Kick-off meeting EUROLIGNIN

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Lignin expertise of ATO (1)

- Fundamental and applied research
  - Network of suppliers, R&D companies and (potential) end-users
- Chemical and physical characterisation of lignin
  - lignosulfonates, kraft, sulfur-free, modified lignins
    - Composition
      - sugar residues, functional groups, molecular weight (HPSEC)
      - instrumental analysis (FTIR, NMR)
    - Properties
      - rheology
      - thermal stability and reactivity (TGA, DSC, DMTA)
    - Structure-properties relationship

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Lignin expertise of ATO (2)

- Application development
  - wood adhesive
    - plywood / fibre boards
  - (bio)polymer additive
    - anti-oxidant, U.V. stabiliser,
    - colouring agent
  - coatings
  - wood preservative
  - surfactant, emulsifier,
  - plasticiser in cement

Lignin based wood adhesive (1)

- Goals
  - (partial) replacement of PF-resins
  - environmentally friendlier product
  - (cheaper product)
- Achievements
  - replacement up to 45 wt%
  - press temperature of 140 °C
  - improvement properties
    - higher press temperature
    - lignin modification by methylolation

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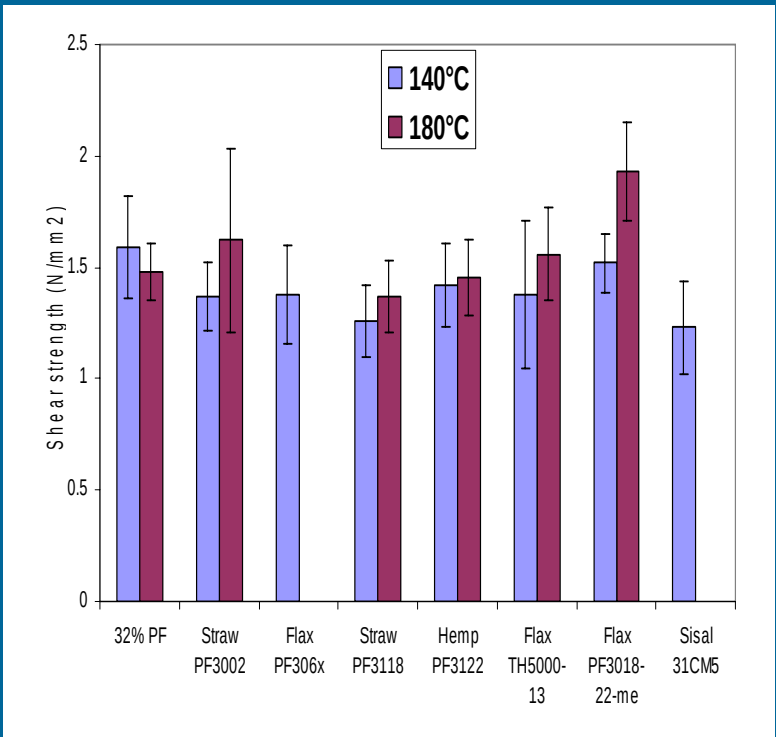
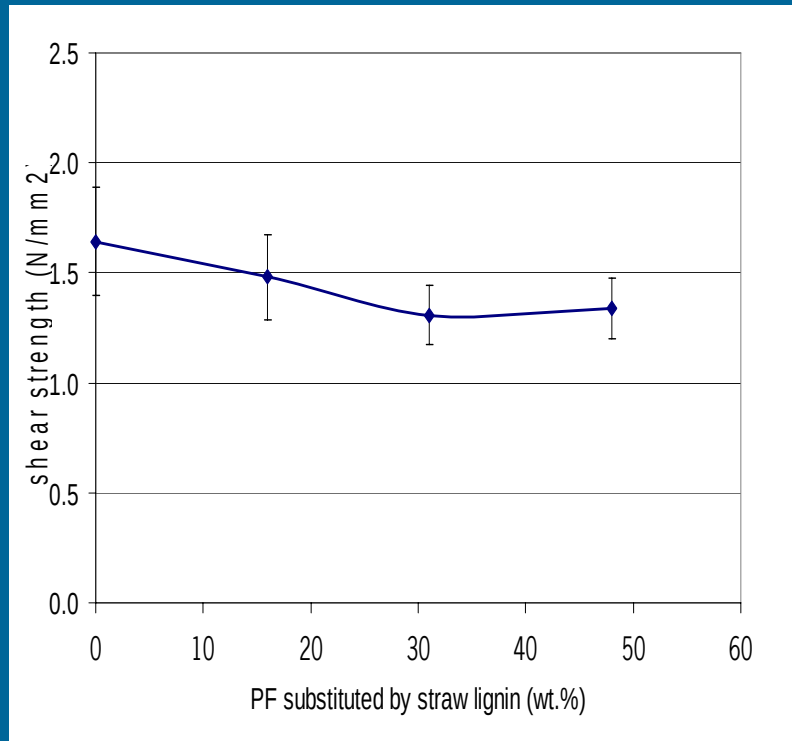
Lignin based wood adhesive (2)



