Robust Lipases for Industrial Polyester Synthesis (ROBUSTLIPASE)

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TÜBİTAK MARMARA RESEARCH CENTER

Food Institute

A Brief Introduction…

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- *Position: Contact Point of TUBITAK MRC Food Institute for Framework Programmes*

- *Organisation's Name: TUBITAK Marmara Research Center*
- *Nature of the Organisation: Public Research and Technology Organisation (Applied Research)*
- *Country from which it operates: Turkey*
- *Department within the organisation: Food Institute*
- *Speciality of the Institute:*
  - Food Science And Technology
  - Nutrition
  - Functional Foods
  - Food Microbiology
  - Biotechnology

Skills and Expertise of the Food Institute

Fields of Activity

1. **R&D STUDIES**
2. **TECHNICAL CONSULTANCY**
3. **TEST AND ANALYSES**
   - Laboratory accreditation for EN ISO/IEC 17025:2005 by German Accreditation Body (DAR/DAP) since 2001
4. **TRAINING PROGRAMMES**

Skills and Expertise of the Food Institute

Strategic Business Units

1. **FOOD SCIENCE AND TECHNOLOGIES STRATEGIC BUSINESS UNIT**
   - **Food Processing Technology Group**
     - Cereal Processing Technologies
     - Chemical, Physical and Sensory Characterisation of Foods
     - Fats and Oils Technology
     - Food Enzymology
     - Fruit and Vegetable Processing Technology
     - Hazelnut Drying and Processing Technologies
     - Non-Destructive Techniques
     - Supercritical Extraction
   - **Preservation and Packaging Group**
   - **Residues and Contaminants Group**
2. **NUTRITION AND FUNCTIONAL FOODS STRATEGIC BUSINESS UNIT**
   - **Functional Foods Group**
   - **Nutrition Group**
3. **FOOD MICROBIOLOGY AND BIOTECHNOLOGY STRATEGIC BUSINESS UNIT**
   - **Food Microbiology Group**
   - **Food Biotechnology Group**
   - **Molecular Biology Group**

The topics we are interested in...

A. Our Proposal Incentives

Topic Called	Food Institute Groups
KBBE.2010.2.3-03: Health-value-added food products for population groups at risk of poverty	• FUNCTIONAL FOODS GROUP • PRESERVATION AND PACKAGING GROUP • CEREAL PROCESSING TECHNOLOGIES GROUP
KBBE.2010.3.3-01: Robust and novel biocatalysts for industrial applications	• FOOD ENZYMOLOGY GROUP • FOOD BIOTECHNOLOGY GROUP

The topics we are interested in...

B. Topics We are Interested in to be Involved (1/2)

Topic Called	Food Institute Groups
KBBE.2010.1.2-02: Sustainable organic and low-input dairy production	NUTRITION GROUP
KBBE.2010.1.2-04: Improving European berries production, quality, neutraceutical and nutritional value (Strawberries, Currents, Blackberries, Blueberries and Raspberries)	• FUNCTIONAL FOODS GROUP • PRESERVATION AND PACKAGING GROUP
KBBE.2010.1.2-05: Integrated pest management in farming systems of major importance for Europe	RESIDUES AND CONTAMINANTS GROUP
KBBE.2010.1.3-01: Development of vaccines and improvement of detection systems toncontrol helminth parasite infections of livestock and reservoirs – SICA (Latin America and/or Asia and/or African Mediterranean Partner Countries and/or African ACP)	• BIOTECHNOLOGY GROUP • MICROBIOLOGICAL CHARACTERISATION AND SAFETY GROUP
KBBE.2010.2.2-02: Diet and prevention of functional decline of the elderly	NUTRITION GROUP
KBBE.2010.2.3-02: Strategies for personalised nutrition	• NUTRITION GROUP • MOLECULAR BIOLOGY GROUP • GROUP OF CHEMICAL, PHYSICAL AND SENSORY CHARACTERISATION OF FOODS
KBBE.2010.2.4-02: Identification of the effect of processing on food contaminants	• CEREAL PROCESSING TECHNOLOGIES GROUP • RESIDUES AND CONTAMINANTS GROUP

The topics we are interested in...

B. Topics We are Interested in to be Involved (2/2)

Topic Called	Food Institute Groups
KBBE.2010.2.4-03: Quality and safety aspects of feed	MICROBIOLOGICAL CHARACTERISATION AND SAFETY GROUP
KBBE.2010.3.2-04: Innovative aquatic biosensors	FATS AND OILSTECHNOLOGY GROUP
KBBE.2010.3.3-02: Biotechnology for 'greening' the chemical industry – Industrial bioprocesses for fine and speciality chemicals and intermediates	FOOD BIOTECHNOLOGY GROUP
KBBE.2010.3.5-03: Approaches towards bioremediation of the Mediterranean Sea by exploring its microbial diversity – SICA (Mediterranean Partner Countries)	FOOD BIOTECHNOLOGY GROUP
KBBE.2010.3.5-04: Microbial diversity and metagenomic mining for biotechnological innovation	FOOD BIOTECHNOLOGY GROUP

