Background

Deforestation is a major problem that should be restricted wherever possible. The use of renewable sources of tannin can make a contribution to reducing deforestation. Tree species such as quebracho and chestnut are currently felled to provide tannin for the leather industry.

Alternative sources of tannin exist, chiefly from a by-product (grapeseed) from the wine industry, which is used for oil extraction and animal meat. Tannin production from the by-product would not impact on these established uses.

Objectives

The project aimed to assess the value of the wine industry by-product for producing tannin suitable for use by the leather industry. Possible benefits would include:

- Reduction in the felling of some tree species.
- Obtaining a better return from a by-product that is typically of low profitable value.
- Reduction in dust formation in the tanning industry by replacing a powder-based product with a liquid one.
- Reduction of the high level of energy consumption necessary for the production of tannin powder, as well as of logistic costs using locally...
available vegetable extracts avoiding overseas sources.

Results

The GRAPE TANNINS project demonstrated the viability of the tannin extraction process developed during the project for industrial leather production. It showed that it is possible to replace commercial vegetable tanning agents by tannins obtained from the valorisation of wine waste.

As part of the project, different components of grape waste were defined. Seed proved to be the optimal in tannin content which ranges from 6 to 16%. The next step was the optimisation of the grape tannins extraction and the concentration process at laboratory scale. Pelt tanning trials were performed on a pilot scale. It also defined an optimum method for extracting tannins from grape seed and designed a prototype.

The project built a semi-industrial prototype, which allowed for the production of sufficient quantities of “grape” tannin to undertake industrial trials in two participating tanneries. This demonstration prototype includes an extraction plant, a concentration plant (including an ultrafiltration section and a nanofiltration section with four membranes) as well as a waste water treatment plant. The foreseen grape oil extraction prototype was not necessary since extraction was carried out by oil producing companies, and was replaced by a plant for the biological treatment of the polluted waste water removed during the concentration process.

In the concentration plant two different grape products were obtained: UF concentrate (14.0% dry matter content, with 7.7% tannin content) and NF concentrate (20% dry matter content, with 6.4% tannin content). Tanning trials with these extracts were tested on respectively hide and skin. Their value as tanning material was confirmed and validated.

The remaining waste of the grape tannin extraction was characterized and assessed for application. The best application was to convert this waste in activated carbon because it has a high economical potential.

The reduction of the deforestation of some tree species, such as chestnut and quebracho, is the main significant environmental benefit that could be achieved using grape seed as renewable source to obtain tannin extracts for the leather industry. It was estimated that 287–514kg million of degreased grape seed could be collected in Europe, meaning saving more than 500 000 trees a year from felling.

Work conditions could also be improved as commercial powder vegetable extracts could be replaced by a liquid one (hence no dust formation and inhalation).

The final phase of the project was the assessment of the commercial viability of the process for producing tannins from grape seed. The concentration system used (filtration by membranes) is not economically viable on an industrial scale as the final product does not have a high enough concentration (about 15% tannin content). An alternative method for concentration ("triple evaporation") was proposed to make the grape tannin concentration process profitable. It
would produce an extract with 35% tannin content for a sale price of €450/ton, making it competitive with the current commercial tannins.

In this way, the project identified the limiting factors of the concentration process and defined the needs for making this step viable commercially.

Disclaimer: This « results » section should be considered as a draft until the Commission has completed its evaluation.

Environmental issues addressed:

Themes

Industry-Production - Food and Beverages
Industry-Production - Leather and Footwear
Waste - Waste recycling
Waste - Industrial waste

Keywords

industrial waste, food production, forest management, alternative material, by-product

Target EU Legislation

- Environmental management & assessment
- Directive 85/337 - Assessment of the effects of certain public and private projects on the environment...
- Directive 2001/42 - Assessment of the effects of certain plans and programmes on the environment...

Natura 2000 sites

Not applicable

Beneficiaries:

Coordinator: Asociación de Investigación de las Industrias del Curtido y Anexas

Type of organisation: Research institution
Description
Asociación de Investigación de las Industrias del Curtido y Anexas is a Spanish research association of the leather industries and annexes. It is a non-profit association and was founded in 1962.

Partners
Comercial Godó S.L., Spain
Villapana S.P.A., Spain
Curtidos Lancina S.A., Spain
Sociedad Aragonesa de Curtición de Ovinos S.A. (SARCO), Spain
D.G. Calidad Ambiental-Consejería de Turismo, Medio Ambiente y Política Territorial-Gobierno de La Rioja (DGCA), Spain
La Alcoholera de La Rioja, Ebro y Duero S.A., Spain

Administrative data:

Project reference
LIFE04 ENV/ES/000237

Duration
01-SEP-2004 to 31-DEC-2007

Total budget
964,608.00 €

EU contribution
474,804.00 €

Project location
Rioja (España) Aragón (España) Cataluña (España) Emilia-Romagna (Italia)

Read more:

Brochure
Title: Leaflet EN

Leaflet
Title: "Proyecto LIFE Taninos" (630 KB) No of pages: 2

Project web site
Beneficiary's website (ES)

Project web site
Project's website (ES/EN)

Publication: Book
Title: "Extracción, concentración y curtición de pieles con el extracto tánico obtenido de las semillas de las uvas" (chapter of a book)
Author: Adzet J. M., Balsells S., Meritxell P., Gonzalez M Year: 2007
Editor: AIICA-Asociación de Investigación de las Industria No of pages: 11

Publication: Layman report
Title: Layman report Year: 2007 No of pages: 10

Video feature
Title: Video feature of the project (ES) (25.3 MB)