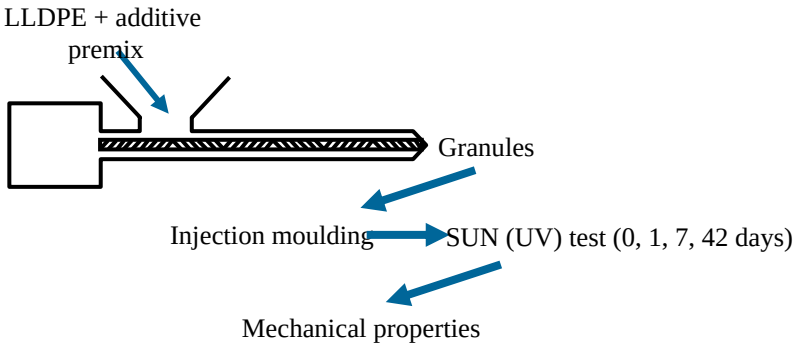


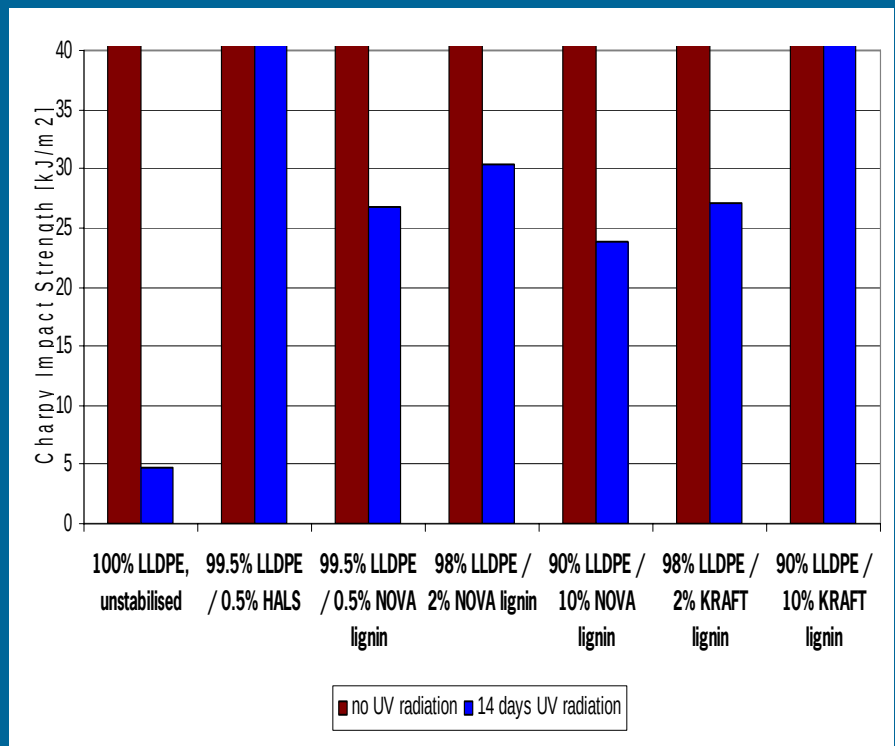
Lignin as colouring agent and U.V. stabiliser (1)

