.05%
Dirt	neg. paper test
PAH	max. 25/5 ppb
Phosphorous	max. 5 ppm
Fe/Cu/Ni	max. 0.5/0.01/0.1 ppm
Soap	max. 10 ppm
Colour	
Tocopherols	
Taste	Bland



QUALITY CRITERIA for PRODUCT PROPERTIES

MARGARINE QUALITY



CONSUMER PERCEIVED QUALITY

- **Taste**
- **Spreadability**
- **Clean tub or wrapper**
no free oil
- **Good kitchen performance**
baking
shallow frying
- **Healthy**



CONSUMER PERCEIVED QUALITY

- **Wrapper**

- kitchen performance
- hardness
- no oil exudation

- **Tubmargarine**

- taste - oral melt
- spreadability from fridge

- **Healthy tubmargarine**

- no hardened components
- pufa - safa
- ratio C18.2/C18.3

- **Bakery and Industrial Fats and Marg.**

- Performance

MARGARINE QUALITY DEPENDS ON....