Involvement of the Food Institute in previous / ongoing projects

Programme and Instrument	Acronym	Project Title	Leader	Total Budget (Euro)	Budget (Euro)	Start	Time (month)
FP6 - IP	QUALITYLOWINPUTFOOD	Improving Quality and Safety and Reduction of Cost in the European Organic and "Low Input" Food Supply Chains	Dr. Hülya Ölmez	12.444.696	215.150	01.03.2004	48
FP6 - CA	SAFEFOODERA	Food Safety-Forming a European Platform for Protecting Consumers Against Health Risks	Assoc. Prof. Dr. Güner Özay	3.740.691	30.600	01.08.2004	48
FP6 - STREP	HEATOX	Heat Generated Food Toxicans Identification, Characterisation and Risk Minimisation	Dr. Hülya Ölmez	4.199.915	176.500	01.11.2003	36
FP6 - SSA	MYCOGLOBE	Integration of Mycotoxins and Toxic Moulds in the Global System for Food safety	Assoc. Prof. Dr. Güner Özay	320.000	-	2004	36
FP6 - SSA	FOODLINK	Linking ACC and EU MS food sectors with a view to higher level of participation in the FP6 projects	Dr. Mehlika Borcaklı	200.000	15.500	15.04.2005	18
FP6 - NOE	EuroFIR	European Food Information Resource Network	Gül Biringen Löker	770.760*	53.643*	01.01.2005	60
FP6 - CRAFT	FERBEV	Improving the processing of four fermented beverages from Eastern European Countries	Dr. Mehlika Borcaklı	1.900.000	140.000	15.9.2005	24
FP6 - SSA	SAFEFOODNET	Food Safety and Hygiene Networking with new Eu Member States and Associated Candidate Countries	Dr. Mehlika Borcaklı	360.000	35.000	1.8.2006	36
FP6 – NOE	MONIQA	The Harmonisation of Analytical Methods Regarding Monitoring the Hazards for Monitoring Food Quality and Safety in the Food Supply Chain	Dr. Sena Ayyıldız	2.959359	90.099*	23.2.2007	36
FP7 – CSA (REGPOT-2007-1)	SAFETechnoPACK	Improving the Scientific and Technological Research Capacity of Food Institute on Safety and Technology of Food Packaging	Dr. Sena Ayyıldız	950.000	950.000	01.02.2008	42
FP7 – CPCSAInfra (INFRASTRUCTURES-2008-1)	EAST-NMR	Enhancing Access and Services to East European users towards an efficient and coordinated pan-European pool of NMR capacities to enable global collaborative research and boost technological advancements	Dr. Somer Bekiroğlu	4.121.399	114.099	01.02.2009	48
FP7 – LSCP (KBBE – 2007)	MYCORED	Novel Integrated Strategies for Worldwide Mycotoxin Reduction in the Food and Feed Chains	Assoc. Prof. Dr. Güner Özay	5.770.000	150.000	01.04.2009	48

Project …

- **The possible name of the project** is “Robust Lipases for Industrial Polyester Synthesis” (ROBUSTLIPASE)
- **The aim of the project is:** Discovery of novel robust lipases from extremophiles for POLYESTER synthesis and their development to ensure optimal properties, stability and performance under industrial conditions.
- **Keywords related to the proposal:** Enzyme, Lipase, Extremophile, Polyester synthesis

Content of the Project in Brief

- **The idea behind the proposal:**
  - Polymers are widely used in our industrialized society
  - Most polymers are oil based and are manufactured in harsh conditions
  - Enzymatic synthesis of polymers is possible
  - Enzyme catalyzed polymers have mainly low MW.
  - This is related to the process conditions substrates but most on ENZYME
  - Extremophiles are a good source of diverse enzymes including LIPASES
  - Isolate LIPASES suitable for ENZYME catalysed POLYESTER synthesis
- **The project should focus on:** Lipase catalyzed polymer synthesis
- **The objectives of our proposal are:** A stable and effective lipase for polmer synthesis from a diol and a dicarboxylic acid.

Workpackage List

- **There should be workpackages like:**

  WP1. Screening of Lipases from Extremophiles

  WP2. Enzyme Modification

  WP3. Preliminary polymerisation studies

  WP4. Optimization of reaction parameters

  WP5. Pilot scale production and characterization of final product

  WP6. Dissemination and Exploitation Activities

  WP7. Project Management

- **The deliverables of those workpackages can be:**
  - Lipase suitable for higher MW polymer synthesis
  - Optimal substrates for polymer synthesis
  - Optimal reaction conditions
  - Scale up

Possible Partners

- **An idea of the existing partnership:**
- **The possible partners for this project can be:**
  - From Academia- Expert in polymer science
  - From Reseach Institute- Expert in extremophiles enzymes
  - From industy- Enzyme manufacturer
  - Possible SMEs- Specialized in innovative polymer products