- Goals
  - development natural based dyes
  - colouring and stabilising of polymers like PP, PE
  - elimination of conventional anti-oxidants and U.V. stabilisers

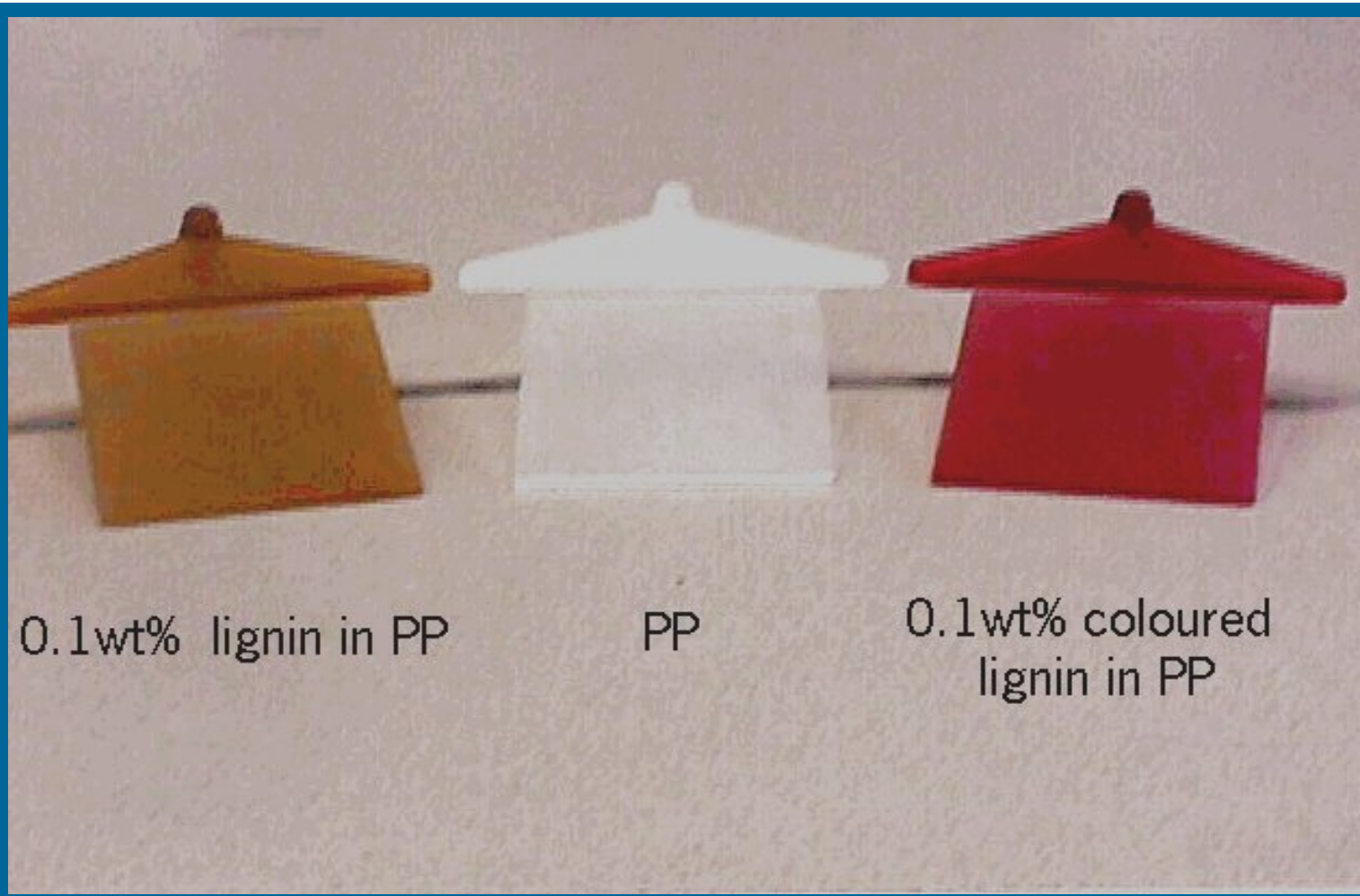
- Achievements
  - different colour shades can be produced
  - improved U.V. stability
  - mechanical properties are not adversely affected
  - improvement of impact strength

