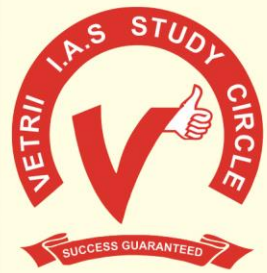

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CORN SILK

- Corn (Zea mays Linnaeus), also known as maize, is a member of the family Poaceae or Gramineae. It is indigenous to Mesoamerica and was domesticated in Mexico some 9,000 years ago, then it spread throughout the American continents.
- Now, it is widely cultivated all over the World. The native corn includes 10,000 species, grouped in 600–700 different genera and this family includes wheat, oats, barley and rice.
- All parts of corn are utilized, including the silks. The flowers of corn are monoecious in which the male and female flowers are located in different inflorescences on the same stalk.
- The male flowers (tassel) at the top of the plant produce yellow pollen. Meanwhile, the female flowers produce CS and are situated in the leaf axils. The silks are elongated stigmas which look like a tuft of hairs. The colors of the CS, at first are usually light green and later turn into red, yellow or light brown. The function of CS is to trap the pollen for pollination. Each silk may be pollinated to produce one kernel of corn.

Significances:

- Corn silk (CS) is made from stigmas, the yellowish thread like strands from the female flower of maize. It is a waste material from corn cultivation and available in abundance.
- It has been consumed for a long time as a therapeutic remedy for various illnesses and is important as an alternative natural-based treatment.
- It has been used as traditional medicine in many parts of the world such as China, Turkey, United States and France.
- It is used for the treatment of cystitis, edema, kidney stones, diuretic, prostate disorder, and urinary infections as well as bedwetting and obesity.
- It soothes and relaxes the lining of the bladder and urinary tubules, hence reducing irritation and increasing urine secretion. Other beneficial treatments of CS include anti-fatigue activity, anti-depressant activity and kaliuretic. In addition, it possesses excellent antioxidant capacity and demonstrated protective effects in radiation and nephrotoxicity.

Background:

- Herbs which have been used for centuries in treating various illnesses play a major role in forming the basic platform of modern medicines.
- The therapeutic effects of many traditional herbs are due to the presences of natural antioxidants, especially phenolic compounds.
- These compounds are able to scavenge reactive oxygen species (ROS) that may cause various diseases related to oxidative stress such as cancer, hypertension, and cognitive dysfunction.

- In order to protect humans from oxidative stress, various herbs and plants are being utilized for their potential benefits in preventing diseases related to oxidative stress and in preserving health.

NEW POLYMERIC MATERIAL FOR CONTROLLED DRUG RELEASE

- A team of researchers at Indian Institute of Technology, Guwahati has developed a bio-compatible polymeric material that promises to help in simultaneous and extended release of two different drugs from a single platform.

About:

- The study has introduced a new general basis for loading and release of various combinations of bio-active molecules.
- The new polymer mimics the chemistry and features of a lotus leaf that make it repel water.
- This helps in controlling the rate of infiltration of water molecules and thus allows the release of a drug molecule in a sustained manner.
- The team is in the process of developing an implant for dual and controlled drug delivery using natural polymers.

Significances:

- This approach will eventually help to combat challenges related to improved efficacy of drugs and resistance.
- Such material would be useful in controlling multiple diseases as well.

Background:

- During severe infection, the body's defense mechanism gets activated at multiple levels and single-molecule drugs can't control multi-stage complications.
- The combination of two or more drugs is increasingly becoming necessary to address drug resistance and treat cancer and neurological disorders.
- But controlled release of more than one drug molecule simultaneously is challenging. Materials in use to carry molecules tend to have a high affinity towards water.
- As a result, when a drug is delivered, water molecules in the body infiltrate the drug-loaded matrix quickly, resulting in the fast diffusion and release of drug molecules.

TEAR-BASED SCREENING TEST FOR ROP

- Researchers at LV Prasad Eye Institute in Hyderabad have identified a few proteins that cause inflammation in the eye leading to abnormal blood vessel growth.

About:

- A group of researchers in Hyderabad have identified a biomarker that can help detect the risk of ROP from just a teardrop.
- Researchers who have been working on genetic or protein-based markers for ROP for many years, have identified a few proteins that cause inflammation in the eye leading to abnormal blood vessel growth
- Premature babies are administered oxygen to help them survive in incubators. This process, however, has to be monitored carefully as overexposure to oxygen can be highly toxic to blood vessels, including those in the retina. Overexposure to oxygen in neonatal care is a major cause of ROP.

