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Faculty of Technology and Metallurgy
Department for Organic Chemical Technology

Scientific field (Frascati Manual)

Physical chemistry, Polymer science, Electrochemistry (dry cells, batteries, fuel cells, corrosion metals, electrolysis)

Chemical process engineering

Coating and films

Composites (including laminates, reinforced plastics, cermets, combined natural and synthetic fibre fabrics, filled composites)

Petroleum engineering, (fuel, oils), Energy and fuels

Bioproducts (products that are manufactured using biological material as feedstock) biomaterials, bioplastics, biofuels, bioderived bulk and fine chemicals, bio-derived novel materials

Nano-materials [production and properties]

Other engineering and technologies

Biomaterials (as related to medical implants, devices, sensors)

Brief description of expertise

Synthesis, investigation and processing of polymeric materials-biodegradable, refine with nanofillers, antimicrobic. bioactive, biocompatible, chemocompatible. Degradation and recycling of polymers and polymeric materials. Biodegradable food packaging. Waste water treatment-removal of heavy metal ions and photocatalytic degradation of dyes. Biocatalysts synthesis. Application of supercritical fluids in food and pharmaceutical industry. Development of added value materials using supercritical fluids Chemical engineering design Process industry engineering management

Keywords

polymers, polymeric biomaterials, recycling and degradation of polymers, Chemical reactor engineering, High pressure processes/ supercritical fluids, Chemical engineering design , Cleaner production , Heterogeneous catalysis, Bio- and alternative fuels

Commercial services

Development of products based on natural extracts for food, cosmetic and pharmaceutical industry.
High pressure process development (application of supercritical fluids) for food, cosmetic and pharmaceutical industry.
Development of added value materials using supercritical fluids.
Testing of commercial polymeric materials:type, solubility, melt flow index, viscosity, molar mass, molar mass distribution, glass transition temperature, thermal degradation,
Development of polymeric materials: biodegradable, refine with nanofillers, antimicrobic. bioactive, biocompatible, chemocompatible
Development of advanced impermeable landfill layer using ear materials from Serbia and region

Cleaner production: thermal power plant waste water treatment
Education: polymers and polymeric materials
Process and plant development for oil / mercaptane removal from refinery waste water
New copper based pesticides formulations and process development

Realized and current projects

A) NATIONAL PROJECTS

Title	Project ID	Funding source	Duration
Functional physiologically active plant materials with added value for application in prahmaceutical and food industry	III45017	Ministry of Science and Technological Development of the Republic of Serbia	2011-2015
Synthesis and characterization of novel functional polymers and polymeric nanocomposites	OI172062	Ministry of Science and Technological Development of the Republic of Serbia	2011-2015
Process and plant development for oil / mercaptane removal from refinery waste water	TR 21006	Ministry of Science and Technological Development of the Republic of Serbia	2008-2010
Technology development for production of herbal based preparations for treatment of topical infections	TR 19037	Ministry of Science and Technological Development of the Republic of Serbia	2008-2010

B) INTERNATIONAL PROJECTS

Title	Project ID	Funding source	Duration
Functional Food Ingredients From Plant Products	E!3490 HEALTHFOOD	EU funding	2007-2009

Title	Project ID	Funding source	Duration
Human Capital Operational Programme. Building the science and engineering of INS through the implementation of technologies into industrial practice	POKL.08.02.01-06-005/12	EU funding	2013-2014
Reinforcing of Nanotechnology and Functional Materials Centre	FP7-REGPOT 2009-1	EU funding	2009-2011
Intelligent Scaffolds as a Tool for Advanced Tissue Regeneration	IZ73ZO_152327/1	Swiss National Science Foundation	2014-2017
Innovative pectin-based films for food packaging: preparation and characterization	680-00-566/2013-09/4	EU funding, Ministry of Science and Technological Development of the Republic of Serbia	2013-2015

Applicable research results

PRODUCT

Title	Basic characteristics	Beneficiary
New dietetic product – compressed lozenges based on medicinal plant extracts with antibacterial activity	natural active substances with strong activity even against strains resistant to antibiotics are incorporated into pharmaceutical preparation of compressed lozenge aimed for treatment and protection of oral cavity and pharynx. Stability tests were performed (accelerated and two year tests). The compressed lozenges were produced on industrial level	University of Belgrade, Economic Institute (Belgrade)

Title	Basic characteristics	Beneficiary
Bioactive semisolid and liquid phytopreparations	natural active substances with strong activity even against strains resistant to antibiotics are incorporated into pharmaceutical preparations for topical applications (cream, spray, ear and nose drops, vaginal tablets ets.). The cream was tested in vivo for antibacterial activity in dogs. Anti-inflammatory activity of the cream was tested in humans. Obtained results proved strong antibacterial and anti-inflammatory activity. Unlike antibiotics, application of this product does not contribute to the bacterial resistance.	University of Belgrade, Institute for medicinal plant research “Dr Josif Pančić”, Faculty of medicine University of Niš and Economic Institute (Belgrade).

