



Biotechnology Seminar
Ambassade du Royaume des Pays-Bas
March 15, 2007
Paris, France

Unlimited. **DSM**

The DSM Business Card

- Top 30 global chemical industry
- EUR 8,4 billion revenues
- 22.000 people on 250 sites worldwide
- Focus Life Sciences and Performance Materials
- R&D (> 300 million/year)
- Key values: People – Planet – Profit
- Leader Dow Jones Sustainability Index

Unlimited. **DSM**

Vision 2010: Accelerating Innovation

Input

- Building on excellent R&D & innovation capabilities
- € 30 → € 70 mln additional annual budget for selected innovation programs
- 15% of Capex → New Business Development
- 250 FTE extra
- Dedicated effort:
4 Emerging Business Areas



Increase Innovation

- Stronger business- driven innovation
- Up to € 1 billion of sales by 2010
- 26 New Products in 2006
- 300 Patent applications filed
- Building mid to long-term business via Emerging Business Areas:

- 1 Biomedical Materials
- 2 Specialty Packaging
- 3 Personalized Nutrition
- 4 White Biotechnology

DSM is everywhere...

Transformation from coal-mining to life sciences and performance materials

DSM Dyneema produces Dyneema[®], a lightweight, super strong high performance polyethylene fiber. Dyneema[®] is an important component in ropes, cables and nets in the fishing, shipping and offshore industries.

DSM Nutritional Products produces Vitamins and UV filters for use in the personal care industry.

DSM Coating Resins produces synthetic coating resins for use in the marine industry.

DSM Fibre Intermediates produces caprolactam as a raw material for Nylon-6, which is used in textiles, and acrylonitrile, which is a raw material for acrylic fibers.

DSM Engineering Plastics produces insulator materials for LV switchgear and ITE components, lighting fittings and armatures, motors, wire and cable, enclosure housings and electrical equipment.

DSM Nutritional Products produces vitamins, carotenoids, enzymes, amino acids and other ingredients for use in the animal feed and pet food industries.

PeptoPro[®], a sports recovery ingredient, a product of DSM Food Specialties, differs from other sports and energy drinks in that it enables faster replenishment of muscle energy stores.

DSM Melamine produces melamine, which is mainly applied in adhesives and impregnating resins for woodbased panels used in the construction industry.

DSM Fine Chemicals products are used in coatings, resins, dyes, pigments, polymers and plastics all around the world, both as base products and as additives that give the end products special qualities, such as a strength, UV resistance and elasticity.

DSM NeoResins produces extremely durable resins specially designed for the marine industry.

DSM Composite Resins produces uncoupled polyester resins, gel coats, string and banded and polymeric plasticizers for use in glass reinforced plastics applications in the marine industry.



**DSM does both humanitarian assistance
and development work**



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A partnership between the UN World Food Programme and DSM



