

Farmer to Pharma: Commercialisation of Natural Products  
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# Innovative Ingredients from Natural Sources

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Croda

# The Croda Company

- Croda has over 80 years of experience in consumer care
- Leading producer of natural ingredients for high growth markets
- Reputation for innovation, quality products and excellent services; customer focused, service-driven culture
- Unrivalled industry/market knowledge and experience
- Global reach with operations in over 30 countries
- Technical and manufacturing centres in each major region of the world
- Research and development of new ingredients is at the heart of Croda
- Innovation is the spirit that drives us forward

# Croda at a Glance

- Sales & marketing offices, distribution centres & key innovation centres located globally
- 18 manufacturing sites globally
- Over 3600 employees worldwide
- Group turnover in excess of GBP 1 billion
- HQ Cowick Hall, Snaith, UK



# Croda's Business Areas

## Personal Care

Includes  
hair care,  
skin care  
and sun  
care

## Life Sciences

Crop Care

Health Care

## Performance Technologies

Polymer Additives

Lubricants

Home Care

Geo Technologies

Coating & Polymers

# A Natural Products Company

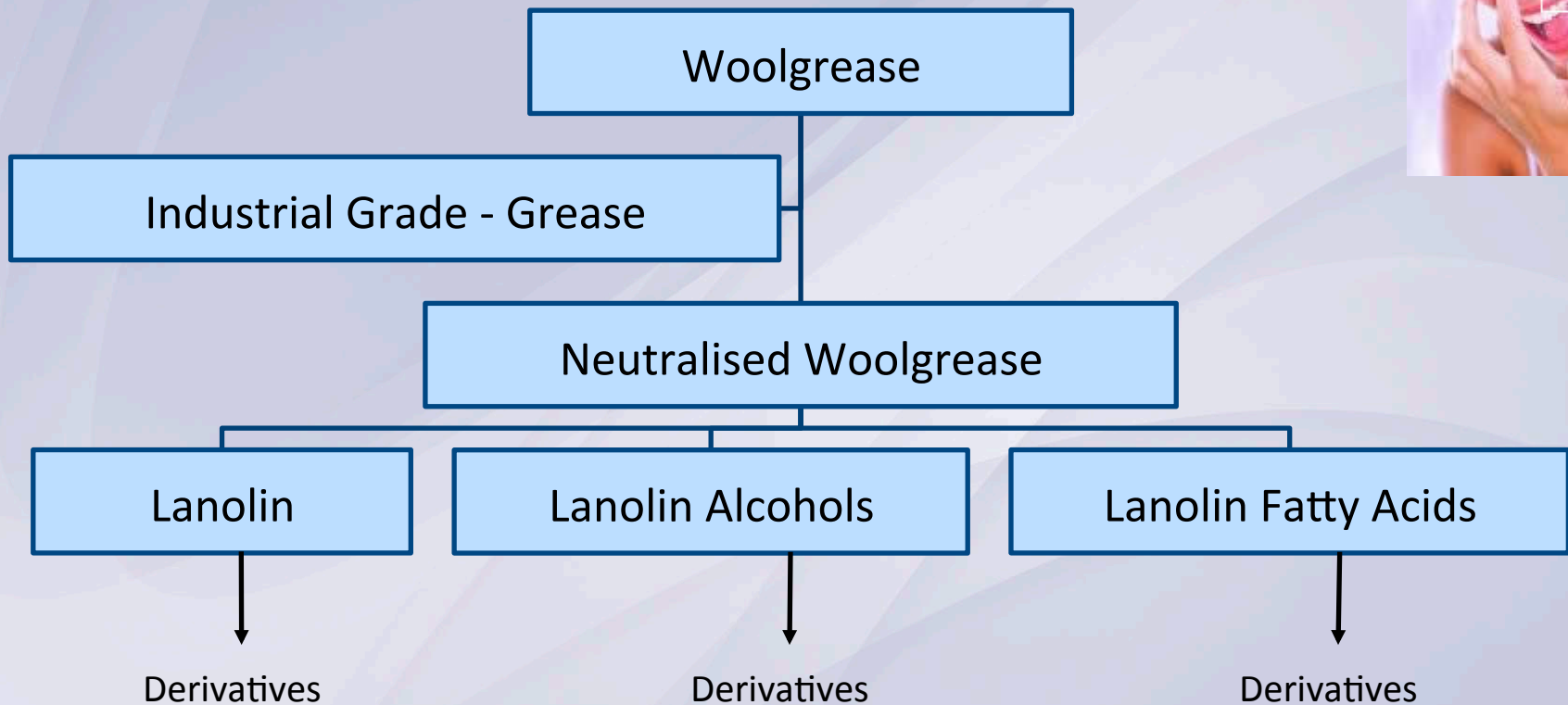
- Croda's business is centred around separation, concentration, purification & derivatisation of natural products
- We have continued to build our expertise in these techniques for over 80 years