Significances:

- Besides identification of biomarker for this condition, the team is also working to fill the gap in existing knowledge about underlying molecular pathology of ROP.
- ROP is a 'self-limiting' condition and it disappears by itself in most premature babies while progressing to severe stage in some. Therefore, early diagnosis can help identify those at risk.
- Vision loss in such babies can be prevented through early interventions like laser surgery or drug-based treatments likely to become available in future.

Background:

- Retinopathy of prematurity (ROP) is one of the most common serious eye complications that occur in premature babies. It can lead to incomplete blood vessel growth in the retina, and eventual loss of vision.
- The role of inflammation caused by reduced oxygen levels in the eyes in the development of this condition. Low oxygen levels in the retina when the child is out of incubator cause abnormal blood vessel growth in the retina, which in turn causes loss of neurons and vision loss. About 40 to 50 per cent of premature infants develop ROP, and of them 10 to 18 per cent progress to develop severe stages of this disease leading to blindness.
- While several risk factors for ROP such as low gestational age, low birth weight, oxygen supplementation, sepsis, multiple births and maternal health during pregnancy were thought to help in predicting the risk of ROP progression in premature infants, but these factors can't help in predicting the risk of severe ROP.

INDIA NANO 2018

- The prestigious Bengaluru India Nano 2018 kicked off with interesting insights from brightest minds across the world during the plenary sessions.

About:

- The event was organised by Department of Information Technology, Biotechnology and Science & Technology, Government of Karnataka in association with Jawaharlal Nehru Centre Applied Scientific Research.
- This International Event was organised under the guidance of Karnataka's Vision Group on Nanotechnology spearheaded by Bharat Ratna Prof CNR Rao
- It is the decennial celebrations of Bengaluru India Nano and it is a tremendous journey for Karnataka as we were the only state that took the initiative to organise this in the national and international level.
- The three-day event, with the theme 'Nano for a Better World', included 18 sessions on the emergence of Nanotechnology in various aspects of the health sector, engineering and technology and brainstorming deliberations along with networking by 41 international and national speakers.
- The premiere event on Nanotechnology saw participation by more than 657 delegates from leading institutes across India and countries including the United States, United Kingdom, Poland, and Singapore.
- Over 118 posters were presented by young researchers and 51 exhibitors participated and showcased their emerging technologies and products including India Oil, Tata Steel, Oxford instruments, Horiba Scientific, HHV, DSS image Tech, DST Nano mission and many more.

Significances:

- To promote the Nano Science technology amongst students across India, road shows have been organised in 18 cities including Tier I & Tier II cities.
- The industry and academia come together to discuss ways to generate nanotechnology opportunities, the loopholes and the ways to fill them in order to offer the best practices to the coming generation
- The event added a different flavour as it not only boosts the confidence of aspiring students but also the other industry leaders to skill themselves to offer something to the industries especially manufacturing, textiles and health. Apart from this, it also offers an opportunity for startups to meet and speak to industry leaders.

Awards:

- Prof C N R Rao Bengaluru INDIA NANO Science 2018 Awards:
- Dr S Sampath professor, Department of Inorganic and Physical Chemistry, Indian Institute of Science, was awarded the Prof C N R Rao Bengaluru INDIA NANO Science 2018 Award with a cash prize of Rs one lakh by CNR Rao Foundation.
- Bengaluru INDIA NANO Innovation Award 2018 was presented to Dr Tata Narasinga Rao, New Materials (ARCI). The award carried Rs 50,000 prize.
- Malhotra Weikfield Foundation NanoScience Fellowship Awards, NanoSparx Awards was given on the occasion.

LAUNCH OF DD SCIENCE AND INDIA SCIENCE

- The Department of Science and Technology and public broadcaster Doordarshan launched two science channels-- DD Science and India Science

About:

- It is of the free-to-air channels a 24/7 channel dedicated to science, with ultimate aim for developing a scientific temperament.
- While DD Science is a one-hour slot on Doordarshan national channel, India Science is an Internet-based channel. The channels will have science-based documentaries, studio-based discussions, virtual walkthroughs of scientific institutions, interviews and short films and will be completely free to access.
- An agreement between Vigyan Prasar, an autonomous organisation under the Department of Science and Technology, and Doordarshan was signed on the occasion. While DD Science will be telecast Monday to Saturday from 5 pm to 6 pm, India Science will be available on any internet-enabled device and will offer live, scheduled play and video-on-demand services

Significances:

- The channel which reaches out to more than 92 per cent of India's population would be a very impactful medium for popularisation of science. The channels were dedicated to science and will "enhance the spirit of enquiry in children. The two science communication platforms are national-level initiatives to elevate science into a celebration and bring it close to everyday life. The two science channels which are milestones in the history of science communication in India are the first step in creating a national science channel for the country.
- While India Science (www.indiascience.in) is already a 24x7 presence, DD Science may also be scaled up to a full-fledged channel in the future.