TECHNICAL SOLUTION

Title	Basic characteristics	Beneficiary
Laboratory technological procedure for an extract production from celery (Apium graveolens) fruit for application in food industry	production based on supercritical fluids.	Aleva
Laboratory technological procedure for an extract production from blacberry (Rubus fruticosus) for application in food industry.	ultrasound assisted extraction was empluyed to obtain extracts with strong antioxidant activity	Aleva
Prototype plant for oil / mercaptane removal from refinery waste water: technology of sorption and filtration	plant for oil / mercaptane removal from refinery waste water main elements are filtration column, pump and adjustable piping system	NIS Petrol, Oil refinery Pancevo
New process of oil / mercaptane removal pilot plant operation : technology of sorption and filtration	Plant capacity 5 m3/h.	NIS Petrol, Oil refinery Pancevo and Pro Voding, Belgrade

Title	Basic characteristics	Beneficiary
Technical solution for the production of copper (II) hydroxide fungicide formulation	Technical solution defines all chemical process parameters. Product was laboratory developed in micro series with all the physical and chemical characteristics.	Hemovet, Novi Sad
Technical documentation of oil / mercaptane removal pilot plant	Technical documentation elements: 1 – storage vessel, 2 – centrifugal pump, 3 – piping, 4 - columns, 5 – filters, 6 - transporter, 7 – plant frame.	NIS Petrol, Oil refinery Pancevo and Petrohemija, Pancevo
Oil / mercaptane removal from refinery waste water process parameters	Oil / mercaptane removal from refinery waste water using technology of sorption and filtration process parameters were defined for various ail content, pH and temperature.	NIS Petrol, Oil refinery Pancevo and Petrohemija, Pancevo

Intellectual property

PATENT

Title	Owner	Inventor	Reg. No
Production Process of Preparations based onUsnea Barbata Lichen Extract for the Treatment of Skin Infections	University of Belgrade (Faculty of Technology and Metallurgy and Faculty of Veterinary Medicine)	Irena Zizovic, Jasna Ivanovic, Dusan Misic, Jakov Nisavic	P-2011/0012, 11/01/2011
Pharmacutical compositions containing herbal based active ingradients for applications in human and veterinary medicine	University of Belgrade (Faculty of Technology and Metallurgy and Faculty of Veterinary Medicine), Economic Institute.	, Irena Zizovic, Dusan Misic, Vanja Tadic, Ivana Arsic, Slobodan Petrovic, Slobodanka Jovanovic, Jasna Ivanovic, Marko Stamenic, Jelena Asanin, Sofija Djordjevic, Ana Zugic, Stoja Milovanovic, Dusanka Runjaic Antic	P-2011/0586, 28/12/2011

Title	Owner	Inventor	Reg. No
Bioactive semisolid and liquid phytopreparations	University of Belgrade (Faculty of Technology and Metallurgy and Faculty of Veterinary Medicine), University of Nis (Faculty of Medicine), Institute for Medicinal Plant Research „Dr Josif Pancic“, Economics Institute.	Irena Zizovic, Dusan Misic, Vanja Tadic, Ivana Arsic, Slobodan Petrovic, Slobodanka Jovanovic, Jasna Ivanovic, Marko Stamenic, Jelena Asanin, Sofija Djordjevic, Ana Zugic, Snezana Savic, Natalija Milcic Matic, Marija Tasic Kostov	P-2014/0263, 26/05/2014

Licenses

Name	Last name	Type of license	License No
Mića	Jovanović	Design engineer license	371067403
Mića	Jovanović	Plant erection license	475H03812

Industry group (according to "Gazette RS", No. 54/10)

Manufacture of pulp, paper and paperboard

Manufacture of refined petroleum products

Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms

Manufacture of paints, varnishes and similar coatings, printing ink and mastics

Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations

Manufacture of other chemical products

Manufacture of basic pharmaceutical products

Manufacture of rubber products

Manufacture of plastic products

Manufacture of weapons and ammunition

Manufacture of domestic appliances

Manufacture of games and toys

Manufacture of medical and dental instruments and supplies

Technical testing and analysis

Research and experimental development on natural sciences and engineering

Other professional, scientific and technical activities n.e.c.

Higher education

Other education

Educational support activities

PhD thesis within the unit done according to the industry needs

Name	Last name	Title	Year	Mentor
Jelena	Lukić	Procesi degradacije papirno-uljne izolacije energetskih transformatora i rafinacija degradiranih mineralnih izolacionih ulja ekstrakcijom tečno-tečno sa N-metil-2-pirolidonom	2013	Dušan Antonović

Staff list within the unit

Name	Last name	Teaching/scientific title
Melina	Kalagasidis Krušić	Associate Professor
Ivanka	Popović	Full Professor
Aleksandar	Orlović	Full Professor
Irena	Žižović	Associate Professor
Mića	Jovanović	Associate Professor
Simonida	Tomić	Associate Professor
Marko	Stamenić	naučni saradnik
Jasna	Ivanović	naucni saradnik
Sandra	Glišić	visi naucni saradnik
Stoja	Milovanović	istraživač saradnik
Ivana	Lukić	istrazivac saradnik
Željka	Kesić	istraživač saradnik
Pavle	Spasojević	naučni saradnik
Vesna	Panić	naucni saradnik
Svetolik	Maksimović	istrazivac saradnik
Marija	Lučić Škorić	istrazivac saradnik
Marina	Mihajlović	istrazivac saradnik
Ana	Dajić	istrazivac saradnik
Dimitrije	Stevanović	istrazuvac saradnik

Name	Last name	Teaching/scientific title
Milica	Karanac	istrazivac saradnik
Katarina	Antić	istrazivac saradnik
Marija	Babić	istrazivac saradnik
Marija	Perišić	istrazivac saradnik
Jovana	Vuković	istrazivac saradnik
Tanja	Đakov	strucni saradnik