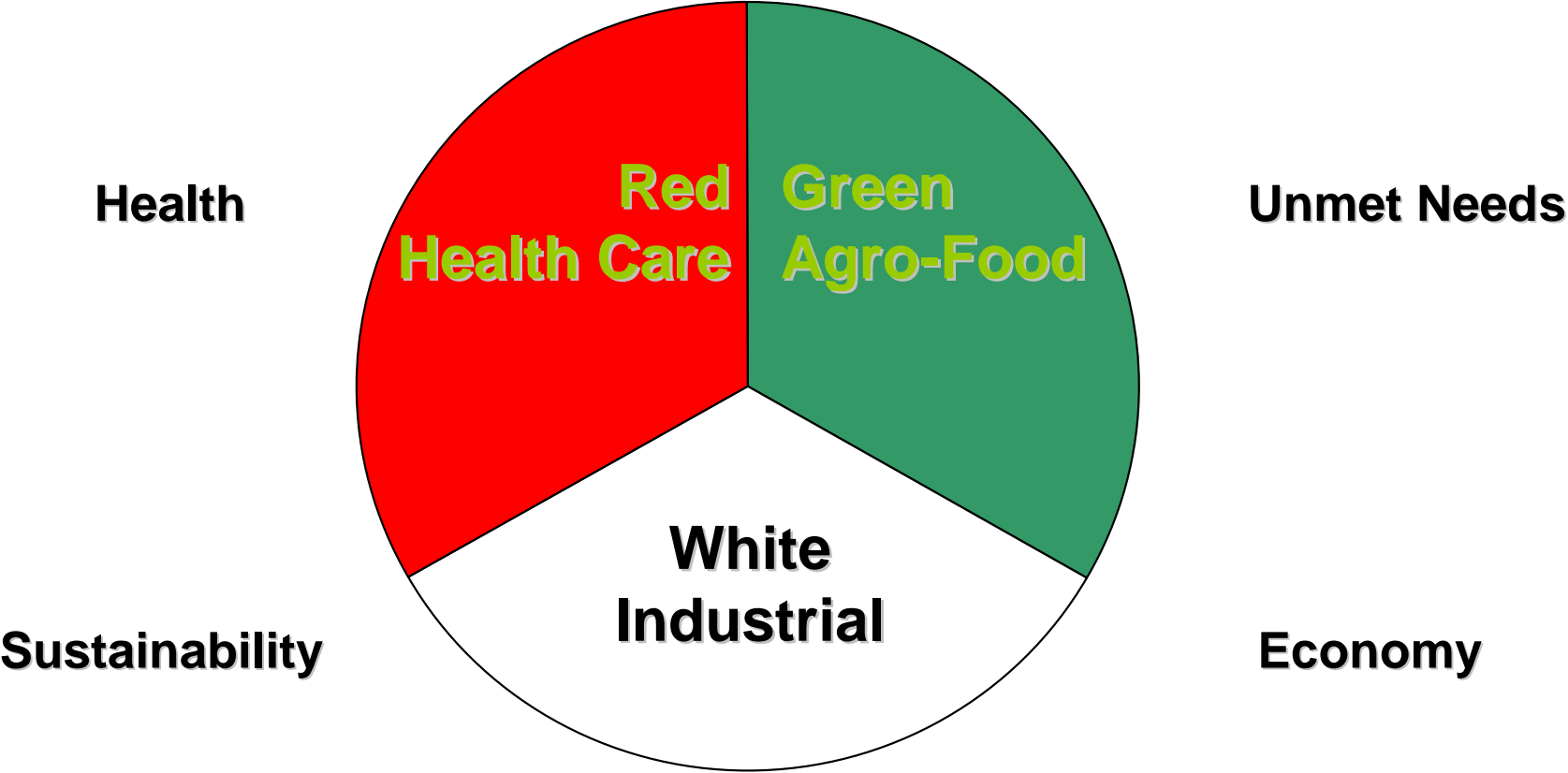
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Picture © WFP

