TÜBİTAK MAM

TÜBİTAK MARMARA RESEARCH CENTER

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INTRODUCTION

ABOUT TÜBİTAK MAM

- Since its establishment in 1972, TÜBİTAK Marmara Research Center (MAM) performs its operations in "TÜBİTAK Gebze Campus" in the City of Kocaeli.
- TÜBİTAK MAM aims at becoming a world leader in science and technology production with its research, development and innovation capabilities widely shared by its Environment & Cleaner Production Institute, Energy Institute, Genetic Engineering & Biotechnology Institute, Food Institute, Chemical Technology Institute, Materials Institute, Earth & Marine Sciences Institute.
- TÜBİTAK MAM is one of the leading organizations of the advanced technology world thanks to its ability and capacity of research, research infrastructure and world class administrative and operational process management.
- With its customer oriented approach, TÜBİTAK MAM offers original solutions to public, private and military agencies and institutions. These solutions are materialized through basic researches, applied research and development, technology transfer, innovation, system and facility construction, national standard and norm setting, professional consulting and training activities

HIGHLIGHTS OF THE PROGRESS MADE DURING LAST YEAR

BIOTECHNOLOGICAL DRUG AGAINST CANCER

Development of biotechnological drugs for use in cancer treatment by employing advanced technologies in world standards

Properties:

- Development and production of Turkey's first national biosimilar drug for cancer treatment as a result of a partnership between public R&D and private sector
- Development of biotechnological cells operating like a biological factory that produces biosimilar drugs and creation of a mother-cell bank and working cell lines
- Physicochemical and biological characterization of product

FROM PLANT TO HERBAL DRUG

The establishment of the Center of Pharmaceutical Excellence continues in TUBITAK MAM Chemical Technology Institute. In this center, it is aimed to manufacture the Herbal Drugs at GMP standards from endemic plants grown in Turkey.

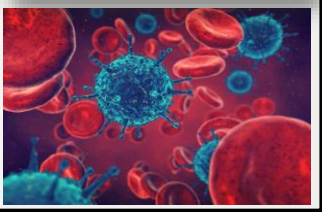
- Active substances obtained from plants are becoming very important in the development of the new drugs. Herbal drug market in Turkey is 0,3 % of the current total pharmaceutical market. This ratio is about 7 % in Europe.

TUMOR-STOPPING ANTIBODY

Biotechnological human antibody drug agent for use in the treatment of cancer and eye diseases

Properties:

- Recombinant human antibody structures that allow the human-compatible use of two anti-angiogenic recombinant antibodies (KDR1.3 and KDR2.6) for stopping tumor angiogenesis (formation of new blood vessels from existing ones)



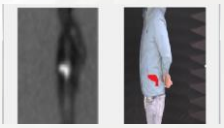
HIGHLIGHTS OF THE PROGRESS MADE DURING LAST YEAR

TERAHERTZ IMAGING

A live bomb detection and contraband imaging system that can detect metal and non-metal dangerous materials hidden on persons or underneath their clothes from a safe distance without contact

Properties:

- In indoor spaces, display of dangerous metal and non-metal objects hidden underneath clothes with 5 cm resolution from 6 m distance
- In outdoor spaces, display of dangerous metal objects hidden underneath clothes with 3 cm resolution from 10 m distance
- Some examples from displayable objects:
  - Weapons, pistols, rifles, knives, etc.
  - Live bomb, explosive mechanisms, etc.
  - Contrabands: Heroin/drugs, tobacco, cigarettes, meat, alcohol, liquid, live animal, etc.



THRU-WALL RADAR IMAGING

A radar that can be placed on a mobile system to provide information about the position and movements of a living creature moving behind a wall

Properties:

- Wall Thickness: Imaging up to 20 cm
- Distance Behind Wall: Imaging from 12 m distance
- Wall type: Cement, plaster cast, brick concrete plaster, mudbrick, plasterboard, etc.
- Viewing angle: At least 120 degrees at azimuth and elevation
- Battery Operation Period: Over 3.5 hours
- Data Transmission: Wireless/Wired
- Radar Architecture: Step frequency continuous wave radar
- Instant Image Output: Horizontal axis for distance, vertical axis for time (1-B)

COLLABORATIONS WITH OTHER CENTRES OF EXCELLENCE

MAM-Rwanda Cooperation

- Turkey-Rwanda Defence Industry Cooperation Meeting were performed in Ankara on 27 February 2019. TÜBİTAK MAM attended the meeting.

  Rwandan Military Delegation was interested in Electric Vehicle and Warm Mix Asphalt Additive produced by TÜBİTAK MAM. The possibility of technology transfer will be evaluated.

MAM-Sudan Cooperation

- The Undersecretary of the Sudanese Ministry of Higher Education and Scientific Research Prof. Mustafa El Ballah and the Director General of the Africa City of Technology Prof. Osama A. Rayis visited TÜBİTAK MAM on 18 January 2019.

  As part of the "Memorandum of Understanding" that was signed between TÜBİTAK MAM and Sudan, it is envisaged to establish cooperation in the fields needed by Sudan including agricultural technologies, digital transformation, renewable energy, nanotechnology and software development.

COLLABORATIONS WITH OTHER CENTRES OF EXCELLENCE

MAM-Jordan Cooperation

- The Jordanian Royal Scientific Society (RSS) Vice President in charge of Technology and Standards Mr. Tareq HASAN and the National Metrology Institute Director Mr. Fawaz ALLABADI visited TÜBİTAK MAM on 29 November 2018.

