

~~in het lichaam aanwezige beschermende macrofagen wordt geremd of vernietigd. Mesothelioom (tumor), een kwaadaardig gezwell uitgaande van het longvlies kan het resultaat zijn. Nanodeeltjes geven (gemakkelijk) aanleiding tot ontstekingen, fibrose, woekerende cellen (→ kanker), ... en dit kan na jaren inactiviteit in de longen nog tot uiting komen.~~

~~Nanodeeltjes kunnen door het longweefsel (diffusie) in de bloedbaan verzeilen en daar een toxisch effect genereren. Dit kan eveneens gebeuren als de opgenomen nanodeeltjes zich vervolgens gaan opstapelen in organen (lever, ...). Wijziging van het genetisch materiaal is mogelijk. Cardiovasculaire effecten zijn aangetoond. Trombose en adersclerose werden genoteerd. Nanodeeltjes als lichaamsvreemde stoffen zijn schadelijk en kunnen in het lichaam aanleiding geven tot aantasting van de celmembranen of de celfunctie zelf beletten of afzwakken. Dat betekent dat blootstelling zeker moet worden vermeden. Voorkomen is in elk geval aangewezen, zeker wanneer het gaat over de "kleine" nanodeeltjes (<50 nm). Onderzoek naar toxicologische effecten van nanodeeltjes is dan ook prioritair en noodzakelijk!~~

2.3. Bescherming tegen nanodeeltjes

~~Het is duidelijk dat bescherming tegen nanodeeltjes essentieel is. Dit geldt zeker voor personen die in productie met nanodeeltjes in contact (kunnen) komen. Het dragen van beschermende kledij of structuren~~

SUSTAFFOR PROJECT: PLANTING TREES IN A MORE SUSTAINABLE AND EFFICIENT MANNER

A significant part of the trees planted on productive and protective reforestation / afforestation, gardening, environmental restorations or fruit production plantations die after few months, if no adequate maintenance is performed. The maintenance of newly planted or seeded trees is not only expensive, but also implies frequently the application of techniques raising social and environmental awareness, such as herbicides, use of fossil fuels or petroleum-based products or of large volumes of water.

The last scientific and technical advances have resulted on more sustainable and efficient techniques for increasing success rates on tree planting, while reducing or even avoiding maintenance costs. These techniques can be utilized on a vast range of plantations schemes, both at household and at professional level.

SUSTAFFOR project (*Bridging effectiveness and sustainability in afforestation / reforestation in a climate change context: new technologies for improving soil features and plant performance*), implemented by a consortium of ten European entities (six Small or Medium size Enterprises {SMEs} and four Research & Development performers {RTDs}) has as main objective to conceive, produce, develop and validate on-field novel techniques aiming at improving the results of tree planting projects from an environmental, technical and economic point of view.

The novel techniques to be developed aim at mitigating the negative effect of temporary water scarcity and

~~(membranen, ...) is noodzakelijk. Voor de consument is het nodig geïnformeerd te zijn of de producten waarmee men in aanraking komt, "nano" bevatten. Dan kan men zelf beslissen in welke mate men dat wenst te ondergaan. Aanduiding op commerciële producten of er nano in voorkomt of aanwezig is, moet dan ook een verplichting worden!~~

3. Besluit

~~Nanodeeltjes vormen een risico. Onderzoek is absoluut noodzakelijk om het soort risico in kaart te brengen. Consumenten moeten geïnformeerd worden over het gebruik van "nano" in producten waaraan ze blootgesteld worden of waarmee ze in contact (kunnen) komen. Nanotechnologie kan leiden tot een beter welzijn in de maatschappij, maar moet met de grootste voorzichtigheid ingezet worden om aldus het risico ervan tot een absoluut (of aanvaardbaar) minimum te beperken.~~

Referenties

- Talrijke studies zijn beschikbaar. Een paar voorbeelden zijn hier gegeven.
- Anthony Seaton, Lang Tran, et al. (2010), "Nanoparticles, human health hazard and regulations", *Journal of the Royal Society, Interface* 7, p. 119-129.
- Thomas A.J., Kuhlbusch, Christof Asbach, et al. (2011), "Nanoparticle exposure at nanotechnology workplaces", *A Review - Particle and Fiber Toxicology*, 8:22.

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competitive vegetation, which are the two main factors that can result in the failure of a young tree in the current context of irregular water availability and climate change.