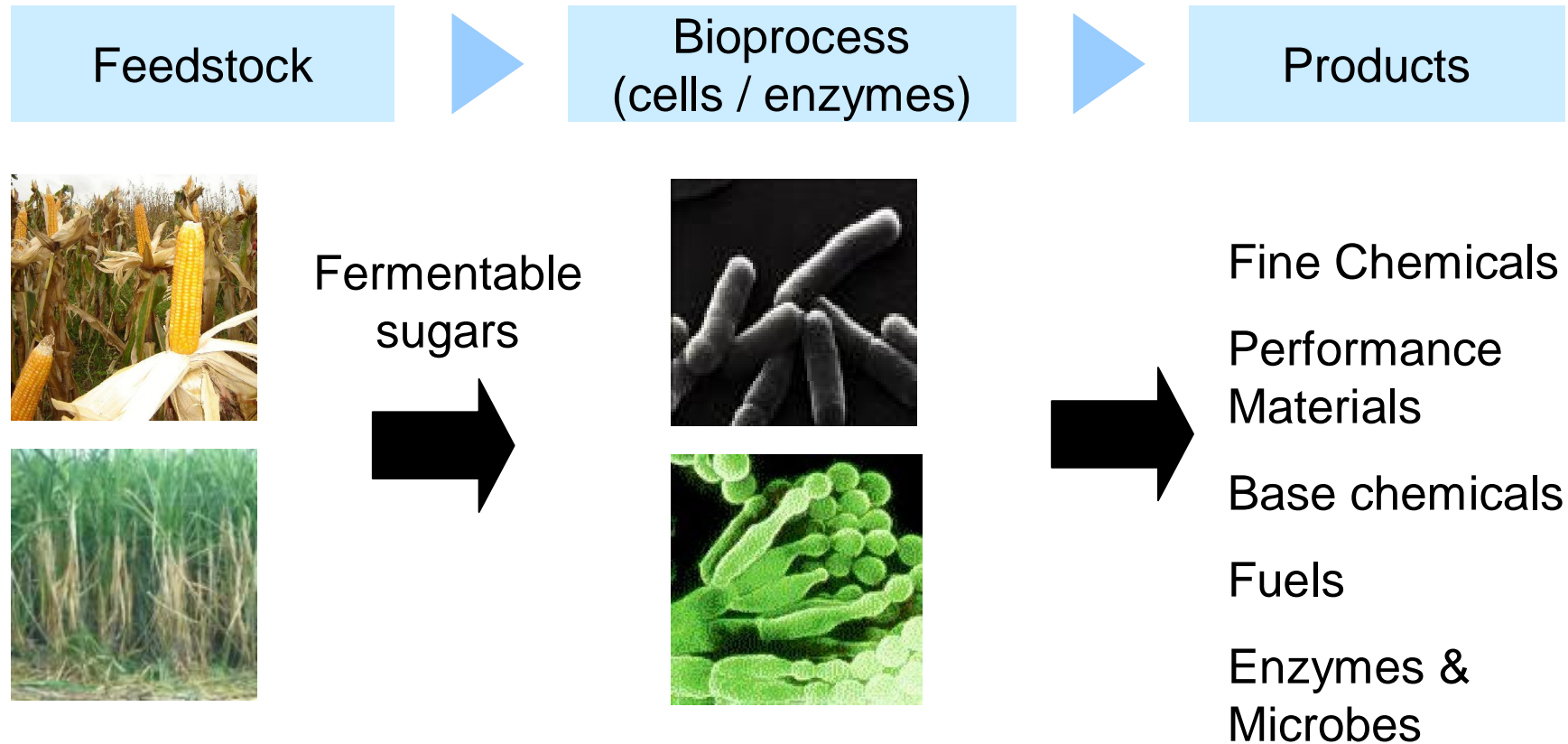
White Biotechnology

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