  The parties exchanged views o the fields of cooperation and signed a "Memorandum of Understanding".

MAM-Pakistan Cooperation

- Thar Region Underground Coal Gasification Project Manager Dr. Muhammad Ashraf Moten visited TÜBİTAK MAM in 2018. Dr. Moten was informed by MAM Energy Institute about pilot systems, gas cleaning, gas conversion reactor designs and field applications.

MAM-COMSATS Cooperation

- Chairman of COMSATS S.M. Junaid Zaidi and the accompanying delegation visited TÜBİTAK MAM in 2018.

ACTIVITIES RELATED TO SOUTH-SOUTH COOPERATION

- TÜBİTAK MAM information was sent to Fraunhofer for the portal website developed for WAITRO members' work.
- South Africa ASCCI Delegation visited TÜBİTAK MAM on 19 February 2018.
- The Libyan Delegation visited TÜBİTAK MAM on 4 May 2018.
- TÜBİTAK MAM participated into "Capacity Building on the Development of Halal Food Production Standard" program held in Thailand on 16-21 July 2018.
- TÜBİTAK MAM and Jordan Royal Scientific Society (RSS) signed a "Memorandum of Understanding" on 29 November 2018.
- TÜBİTAK MAM attended 3 webinars of "WAITRO Benchmarking Project-Support for RTOs without an SME Programme" held with Danish Technical Institute (DTI) on skype in 2018.

SCIENCE AND TECHNOLOGY FOR ACHIEVING SDGs

WARM MIX ASPHALT ADDITIVE

Inorganic asphalt additive for road applications which allows bituminous blends to be produced at 15-35 °C lower temperatures without compromising asphalt quality

Properties:

- Warm Mix Asphalt (WMA) allows to extend the construction season especially in regions with cold and rainy climate, to make the coatings faster, to protect the infrastructures from the water effect, to make the roadworks faster and timely and to put the roads into service rapidly
- WMA applications reduce environmentally harmful emissions (by 30%-90%) in the production unit and area asphalted, and improve occupational health and safety

RESISTANT STARCH

Wheat, corn and potato starches that offer high efficiency in fight against obesity and diabetes, with low glycemic index, reduced energy and prebiotic properties

Properties:

- Gives a feeling of satiety, reduces appetite and balances blood sugar
- 50% lower energy content than regular starch
- 90% lower glycemic index than regular starch
- Positive effect on bowel health owing to prebiotic properties allowing the production of butyrate and other short-chain fatty acids in large intestine
- Helps fight against obesity and diabetes
- Almost 100% purity

SCIENCE AND TECHNOLOGY FOR ACHIEVING SDGs

LIQUID FUEL AND PRECIOUS CHEMICAL PRODUCTION FROM COAL, BIOMASS AND PLANT INSTALLATION

Production of liquid fuel, synthetic natural gas, precious chemicals and electricity from the syngas which is generated by coal and biomass gasification

Properties:

- Production of commercially and strategically important transportation fuels with common and national resources of coal and biomass mixtures, and their testing on vehicles
- Refining of the raw fuel made from the synthetic gas generated by gasification, and conversion into diesel, jet fuel and gasoline
- Technology development for synthetic natural gas production from synthesis gas, and the production of catalysts for this technology

PRODUCTS FOR MYCOTOXIN DETECTION- AFLATOXIN

Antibody and antibody-based mycotoxin analysis products developed for use in mycotoxin assays, which are considered as an important criterion for food quality

Properties:

- 9 different Anti AFL Monoclonal Antibodies
- 2 different Anti OTA Monoclonal Antibodies
- 1 Anti FUM Monoclonal Antibody
- AFL Immunoaffinity Column (IAC)

SCIENCE AND TECHNOLOGY FOR ACHIEVING SDGs

WASTE BATTERY RECYCLE PLANT INSTALLATION

Establishment of a disposal and recovery facility to contribute to the national economy by avoiding the environmental impact of regular storage of domestic primary cell wastes and recovering precious elements in the batteries

Properties:

- Pilot plant with 300 tons/year domestic waste battery recovery capacity
- Laboratory infrastructure
- Facility products and their usage areas:

References:

As a result of the cooperation between the Ministry of Environment and Urban Planning and TÜBİTAK MAM, Turkey's first recycling plant for domestic battery wastes with 1 ton/day capacity was established within the Exitcom Recycling Company.
Through laboratory-scale studies for the recovery of lithium ion batteries; lithium and cobalt salts were produced out of lithium ion batteries.

FUTURE PROGRAMS

Laboratory Equipment Maintenance and Repair Training

- Within the scope of cooperation made with COMSATS, it is planned to provide "Laboratory Equipment Maintenance & Repair" training to TÜBİTAK personnel by COMSATS in 2019.

Halal Food Training

- Within the scope of cooperation made with The Standards and Metrology Institute for Islamic Countries (SMIIC), it is planned to provide "Detection of Porcine DNA from Processes Foods & Food Additives" training to SMIIC by TÜBİTAK MAM Food Institute in May of 2019.

Biomaterials, Biomechanics and Bioelectronics (3B) Center of Excellence

- "TÜBİTAK MAM Biomaterials, Biomechanics and Bioelectronics (3B) Center of Excellence" has been established in TÜBİTAK MAM Materials Institute. The 3B Center of Excellence aims to develop and produce high-tech materials and devices for health sector through national capabilities. The desire to establish cooperation within the scope of 3B Center of Excellence is indicated by the official letters transmitted between COMSATS and TÜBİTAK MAM.

Thank You