These techniques include two different approaches:

- Innovative mulching materials: soil covers impeding weed development and reducing soil water evaporation in the area occupied by tree roots during the first years of the plantation. The prototypes to be developed during the project, both built in Europe, are either 100% biodegradable or reusable in successive plantations. These techniques aim at being a feasible alternative to the recurrent application of herbicides or mechanical weeding, and to petrol-based mulches.
- Innovative soil conditioners: mix of different products improving soil conditions in the soil volume occupied by tree roots during the first years: hydro-absorbent polymers (that absorb water during wet periods and release it during dry periods), fertilizer, root growth precursors, etc. During the project an improved formulation of this technology will be produced, aiming at being an alternative to emergency water applications.

The SMEs participating in the project are:

- D.T.C. (Belgium): expert in the fabrication of specialized plastic and bio-plastic products by mould injection; during Sustaffor this SME will develop a prototype of 100% biodegradable mulching disk based on a biopolymer formulation.
- La Zeloise nv (Belgium): company working on natural fibre products, especially recycled jute, treated

with innovative finishing techniques for enhanced properties. During the project, La Zeloise nv will develop a 100% biodegradable mulch made with woven jute cloth treated with furan bio-based resin.

- EcoRub bvba (Belgium): SME producing agro-forestry auxiliary products based on recycled rubber, coming from worn-out tyres and conveyor belts. This company will develop a long-lasting mulching mat, reusable in successive tree plantation projects.
- TerraCottem Internacional sl (Spain): developer and distributor of the TerraCottem® soil conditioning technology, a proprietary mixture of polymers, fertilizers, growth precursors and carrier material that is unique for its synergetic effect; this technique stimulates plant growth, increases the capability of soils and growing media to retain and provide water and nutrients to the plants and reduces the amount of water necessary to create high-quality plants and turf. During the project this SME will develop a new formulation of this technology, with a new high-performance polymer.
- Terrezu sl (Spain): this company has a vast experience on the implementation of innovative and sustainable solutions for landscaping and forest restoration in Southern Europe. During Sustaffor this company will coordinate SMEs activities and will advise on the potential of the novel techniques in Mediterranean and mountain conditions.
- Ceres International Sp. z.o.o. (Poland): an SME commercializing innovative products for horticultural, forest and nursery sectors in central and Eastern Europe. This company will advise on technical requirements and commercialization potential of the novel techniques in central and Eastern European markets.

The four RTDs are the *Centre Tecnològic Forestal de Catalunya* (CTFC, Spain), project coordinator and director of scientific and technical activities; *Centre National de la Recherche Scientifique* (CNRS, France), which will study the biochemical changes in soil organic matter in the field trials; Belgian Textile Research Centre (Centexbel, Belgium), which will study the resistance and degradability of the novel techniques and EDMA Innova (Spain), which will participate on the environmental monitoring of field trials.

The novel techniques to be developed during the project will be evaluated independently and combined (mulch + soil conditioner), and will be compared with the current best available techniques applied for the same purpose. The field trials will be implemented in

~~SENSORISCH TEXTIEL: VORMGEHEUGENMATERIALEN~~

~~Prof. Dr. Marc Van Parys~~

1. Sensorische functionaliteit

~~De zoektocht naar sensorische materialen is sterk stijgend en wordt aangedreven door de globalisering, het veeleisende vraagpatroon van de consument en de snelle veranderingen in wetenschap en technologie. Dit wordt extra versterkt door een nieuwe innovatiecultuur uit industrie en onderzoeksinstituten.~~

~~Recente ontwikkelingen in de wetenschap en technologieën bevorderen en stimuleren de transitie van klassieke naar geavanceerde textielproducten op basis~~

four strongly contrasted conditions in Northeast Spain representing many of European and Mediterranean conditions: Semiarid, Mediterranean-continental, Mediterranean-humid and Subalpine. Moreover, an in-depth evaluation of the techniques under controlled conditions will be performed in a nursery.

This project is financed by the 7th Framework Programme of the European Union, through the "Capacities – Research for SMEs" call; it started on 1st October 2013 and will last for 24 months.

Further information will be available at the project website, where the main results, divulgation activities and other technical events will be provided: www.sustaffor.eu.



Fig. 1: Tree plantation with mulching at Bellver de Cerdanya, Spanish Pyrenees



Fig. 2: Example of jute mat utilized in environmental restoration



Fig. 3: Aspect of a soil conditioner TerraCottem® before being installed at the plantation pit

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