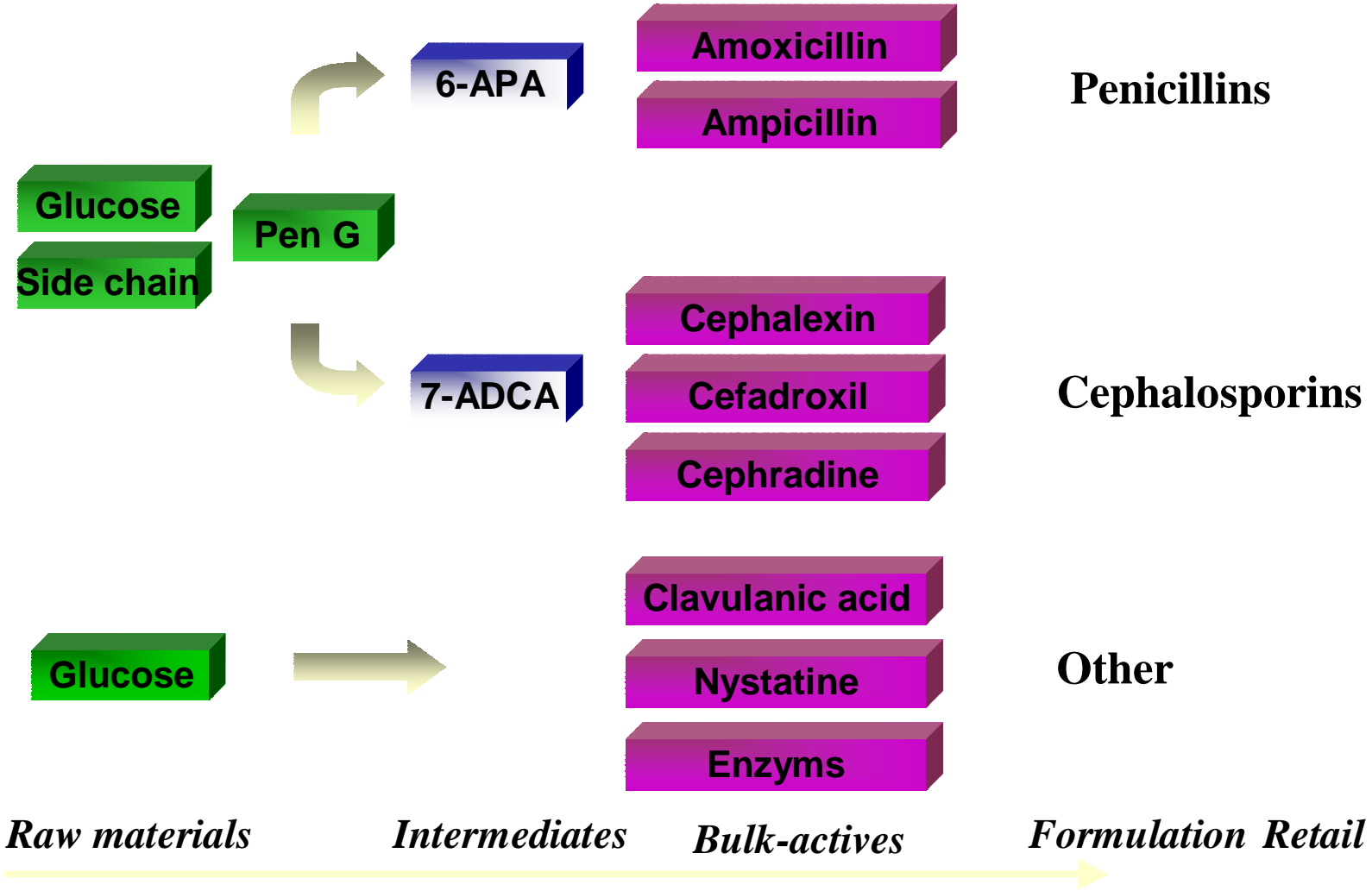
The colors of biotechnology