SAIF SEAS- DRONE

- Vizag-based startup Saif Automation has developed a prototype of a drone that can be deployed in an emergency situation arising at sea or in water bodies. The company aims to help in reducing incidents of drowning at least in places where the drone is deployed.

About:

- As rescues on high seas are dangerous operations and pose significant threats to those involved.
- To reduce the risk involved, a Vizag-based start-up, Saif Automation, has come up with India's first unmanned, remote-controlled drone that can carry out rescue operations in seas, lakes, or pretty much any water body.
- The rescue drone, called Saif Seas, is an industry-grade, remote controlled drone that can cut through water at a speed of 7knots - way faster than any life guard can swim.
- The battery-powered drone can endure continuous use for up to 1.5 hours, supports GPS tracking, and has a belt that pulls drowning people to shore.
- The drone has a dedicated radio communication from its remote to the craft. The drone is not dependent on the internet or any tower signal. This is particularly helpful because, in the event of a cyclone or earthquake, there will be network issues.

Some features of the drone:

- ✓ Unmanned remote controlled
- ✓ String 3km communication range for remotes, extendable up to 10 km
- ✓ Two hours to get fully charged
- ✓ Weighs around 12 kg
- ✓ A long-lasting battery with 45 minutes on moderate load and eight hours of GPS tracking.
- ✓ Can be fitted with HD camera, robotic probes or weaponry

METHANOL ECONOMY

- Methanol Economy is the "Bridge" to the dream of a complete "Hydrogen based fuel systems".

About:

- The methanol economy is a suggested future economy in which methanol and dimethyl ether replace fossil fuels as a means of energy storage, ground transportation fuel, and raw material for synthetic hydrocarbons and their products. It offers an alternative to the proposed hydrogen economy or ethanol economy.
- Methanol is a clean burning drop in fuel which can replace both petrol & diesel in transportation & LPG, Wood, Kerosene in cooking fuel. It can also replace diesel in Railways, Marine Sector, Gensets, Power Generation and Methanol based reformers could be the ideal compliment to Hybrid and Electric Mobility.
- Methanol burns efficiently in all internal combustion engines, produces no particulate matter, no soot , almost nil SOX and NOX emissions (NEAR ZERO POLLUTION).
- The gaseous version of Methanol – DME can blended with LPG and can be excellent substitute for diesel in Large buses and trucks.

Need:

- India needs around 2900cr litres of petrol and 9000cr litres of diesel per year currently, the 6th highest consumer in the world and will double consumption and become 3rd largest consumer by 2030. Our import bill on account of crude stands at almost 6 lakh crores.
- Hydrocarbon Fuels have also adversely affected the environment with Green House Gas Emissions (GHG). India is the third highest energy related carbon dioxide emitter country in the world. Almost 30%pollution in cities like Delhi is from automobiles and the growing number of automobiles on the road will further worsen the pollution.
- It must be noted that the recent situation is alarming and time has come for the Govt to present a comprehensive road map to reduce the urban pollution in this country and stop pollution related deaths completely.
- Hon'ble Prime Minister has set a goal for our Country to reduce the import bill by 10% by the year 2022. Crude oil imports drain our foreign exchange, putting enormous pressure on our currency & thereby weakening our bargaining power with the rest of the world. We need to have our own "Indian Fuel of global relevance".

Production:

- Methanol can be produced from Natural Gas, Indian High Ash Coal, Bio-mass, MSW, stranded and flared gases and India can achieve (through right technology adaptation} to produce Methanol @ Rs.19 a litre from Indian coal and all other feedstock.