# Renewable Chemistry at Croda: A Few Examples

# Lanolin and Derivatives

- Natural raw material source – woolgrease from wool scouring
- 25 kT per annum available for lanolin production worldwide



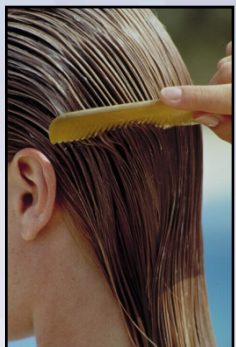
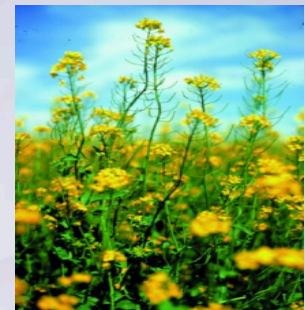
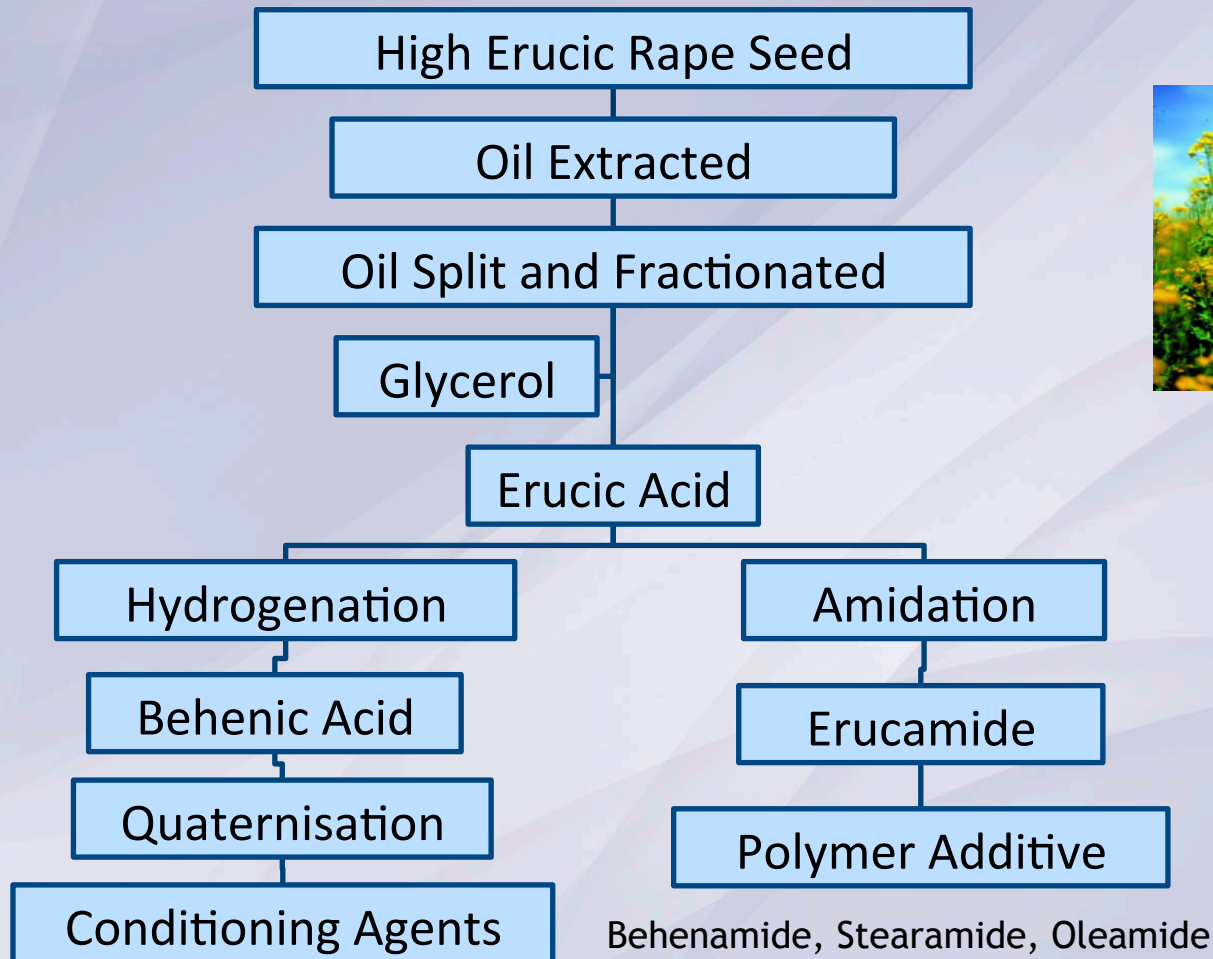