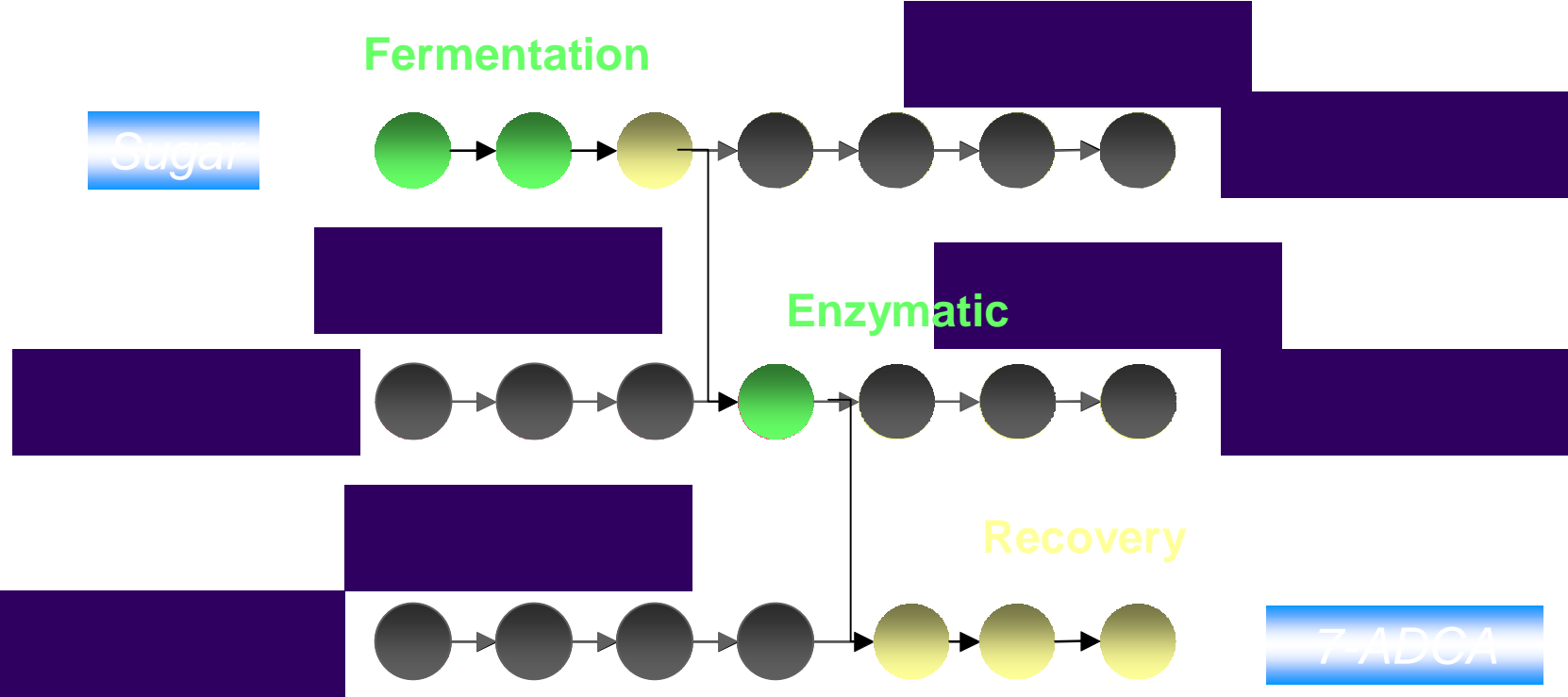
White Biotechnology



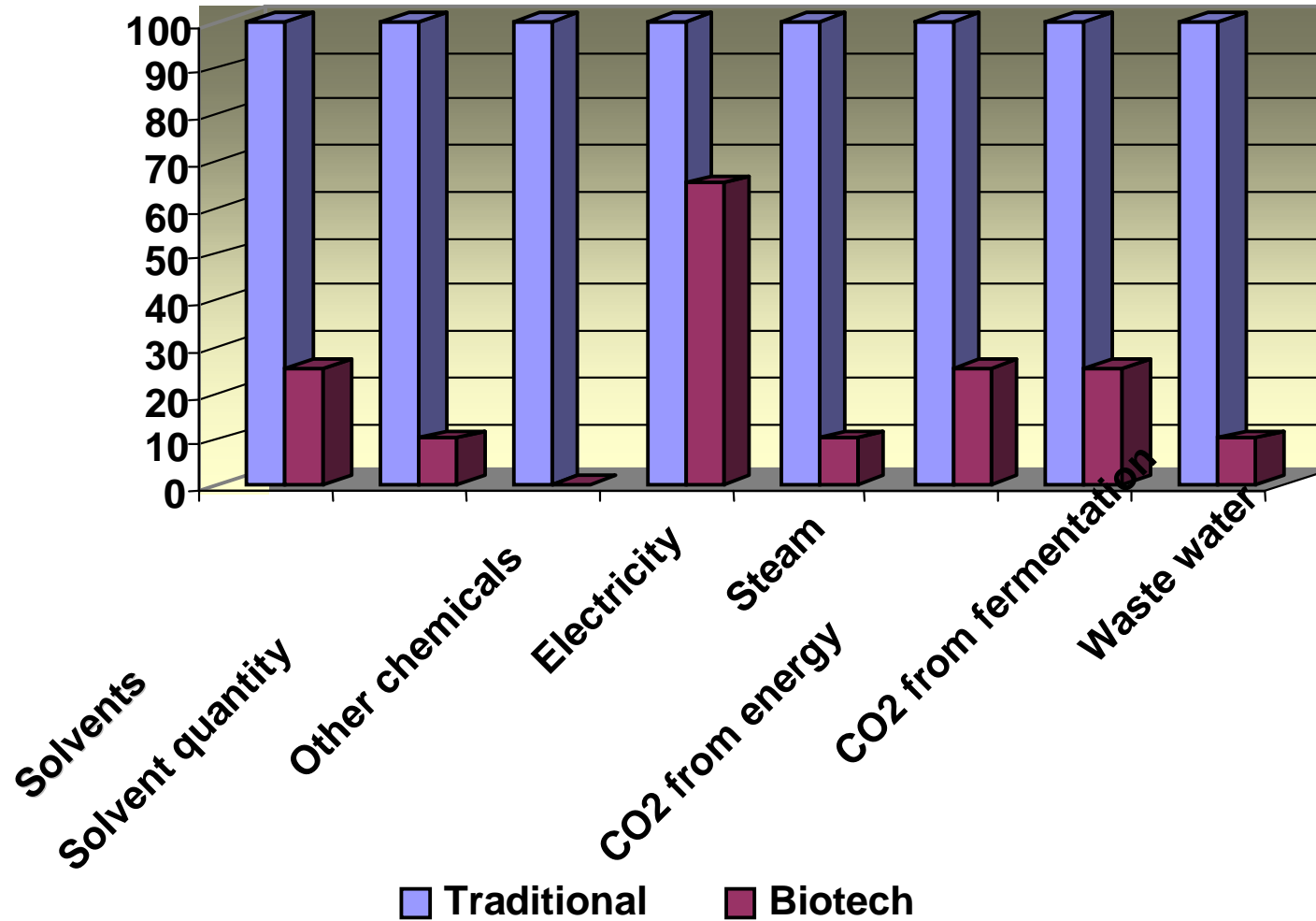
Antibiotics



Traditional & New 7-ADCA route

