

Ensuring Sustained Business Development

Research and Development

Developing New Technologies for Next Generations

While the Nippon Unipac Holding Group is mainly engaged in the paper and paperboard business, it operates a variety of other businesses including chemical products and paper cartons. Each Group company applies its powers and abilities to develop new products in each business division and new technologies that respond to evolving market needs, both in Japan and abroad.

The Group's R&D policy comprises the following three points, aiming at sustaining steady and continuous business development.

- Developing customer-oriented products.
- Developing next-generation technologies.
- Developing environment-friendly products and technologies.

Customer-Oriented Products

- Products with high brightness, high gloss, low density, light weight and other characteristics demanded in the increasingly visual-oriented and diversified printing and publication markets.
- Products for the publication and business communication paper market, where the on-demand printing system is increasingly spreading.

Next-Generation Technologies

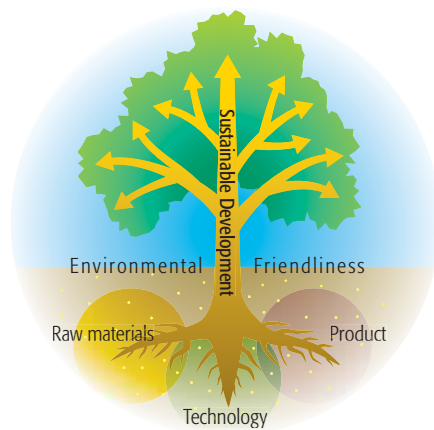
- Utilization of bio-technology for trees of paper material
 - ▶ Afforestation technologies of micropropagated elite trees: Eucalyptus afforestation by clonal

elite trees[*17], screened from natural forests, that offer twice the yield of pulp, faster growth, and improved environmental stress tolerance as compared with conventional trees.

- ▶ Technologies for the repeated transformation of desirable genes in safety by the Multi-Auto Transformation Vector System (MAT Vector® System)[*18] which Nippon Paper Industries Co., Ltd. originally developed: providing trees with salt-tolerance and dry-tolerance, acquiring higher pulping yield.
- Application of bio-technology
 - ▶ Application of clonal cell culture for garden trees: micropropagation of precious trees or ornamental trees.
 - ▶ Application of the MAT Vector® System for the crops: developing rice with health-promoting benefits [*19], which can be an effective dietary aid in treating diabetes.
- Develop new products or cost cutting technologies on improving the functionality of in-house production of materials used in the paper making process, such as fillers[*11] and pigments[*12].

Environment-Friendly Products and Technologies

- Expand recycling technologies which enables the use of wastepaper not currently reused in paper making, such as office wastepaper and magazines that contain adhesives in their spines.
- High-quality paper for paper containers that can replace plastic containers.



Planting site for clone sapling in Collie, Western Australia (as of March 2003, one year and eight months after planting)



Rice including GLP-1 (unpolished rice)



Ordinary rice (unpolished rice)



Rice including GLP-1 (polished rice)



Ordinary rice (polished rice)

Rice with health-promoting benefits (genetically modified[*20] rice including a large amount of GLP-1, the peptide drug that promotes insulin secretion)

* Please refer to the Glossary on pages 60 and 61 for details.

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