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# Activity 2.3 Life Sciences and Biotechnology for sustainable non-food products and processes

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E-2 Biotechnology



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## Key Action 5: Sustainable Agriculture, Fisheries, Forestry, Rural Development

### FIVE MAIN RESEARCH AREAS

5.1 Sustainable agriculture and fisheries

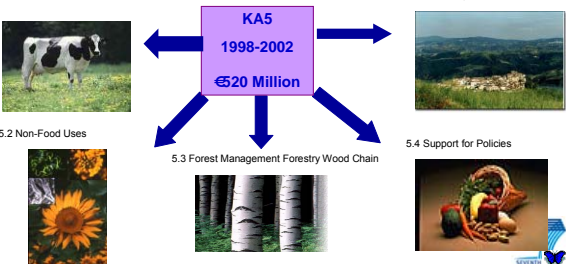
5.2 Non-Food Uses

5.3 Forest Management Forestry Wood Chain

5.4 Support for Policies

5.5 Rural Development

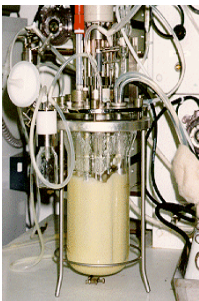
KA5  
1998-2002  
€20 Million




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## 5.2 Nonfood uses



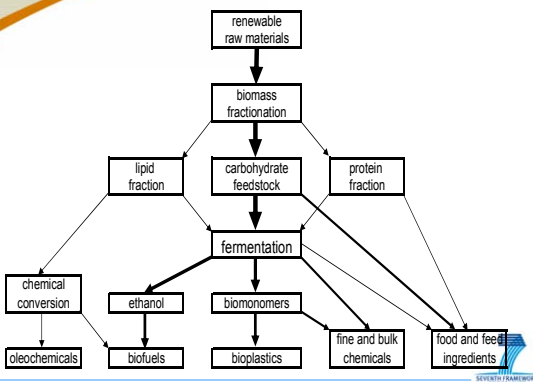
- Oilseed
- Grain
- Fibres
- Solid Liquid Fuels
- Solvents
- Plastics
- Bulk chemicals
- Fine chemicals
- Textiles
- Oils



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## General concept of a biorefinery