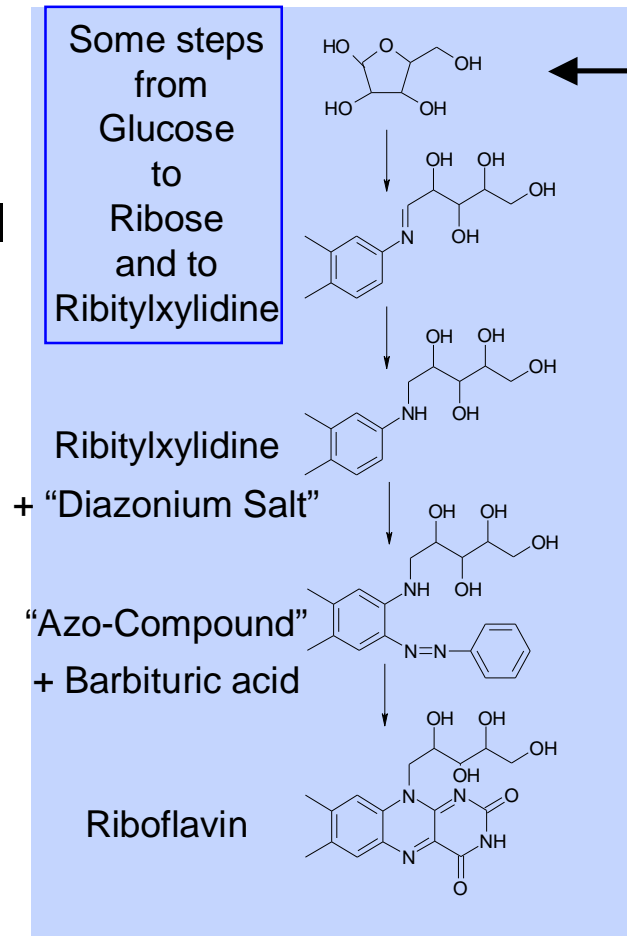


Advantages of Biotechnology



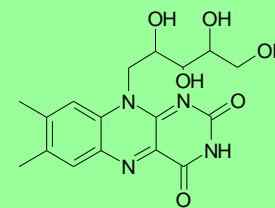
Traditional and new Vitamin B₂ production