# Lanolin and Derivatives





# Fatty Acid Amides



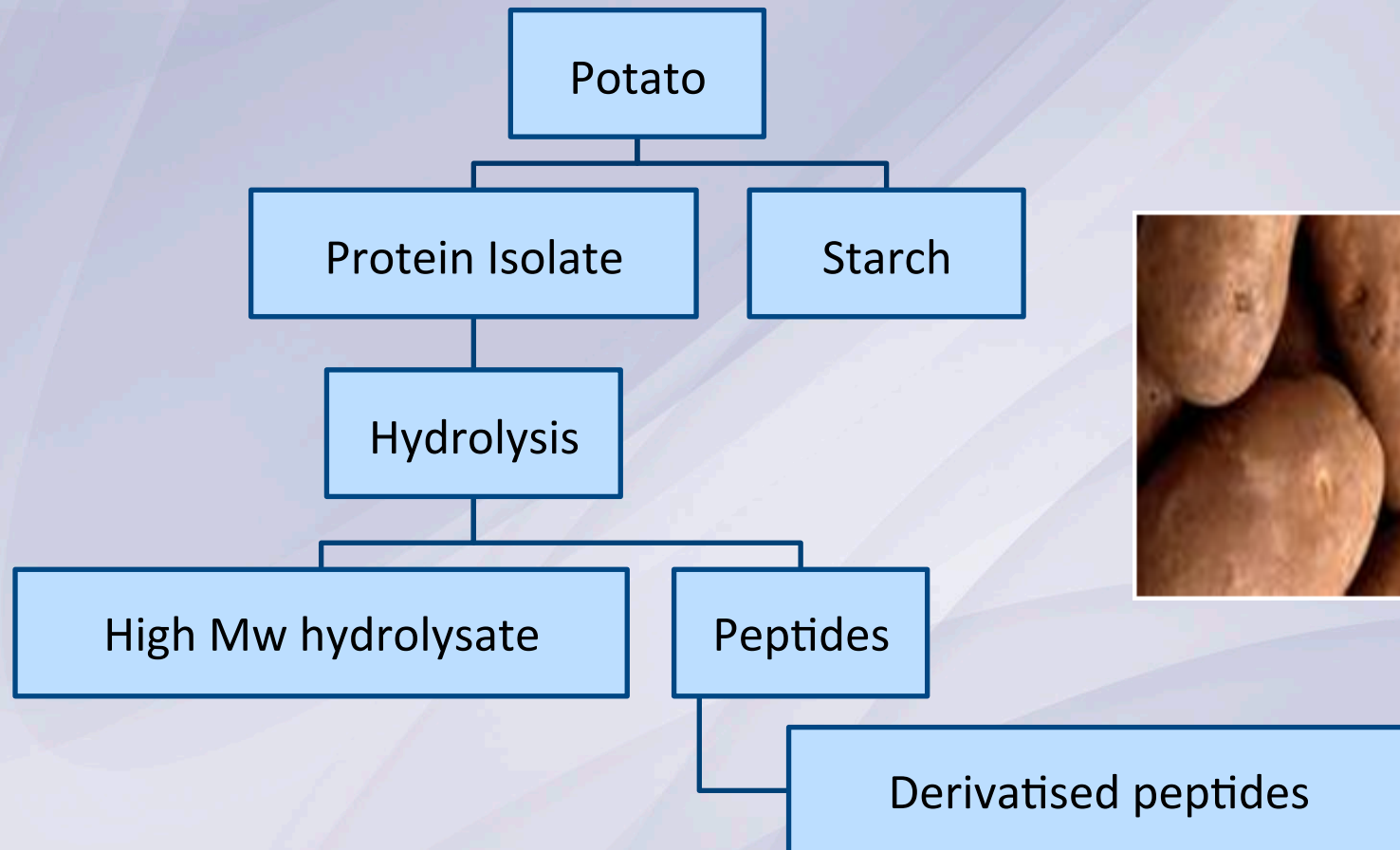
Behenamide, Stearamide, Oleamide

# Fatty Acids - General

- Croda is a large oleo-chemicals producer
- These are predominantly derived from natural renewable resources
  - Sunflower oil
  - Palm oil
  - Coconut oil
  - Rapeseed oil
- Oils are split and fractionated at various manufacturing sites around the world
