

**Scientific & Technological Achievements of I.R. of Iran
(October-November 2016)**

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A) Medical and Biotechnological equipments & findings

Researchers boost food shelf life with nano packaging

Iranian researchers have improved properties of polymeric materials in food packaging by exploiting nanoparticles of clay and iron oxide. Simultaneous use of these two materials brings about synergic effects to further boost the shelf life of food and pharmaceuticals. The results of the research have been published in Trends in Food Science & Technology journal, Volume 51, 2016, pages 41–48.¹

Iranian biosensor makes accurate & cheap cancer detection

Iranian scientists have developed highly accurate and cost-efficient biosensors that can detect cancers that require tissue sampling such as breast cancer, prostate cancer and cancer in lymph nodes. The biosensors have been designed and developed via nanotechnology and is simple to use, highly cost-efficient, easily accessible and very accurate. This system has been patented in Iran and the US, and no other country has yet the technology to develop such a biosensor.²

Researchers develop incubator for microbial culture

Researchers at Amirkabir University of Technology have developed an incubator for culturing cells and microbes for the first time in the country. The incubator has applications in laboratories and research centers and is essential for a lot of experimental work in cell biology, microbiology and molecular biology. This device has been designed and constructed on a much lower budget than its foreign versions.³

Iranian scientists produce anti-bacterial nanocombination

Iranian researchers produce a kind of nanocombination with high anti-bacterial effect to resist infectious diseases. They can prevent of bacteria culturing for two weeks. This nanocombination is useful for food and textile industries and for elimination of pollutions

¹- <http://www.isna.ir/news/95050114608>

²-<http://en.mehrnews.com/news/120739/Iranian-biosensor-makes-accurate-cheap-cancer-detection>

³- <http://www.aryanews.com/NewsFeed/2083385/Researchers-develop-incubator-for-microbial-culture>

from water. Results of the research have been published in Applied Microbiology and Biotechnology.⁴

Jujube syrup for treating diabetes & high blood pressure

Iranian researchers have produced jujube syrup that has health benefits for blood detoxification and is also effective on patients with diabetes and high blood pressure .The syrup is also effective for metabolic syndrome, abdominal obesity, fatty liver disease and reducing blood viscosity⁵.

Researchers develop coral nanoscaffold for treating damaged bones

Iranian researchers at Amirkabir University develop coral nanoscaffold for treating damaged bones in less than three months. This type of nanoscaffold is suitable for cell proliferation because of its similarity to the cellular structure of the body. It has high mechanical property and is able to tolerate different weights.⁶

New method for accelerating wound healing process

Scientists at Sharif University provide nanocomposite wound dressing with anti-bacterial property that can accelerate wound healing process. This kind of wound dressing has suitable mechanical and biological properties and can be used in skin tissue engineering, drug delivery and preparation of artificial skin. Results of the research have been published in Journal of Composites: Part A.⁷

Iranian researchers use nanotech. to improve addiction tests

Iranian researchers have used nanotechnology to introduce a quick and very accurate method for detecting addiction. This method is able to detect the consumption of drugs in people who used the drug 6months before the test. The method of sampling is the most important difference between the presented method and other usual addiction test methods. The sample in

⁴ - <http://www.ghatreh.com/news/nn34203455/>

⁵ - <http://en.mehrnews.com/news/120573/Jujube-syrup-for-treating-diabetes-high-blood-pressure>

⁶ - <http://www.dastavardha.com/index.aspx?pid=99&articleid=192298>

⁷ - <http://www.isna.ir/news/95050115467>

this method is taken from a few hairs, and it turns into a solution. Results of the research have been published in Forensic Science, Medicine, and Pathology, vol. 11, issue 4, 2015, and pp.497-503.⁸

Researchers produce sensors for early diagnosis of hepatitis B

Iranian researchers at Tehran University produce sensor based on modified nanoparticles for early diagnosis of hepatitis B. Since the disease is viral and contagious, early detection is important to prevent the progression of disease in patient and spread to others, too. This kind of sensor has been produced using nanotechnology and reaction between antibody and antigen.⁹

Scientists use nanoparticles & ultrasonic waves for treating cancer

Iranian researchers develop a new method for treating cancer via simultaneous use of gold nanoparticles and ultrasonic waves. One of the advantages of this method is fewer side effects on healthy tissue around the tumor. Results of the research have been published in the journal of Ultrasonics Sonochemistry.¹⁰