Traditional



Glucose

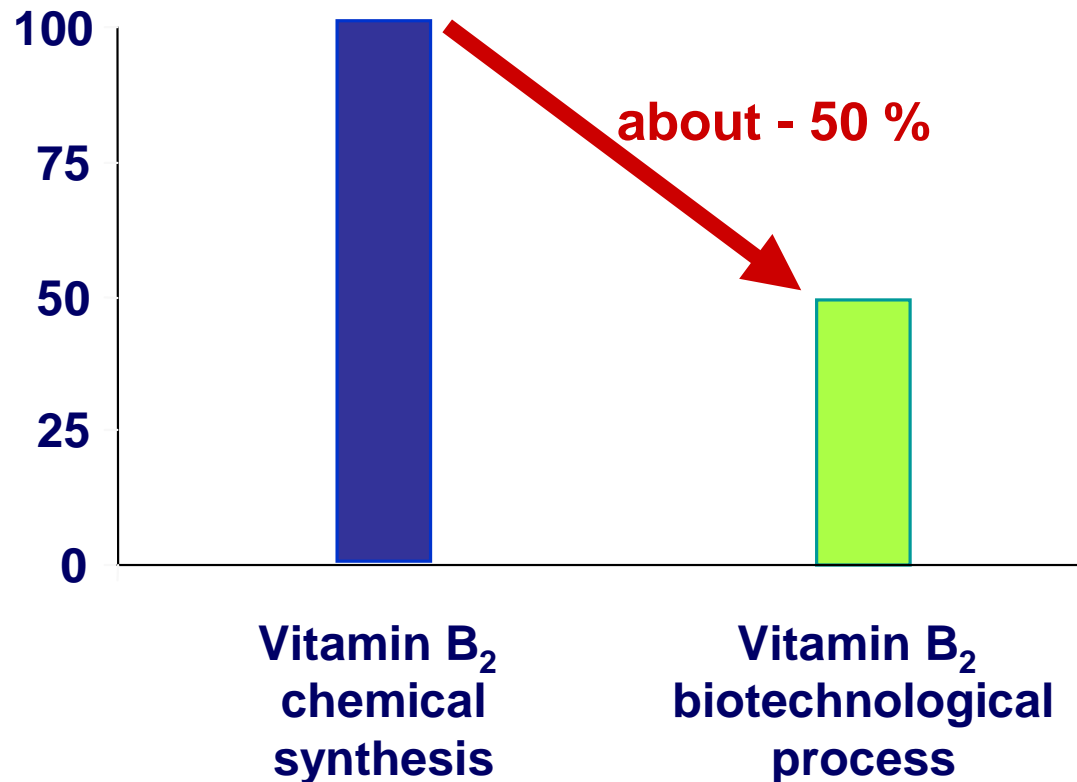
Biotech



Riboflavin

Economic Advantages of the biotechnological Vitamin B₂ process

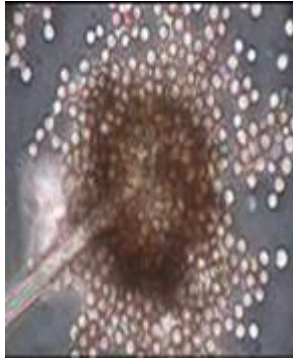
Costs (%)