- Various fatty acids are recovered and used to produce a large range of Croda products via further processing and derivatisation
- Products includes emulsifiers, emollients, surfactants etc



# Proteins and Derivatives



# Proteins and Derivatives

➤ Other sources of protein are readily available e.g.

- Wheat
- Oat
- Soya
- Pea
- Brazil nut
- Cottonseed
- Collagen
- Keratin
- Silk

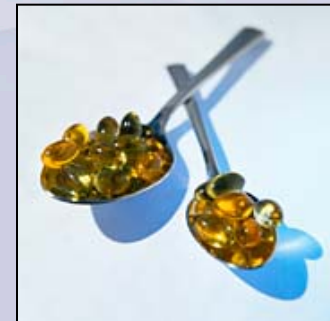
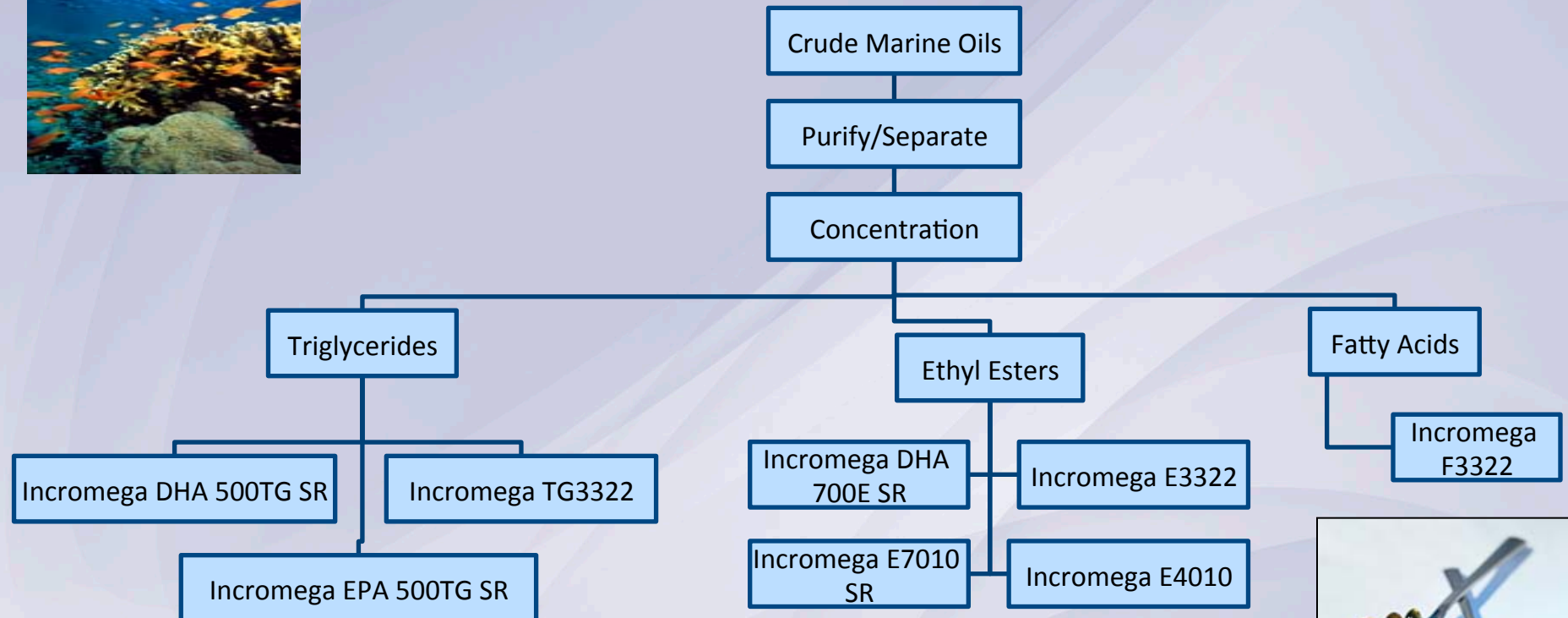