Lignin as colouring agent and U.V. stabiliser (2)





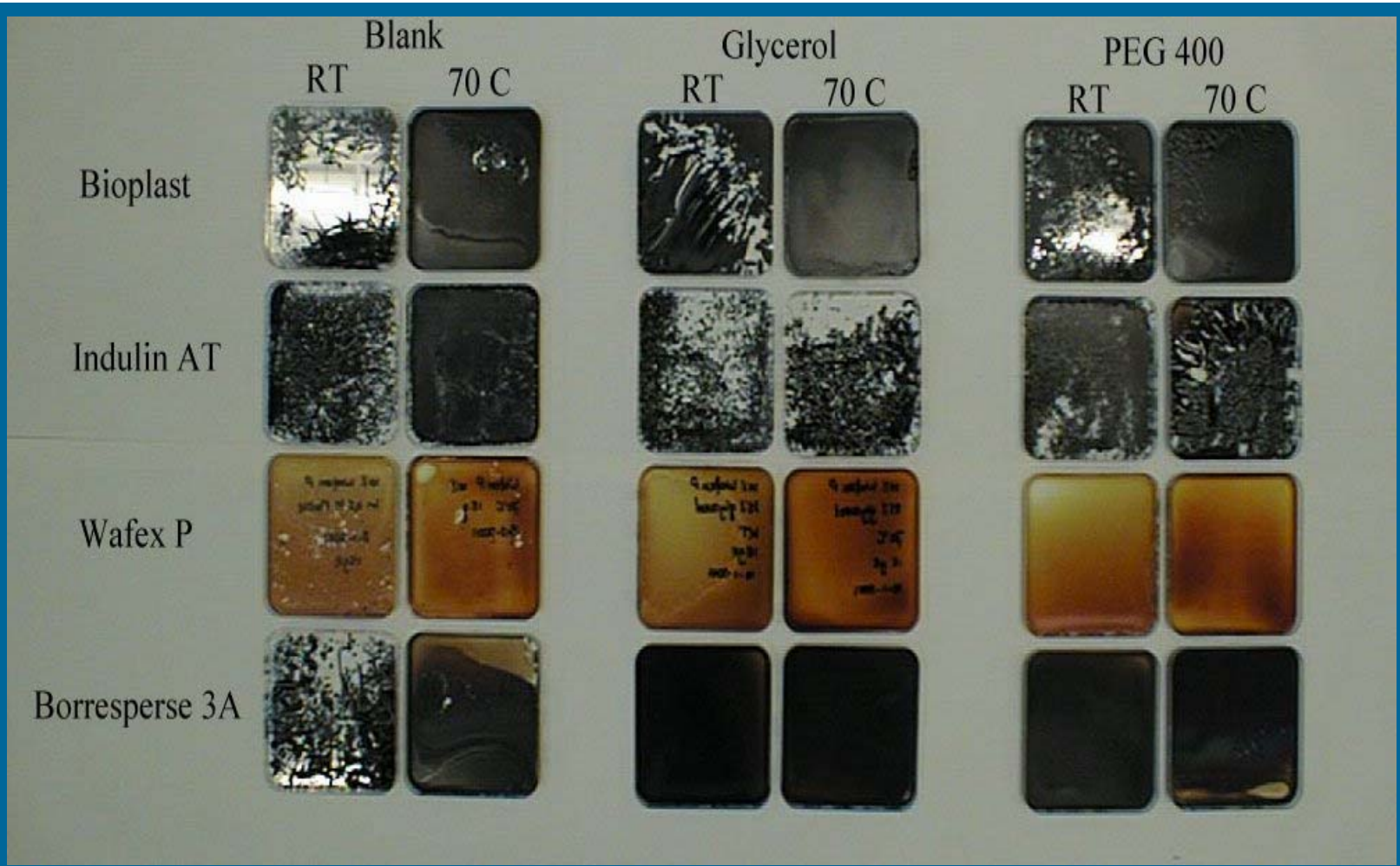
Lignin as colouring agent and U.V. stabiliser (3)