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    graph TD
      A[renewable raw materials] --> B[biomass fractionation]
      B --> C[lipid fraction]
      B --> D[carbohydrate feedstock]
      B --> E[protein fraction]
      C --> F[chemical conversion]
      C --> G[fermentation]
      D --> G
      E --> H[food and feed ingredients]
      F --> I[oleochemicals]
      G --> J[ethanol]
      G --> K[biomonomers]
      G --> L[fine and bulk chemicals]
      J --> M[biofuels]
      K --> N[bioplastics]
      H --> O[food and feed ingredients]
  
```

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## Policy framework for renewable energy

- Policy papers and legislation adopted
  - White Paper on renewable energies - 1997
  - Green Paper on security of energy supply – 2000
  - Directive on electricity from renewable sources - 2001
  - Biofuels Directive – 2003
  - Energy taxation Directive – 2003
  - Biomass Action Plan – 2005
  - Biofuels Strategy – 2006
  - Renewable Energy Roadmap – end 2006
  - Strategic EU Energy review – starting 2007




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## Support from Common Agricultural Policy

- CAP reform (2003)
  - Decoupled income support
  - Non-food (energy) crops on set-aside areas
  - Energy crop premium
  - Reduced scope for steering production
- Sugar reform (2005)
  - Sugar beet for ethanol eligible for both regimes exempt from quotas
- Rural development policy (2007-2013)
  - Menu of measures for renewable energies, e.g., biomass supply chains, biofuels processing capacity on/near the farm



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**Environmental Technologies**

- 6th Environmental Action Programme – 2002-2012
- COM(2001)609
- Climate change, Nature and biodiversity loss (sustainable aquaculture), Environment and health.
- Environmental Technology Action Plan (ETAP) COM(2004)38
- Biotechnology for industrial processes
- Biomass for energy and fuel.
- Bio-remediation.
- Climate change COM(2005)35 final
- Reducing greenhouse gas emissions by 8% below level of 1990 Kyoto Protocol – entered into force Feb. 2005
- Environment and health COM(2003)338 final
- Action Plan
- Sources of pollution and health effects (biomonitoring).
- European Parliament resolution on the promotion of crops for non-food purposes

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**Technology Platforms**  
supporting pillar 3 of Knowledge-Based Bio-Economy

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**Activity 3:**  
**Life sciences and biotechnology for sustainable non-food products and processes**

**Area 2.3.1:**  
**Improved biomass and plant based renewables**

**Area 2.3.2:**  
**Bioprocesses**

**Area 2.3.3:**  
**Environmental biotechnologies; Use of waste and by-products**

**Activity 3:**  
**Life sciences and biotechnology for sustainable non-food products and processes**

**Area 2.3.1 Improved biomass and plant based renewables**

**Call 1**

- Understanding Plant Cell Walls for optimizing Biomass potential
- Novel plants for energy production
- Plants providing oils of the future
- New forest based products and processes
- Plant made recombinant pharmaceuticals for animals
- Biological Polymers from plants
- Technical, socio-economic, geographic and regulatory aspects of future non-food crop systems in particular related to co-existence and safety of agri-food chains
- Identification of optimal terrestrial and aquatic biomass and waste for Bioproducts

**Call 2A**

- The expression and accumulation of valuable industrial compounds in plants

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**Area 2.3.2 Bioprocesses**

**Call 1**

- Development of cellulases for lignocellulosic biomass pre-treatment
- Development of enzymes for lipid modification and activation
- Improved biocatalysts for bioprocesses
- Study of microbial stress for more robust industrial micro-organisms
- Metabolic engineering and modelling

**Call 2A**

- Novel enzymes and microorganisms for biomass conversion to bioethanol
- The search of novel enzymes and microorganisms for different bioprocesses
- Microbial genomics and bio-informatics
- Biotechnology for the conversion of biomass and waste into value-added products

**Activity 3:**  
**Life sciences and biotechnology for sustainable non-food products and processes**

**Area 2.3.3 Environmental biotechnologies: Use of waste and by-products**

**Call 1**

- The use of Synthetic Biology for the solution of environmental problems
- Microbial gene expression under condition of stress
- Novel methods of treatment of animal by-products for the production of substances with biologically valuable functional properties

**Call 2A**

- Novel biotechnology approaches for utilizing wastes, including aquaculture wastes, to make high added value products
- Exploring molecular microbial diversity in aquatic environment or the soil

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## Biorefineries

**will be supported in two FP7 Themes:  
 Food, agriculture and bio-technology and Energy**

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## Renewable fuel production

### Technology development

#### Biorefinery

- Developing biorefinery schemes to be integrated in existing industrial complexes
- Forest based biorefinery
- New uses for glycerine in biodiesel plants

#### First generation biofuels

- Cost reduction of bioethanol production from sugar and starch crops
- Cost reduction of biodiesel production from oil crops, animal tallow and used cooking oils

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## Renewable fuel production

### Technology development

#### Second generation fuel from biomass

- Pre-treatment/Hydrolysis/Fermentation of lignocellulosic biomass for ethanol production
- High purity syngas cleaning technologies for biofuels
- Biological conversion of syngas into liquid biofuels
- Synthetic biofuels via gasification. Production and testing
- Hydrogenation of oils and fats

#### Biofuels use in transport

- Large scale demonstration of liquid and gaseous biofuels' use in transport/ vehicles

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## Staying informed

**CORDIS**

**BioMat**

**RESEARCH**

**Calls for proposals**  
<http://cordis.europa.eu/en/home.html>

**Research web site**  
[http://ec.europa.eu/research/future/index\\_en.cfm](http://ec.europa.eu/research/future/index_en.cfm)  
[http://ec.europa.eu/research/energy/index\\_en.htm](http://ec.europa.eu/research/energy/index_en.htm)  
[http://ec.europa.eu/research/agriculture/index\\_en.html](http://ec.europa.eu/research/agriculture/index_en.html)

**Energy Policy**  
[http://ec.europa.eu/energy/index\\_en.html](http://ec.europa.eu/energy/index_en.html)

**Conferences, proceedings, Newsletter**  
[http://ec.europa.eu/research/energy/gp/gp\\_events/article\\_1567\\_en.htm](http://ec.europa.eu/research/energy/gp/gp_events/article_1567_en.htm)  
[http://ec.europa.eu/research/energy/nn/nn\\_pu/renews/article\\_1402\\_en.htm](http://ec.europa.eu/research/energy/nn/nn_pu/renews/article_1402_en.htm)  
[http://www.europa.eu.int/comm/research/conferences/2005/kbb/index\\_en.html](http://www.europa.eu.int/comm/research/conferences/2005/kbb/index_en.html)  
<http://biomatnet.org/home.html>  
<http://www.epbio.net/workshops.htm>

**Biomass Action Plan**  
[http://ec.europa.eu/energy/res/biomass\\_action\\_plan/green\\_electricity\\_en.htm](http://ec.europa.eu/energy/res/biomass_action_plan/green_electricity_en.htm)

**EU Strategy for Biofuels**  
[http://ec.europa.eu/agriculture/biomass/biofuel/index\\_en.htm](http://ec.europa.eu/agriculture/biomass/biofuel/index_en.htm)

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