- Hydrolysed proteins are used in hair care and skin care for their moisturising and conditioning properties
- Also use starches and cellulose to make cosmetic ingredients e.g. styling

# Proteins and Derivatives



# Omega-3 Marine Oils





# Omega-3 Marine Oils





# Biotechnology

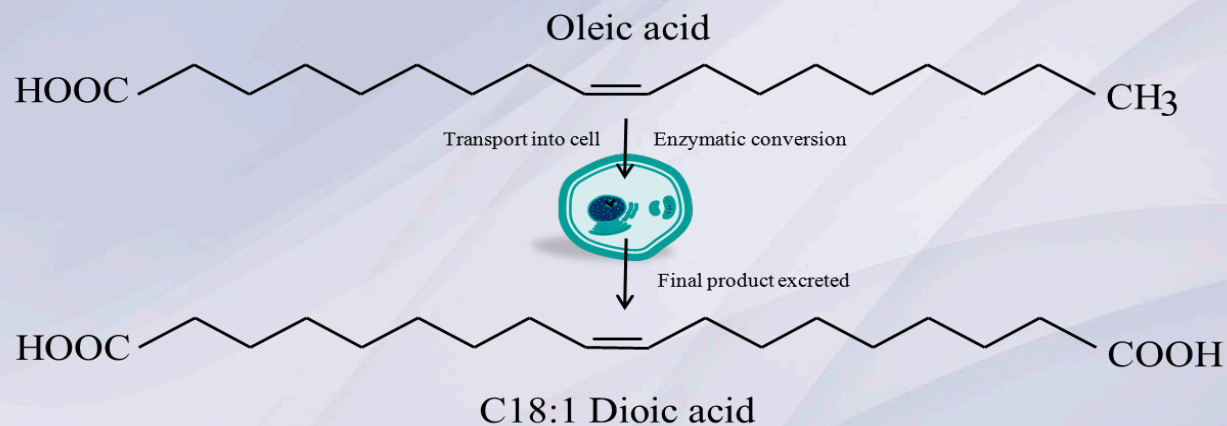
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- The use of (micro)organisms to manufacture value added products
- Can involve use of genetically modified organisms
- Harnesses the enormous chemical potential of living organisms
- Microbes represent the greatest reservoir of chemical diversity on the planet