**Competitive
manufacturing costs**

**Potential for further
cost reductions
to maintain
competitiveness in
future**

White Biotechnology at DSM via Genomics



Aspergillus niger

Saccharomyces cerevisiae

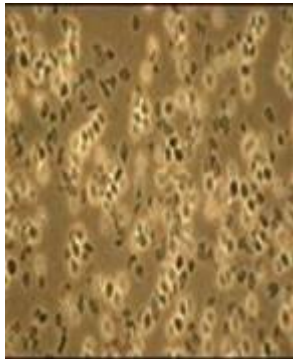
Kluyveromyces

Lactic acid bacteria

Gluconobacter

Propionibacterium

Bacillus



Blakeslea trispora

Mortiella alpina

Penicillium chrysogenum

Escherichia coli

PER.C6 cells

Enzymes, citric acid

Live cultures, enzymes

Intracellular enzymes

Live cultures

Vitamin C

Vitamin B12

Enzymes, vitamin B2

Beta-carotene

Arachidonic acid

Antibiotics

Enzymes, fine chemicals

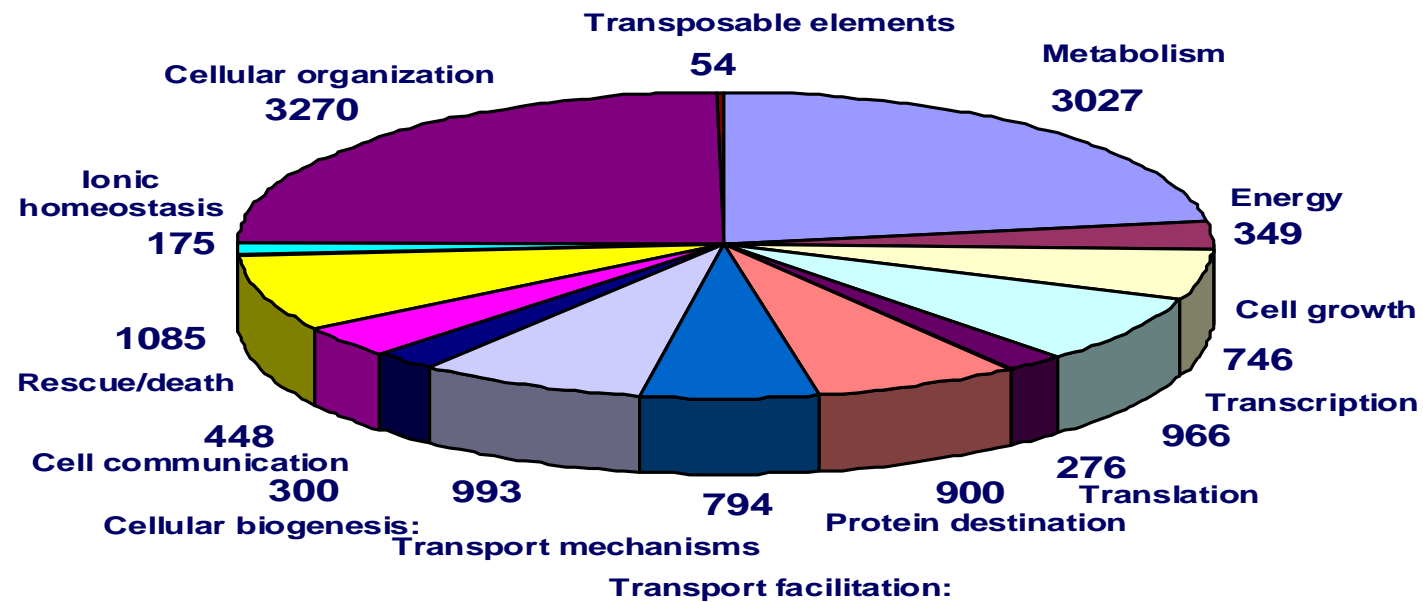
Pharmaceutical proteins

Strain & process development / New products

Genome sequence available

Power of Genomics...

- Many potential new products
- *A. niger* protein classification



New enzyme product: Brewers Clarex

Brewers Clarex™

Novel enzyme for prevention of haze formation in beer

Semi-industrial beer production trials

40% less haze compared to commonly used chemical clarifying agent (PVPP), no negative effect on foam and taste