B) Industrial and Software equipments & findings

Iranian researchers produce blue nano-pigment

Iranian researchers at University of Zanjan have reached semi-industrial production of blue nano-pigment with high thermal resistance. The nano-pigment can be used to produce all range of colors at nanoscale. These blue nano-pigments are organic and non-toxic with high purity and can be applicable in automobile manufacturing, textile industry, stamp ink, handicrafts, rubber, and paints.¹¹

Optimization of nanocomposite using in paint industry

Iranian scientists provide a new method for producing nanocomposite with better qualifications. Some of the benefits of this method are decreasing costs and improving physical properties such as increasing electrical conductivity and high absorption of

⁸-<http://en.mehrnews.com/news/119505/Researchers-use-nanotech-to-improve-addiction-tests>

⁹- <http://www8.irna.ir/fa/News/82244129/>

¹⁰-<http://www.irna.ir/fa/News/82243671/>

¹¹-<http://en.mehrnews.com/news/120899/Iranian-researchers-produce-blue-nano-pigment>

electromagnetic waves. This type of nanocomposite can be used in paint industry. Results of the research have been published in the journal of Composites: Part A.¹²

Production of polymers for modification pitch & asphalt

Iranian researchers produce a new polymer for improving the quality of pitch and asphalt, which prevent fraction. The other advantages of this method are durability, no need for installation of accessories, lower cost and easy usage.¹³

Improving resistance of composite structures

Iranian researchers at Amirkabir University produce nanocomposite with high resistant against bumps by using clay nanoparticles. Lower cost, increasing energy absorption and efficiency of structures are the most important advantages of nanocomposite. They can be used in aircraft and aerospace industries. Results of the research have been published in the journal of Composites Science and Technology.¹⁴

Iranian researchers produce green industrial catalysts

Iranian scientists produce green industrial catalysts using palladium nanoparticles. They have the ability to create a chemical process with high performance. These catalysts have industrial and pharmaceutical usages and the most important advantages are reusability, bio-friendly and the ability to use in acidity and alkalinity conditions and high temperature.¹⁵

Production of magnetic nanoparticles using walnut shell

Iranian researchers at Azad University synthesize magnetic nanoparticles using walnut shell. The most advantages of this method are non-toxic, bio-friendly, lower cost and improving magnetic properties. These laboratory nanoparticles can be used in electricity industry, biological processes, magnetic and optical equipments. Results of the research have been published in the journal of Current Nanoscience.¹⁶

¹² -<http://www.isna.ir/news/95072715776/>

¹³ - <http://www.mehrnews.com/news/3795996/>

¹⁴ - <http://www.irna.ir/fa/News/82275374/>

¹⁵ -<http://www.isna.ir/news/95070603494/>

¹⁶ - <http://www.mehrnews.com/news/3790912/>

C) Petrochem, Energy, Oil and Gas Industrial equipments & findings

Production of anti-corrosion coatings for oil & gas industries

Iranian scientists produce nanocomposite anti-corrosion coatings using clay nanoparticles. High anti-corrosion, lower cost, bio-friendly and suitable mechanical and physical qualifications are the most important advantages of these coatings. They can be used in oil and gas industries. Results of the research have been published in the journal of Progress in Organic Coatings.¹⁷

Researchers construct solar absorption cooling

Iranian researchers at Isfahan university construct a semi-industrial solar absorption cooling that is able to absorb and save solar thermal energy for cooling process. The most important characteristics of this method are bio-friendly and usage of solar energy as a clean fuel instead of fossil fuels to save energy.¹⁸

Scientists synthesize nanoparticles through green method

Iranian researchers synthesized zinc oxide nanoparticles through a green and environmental-friendly method with applications in the production of laser, diode and solar cells. These production methods are eco-friendly and cost-effective. Results of the research have been published in Ceramics International, vol. 42, issue 3, 2016, pp. 3820-3825.¹⁹

Iranian researchers optimize polymeric fuel cells

Researchers at Amirkabir University optimize polymeric fuel cells. This kind of fuel cell is able to produce electricity and heat simultaneously. The most important advantages of this cell are lower cost, increasing efficiency and decreasing energy consumption. Results of the research have been published in Electrochimica Acta and International Journal of Hydrogen Energy.²⁰

¹⁷ -<http://www.isna.ir/news/95071710073/>

¹⁸ -<http://www.irna.ir/fa/News/82285654/>

¹⁹ -<http://en.mehrnews.com/news/119460/Scientists-synthesize-nanoparticles-through-green-method>

²⁰ - <http://www.mehrnews.com/news/3795553>