# White Biotechnology

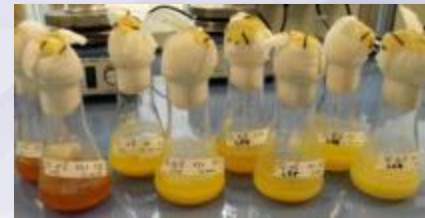
## ➤ ODA White

- A skin lightening active marketed by Sederma.
- Based on oleic acid (C18:1) conversion to  $\omega$ -dioic acid.
- An otherwise very difficult chemical conversion.
- Conversion carried out by yeast biotransformation.



# Green Biotechnology

- A new process for green efficacy
  - Use of undifferentiated plant cells to synthesise targeted phytomolecules
  - Unlimited availability - no reliance on crop harvest or seasonality
  - Sustainable approach not taking up valuable farming land
  - No fertilizer, no pesticide, no preservatives
  - Enhanced yields of the phytochemicals of interest compared to whole plants extractions



# Blue Biotechnology

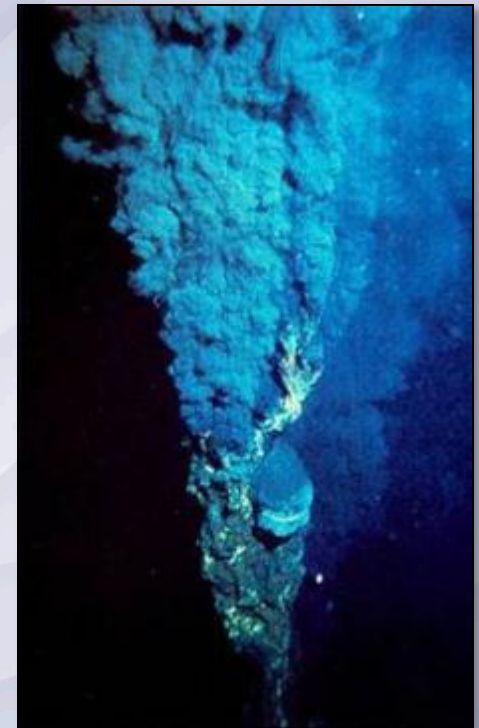
## Venuceane™

Cosmetic skin active produced by fermentation

Marine extremophile micro-organism from deep sea hydrothermal vents

- High pressure (200 bars)
- High temperature (about 75°C)
- No light
- Little oxygen
- Toxic environment rich in free radicals

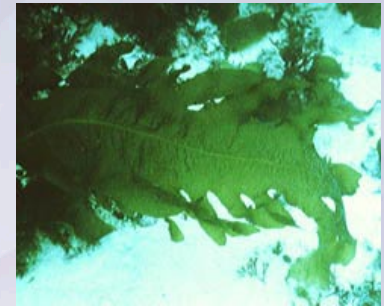
Survives by synthesizing an enzymatic cocktail which also offers beneficial properties to the skin



# Other Natural Sources

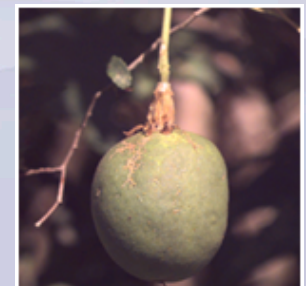
## ➤ Botanical actives

- Blue Lotus extract
- Wakame extract (Japanese Kelp)



## ➤ Amazonian Oils

- Murumuru
- Babassu
- Andiroba
- Pequi
- Maracuja
- Castanha do Brazil
- Cupuacu





# Future

- Croda recognises the business risk associated with a longer term reliance on fossil fuel derived raw materials
- Is committed to mitigating this risk and further developing its reliance on renewable resources
- Recognises importance of sustainable development and environmental improvement
- Dedicated to Bio-innovation
- Green chemistry will be a major contributor to future process and product innovation
- Biotechnology (white, green and blue) will become a more important tool for developing the next generation of innovative products
- Is committed to reducing energy requirements and moving to renewable energies