Lignin based coatings (1)

- Goals
  - development of controlled release coating for active ingredients, like urea in fertiliser
- Achievements
  - lignin/plasticizer has good film forming properties
  - free film has good water resistance
  - lignin based coating reduces urea release
  - further improvement is necessary

Lignin based coatings (2)



Lignin projects (1)

- Value added lignins as renewable raw materials dedicated to the end users requirements out of black liquor from existing pulp mills (VALOIR)
  - EU funded, 1998-2001, Granit, University of Freiburg, Holderbank, Schauman, University of Lausanne, Vantico, Celesa, ATO (coordinator)
- Characterisation and application of Novafibre lignin
  - Kiram AB, 2000
- Development of a controlled release coating based on lignin for slow release of urea
  - Agrium, 2001

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Lignin projects (2)

- Lignin based wood preservative
  - CINDU, 2002-2005
- Lignin as functional additive for (bio)polymers
  - strategic research, 2001-2003
- Lignin as natural binder and microbial control agent (LANBAMCA)
  - project proposal EU-CRAFT (end of 2002)
  - TFC (coordinator), Granit, Portocork, Naco, ATO, INETI, PPI, EFPG
- ATO is member of the International Lignin Institute (ILI)
- Persons involved in lignin related projects: 10

Publications

- B. de Groot, J.E.G. van Dam, R.P. van der Zwan, K. van 't Riet - "Simplified kinetic modelling of alkaline delignification of hemp woody core" - *Holzforschung* **48** (1994) 207-214.
- B. de Groot, J.E.G. van Dam, K. van 't Riet - "Alkaline pulping of hemp woody core: kinetic modelling of lignin, xylan and cellulose degradation" - *Holzforschung* **49** (1995) 332-342.
- J.E.G. van Dam - "VALOIR" – R&D program on valorization of Lignin", *Proceedings 4th International Forum*, Lausanne, October 22-23, 1998 (International Lignin Institute).
- R.J.A. Gosselink, J.C. van der Putten, J.C. van der Kolk, J.E.G. van Dam, B. de Klerk-Engels – "Vegetable fiber based geotextiles with adjusted durability", *Proc. IECA conference*, Palm Springs, CA USA, February 2000, p129-136.
- T. A. Gorshkova, V. V. Salnikov, N. M. Pogodina, S. B. Chemikosova, E. V. Yablokova, A. V. Ulanov, M. V. Ageeva, J. E. G. van Dam, V. V. Lozovaya -"Composition and distribution of cell wall phenolic compounds in Flax (*Linum usitatissimum* L.) stem tissues", *Annals of Botany* **85**, 4 (2000) 477-486.
- R.J.A. Gosselink, A. Abächerli, H. Semke, R. Malherbe, P. Käuper, and J.E.G. van Dam – Characterization of sulfur-free lignins from alkaline pulping of annual fibre crops – *Proc. 5th ILI Forum,* Bordeaux, France, September 7th 2000.
- E. de Jong, E. Scott, R.J.A. Gosselink and J.E.G. van Dam – "The simultaneous colouring and uv stabilisation of materials using dyed lignin" – *Proc. 5th ILI Forum,* Bordeaux, France, September 7th 2000.
- R.J.A. Gosselink, A. Abächerli, H. Semke, R. Malherbe, P. Käuper, A. Nadif and J.E.G. van Dam – "Analytical protocols for sulfur-free lignin characterization" –Industrial Crops and Products (submitted August 2002).

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Aim participating EUROLIGNIN

- ATO has been and will be involved in the development of lignin related applications and will be part of the existing and new network activities
- Based on the knowledge and expertise, ATO will play an active roll in the EUROLIGNIN project

Contribution to EUROLIGNIN

- coordinator of the EUROLIGNIN project
- contribution to all workpackages
  - coordinator
  - definition/conclusions area 2: Market
  - definition/conclusions area 3: Analytical methods
  - presentation of EUROLIGNIN group in E-Windows

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