An Introduction to Production, Processing and Applications of Palm and Palm Kernel Oils

Presented By

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At Four Points by Sheraton Toronto Mississauga
Content

- Production
- Processing
- Applications
- Facts about palm oil
WHERE IT ALL BEGAN

Elaeis oleifera

Elaeis guineensis
WILD OIL PALM GROVE
Rainfall: 1500-2000 mm/year, evenly distributed
Temperature: min 22-24°C max 29-33°C
Soil: loose-textured, no hard layer
Sunshine: continuous 5 hours/day
Inheritance of Fruit Forms (DxP)

DURA  X  PISIFERA  TENERA
Germinated Oil palm seeds → Young palm seedling → Planting materials at the nursery → Oil palm plantation
Species: Elaeis guineensis  
Type: Tenera (DXP)  
Planting density: 148 palm/ha  
Nursery period: 24 months  
Economic Life: 25 years  
Palm Height: 2.3 meters  
Harvesting interval: 15 days  
No. of bunches/yr: 19
Bunch weight: 10-15 kg
Fruitlets/bunch: 1000-3000
Oil/bunch: 22-25%
Kernel/bunch: 4%
Fruit shape: Oval
Fruit size: 5 cm
Fruit weight: 10 g
Mesocarp/fruit: 83%
Oil/dry mesocarp: 75%
Kernel/fruit: 7%
FFBs enter the mill for processing.

Sterilization in large pressure vessel/cages.

Stripping in a rotating drum stripper.

Extraction in a homogeneous oil mesh.

Purification in a continuous clarification tank.

Crude palm oil.

Palm kernel.
ANATOMY OF OIL PALM FRUIT

Mesocarp: Palm Oil (PO)

Shell

Kernel: Palm Kernel Oil (PKO)
REFINING OF CRUDE PALM OIL

CRUDE PALM OIL

Physical Refining

Degumming & pre-bleaching

Deacidification and deodorization

Deodorization

RBD Palm Oil

Fatty Acid Distillate

Chemical Refining

Alkali Neutralization

Earth Bleaching

Soap Stock

Acid oil
REFINING OF PALM OIL
FRACTIONATION OF PALM OIL
PALM & PALM KERNEL OIL PRODUCTS
**RBD Palm Oil**
- IV 52-53
- M.Pt. 37-38 °C
- (Sat. fatty acids) S.F.A. 49-50%

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**Palm Olein**
- IV 56-57
- C.Pt. 7-10 °C
- S.F.A. 45%
- Fluid frying oil

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**Soft Stearin**
- IV 40-42
- M.Pt. 47-49 °C
- Margarine base stock

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**Super Olein**
- IV 64-65
- C.Pt. 3-4 °C
- S.F.A. 37%
- Liquid oil blend with soya

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**Palm Mid Fraction**
- IV 42-48
- M.Pt. 27-31 °C
- Margarine base stock

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**Top Olein**
- IV 70-72
- C.Pt. -2 °C
- S.F.A. 30%
- 24 hours at 0°C

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**Palm Stearin**
- IV 32-35
- M.Pt. 52-54 °C

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**Olein Like Fraction**
- IV 56
- C.Pt. 10 °C
- Margarine base stock

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**Super Stearin**
- IV 10-20
- M.Pt. 58-61 °C
- Substitute to hydrogenated fats in margarine

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**Hard Palm Mid Fraction**
- IV 32-36
- M.Pt. 33-3 °C
- Base stock for Cocoa Butter equivalent (CBE)
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Figure 1: From tree to table – the palm oil process

Fresh palm fruit bunches from the plantation

In-country mill

Crude palm oil (CPO)
- Refinery
  - Various palm oils and fats
    - Food industry
      - Biscuits
      - Cakes
      - Chips
      - Chocolate
      - Cooking oil
      - Crisps
      - Frying fat
      - Ice cream
      - Margarine
      - Mayonnaise
      - Pastry
      - Snacks
      - Others

- Various palm oil products
  - Cosmetics
  - Detergent
  - Soap

- Chemical industry
  - Paint
  - Grease
  - Chemicals
  - Others

Palm kernels
- Crushing plant
  - Palm kernel oil (PKO)
  - Palm kernel meal (PKM)
  - Animal feed
    - Meat products

- Various palm kernel oils and fats
  - Chemical industry
  - Livestock industry
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Facts About Palm Oil

- Sustainable
  - The only vegetable oil with internationally recognised sustainable certification
- Natural
  - Free of GMO
  - Expeller-pressed oil
- Versatile
  - Semi-solid
  - Naturally stable – excellent for frying
- Healthy
  - Well-balanced natural oil with unique composition of fatty acids (50:50)
  - Free of trans fatty acid
  - Contains vitamin E, Carotenoids & other phytonutrients
  - Cholesterol free
- Most cost effective raw material - price and quality
- Consistent and abundance in supply
Technical Support
General Advisory Services
Product Technology Transfer
Training – POFP, Seminars, Etc
Consultancy
Trouble Shooting
Thank you

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Palm Fruits at a Glance

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Type: Tenera (DXP)
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Economic Life: 25 years
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Fruitlets/bunch: 1000-3000
Oil/bunch: 22-25%
Kernel/bunch: 4%
Kernel production/year: 8kg
Oil production/year: 42.5 kg

Fruit shape: Oval
Fruit size: 5 cm
Fruit weight: 10 g
Mesocarp/fruit: 83%
Oil/dry mesocarp: 75%
Kernel/fruit: 7%
The Oil Palm Fruits

Basic Information
- Fruits per bunch: 1000 to 3000
- Bunch Weight: 15-25 kg
- Fruit size: 5 cm
- Fruit shape: Oval
- Fruit Color: Yellowish Red
- Fruitlet weight: 10 grams
- Oil per bunch: 23-25%

Mesocarp: crude palm oil
Palm kernel: crude palm kernel oil
Shell
Mature plantation

New variety of oil palm tree

Harvesting of oil palm fruits