- The best part world is already moving towards renewable methanol from Co2 and the perpetual recycling of Co2 into Methanol, say CO2 emitted from Steel plants, Geothermal energy or any other source of CO2, effectively "Air to Methanol"
- During the last few years, the use of methanol and DME as fuel has increased significantly. Methanol demand is growing at a robust 6 to 8 % annually. World has installed capacity of 120 MT of Methanol and will be about 200 MT by 2025.
- Currently Methanol accounts for almost 9% of transport fuel in China. They have converted millions of vehicles running on Methanol. China alone produces 65% of world Methanol and it uses its coal to produce Methanol. Israel, Italy have adopted the Methanol 15% blending program with Petrol and fast moving towards M85 & M100, Japan, Korea have extensive Methanol & DME usage and Australia has adopted GEM fuels (Gasoline, Ethanol & Methanol) and blends almost 56% Methanol. Methanol has become the choice of fuel in Marine Sector worldwide and countries like Sweden are at the forefront of usage.
- Large passenger ships carrying more than 1500 people are already running on 100% Methanol. 11 African and many Caribbean countries have adopted Methanol cooking fuel and across the world Gensets and industrial boilers are running on Methanol, instead of diesel.
- Renewable Methanol by capturing Co2 back from the atmosphere is becoming very popular and is seen by the world as the "Enduring Energy Solution known to Mankind". Methanol is a significant solution to the burning problem of Urban pollution worldwide.

What India Can do:

- India has an installed Methanol Production capacity of 2 MT per annum. As per the plan prepared by NITI Aayog, using Indian High Ash coal, Stranded gas, and Biomass can produce 20MT of methanol annually by 2025. India, with 125 Billion Tonnes of proven Coal reserves and 500 million tons of Biomass generated every year & the huge quantities of Stranded & Flared gases has a huge potential for ensuring energy security based on alternate feedstock and fuels. Methanol Benefits in Different sector:

Transportation sector:

- With Very little modifications to existing engines (vehicles) and fuel distribution infrastructure. 15% of all vehicle fuels can be converted to Methanol & Di Methyl Ether (DME).
- India is shortly going to implement Methanol 15 % blending program with Petrol and cost of petrol is expected to come down immediately by 10% and M100 program for buses and trucks is also to be implemented shortly.
- Ministry of transport has already prepared the draft notification of M15, M100 & DME as transport fuel and is expecting a clearance from Law ministry to be notified officially. India has

had extensive discussions with Israel, which has successfully implemented Methanol 15 (M15) blending program for Technology transfer.

- Global engine manufactures like Volvo, caterpillar, Mercedes and in collaboration with Indian players can manufacture these engines under the Make in India and will result in big FDI investments. The development of this sector will bring jobs in the engineering sector.

Marine Sector:

- Worldwide due to emission regulations being implemented stringently by IMO (International Maritime Organisation), marine Sector is shifting to Methanol as fuel of choice. Being a very efficient in liquid form and practically generating no SOx or NOx, Methanol is much cheaper than LNG and Bunker / Heavy Oil.
- Ministry of shipping is preparing a road map to convert 500 barges into Methanol and a cabinet note is being prepared to adopt Methanol in Inland Waterways system. The first barge in India to run on Methanol will be achieved in the next 12 months. Sweden has already about 17 boats, ferrys, barges and a 1500 passengers cruise ship running on Methanol.
- India will convert about 50 Nos of vessels in the Port sector and various vessels owned by government entities to operate on Methanol.
- It is in touch with all global and national players to bring all this technology in India, resulting in a massive modernization and transformation of the sector. This opportunity will also be used to standardise all the marine regulations both sea and inland in parity with International Maritime Organization rules and with global standards.

Methanol in Railways:

- Indian Railways consumes about 3 billion litres a year and the annual diesel bill is in excess of Rs. 15000 Crores.
- A Methanol locomotive prototype is being implemented by Indian Railways under a grant by Department of Science & Technology and once all 6000 diesel engines are converted to methanol (at very minimal cost of less than 1 crore a engine), the annual diesel bill can be reduced by 50%. Methanol conversion program in railways is complimentary to the goals of electrification in Railways.
- Methanol & DME in Cooking fuel program (Liquid fuel and LPG – DME blending program
- The cooking fuel program of Methanol liquid fuel and LPG-DME blending is a low hanging fruit for India.
- A 20% blending program with LPG, without any infrastructure modifications would result in a immediate savings of Rs.6000 Crores a year.

- Lakhs of rural women will cook healthy and Methanol supplied in canisters would ensure fuel supply in the remotest part of North East and Himalayas.
- India by adopting Methanol can have its own indigenous fuel at the cost of approximately 19 Rs. A litre at least 30% cheaper than any available fuel.
- Methanol fuel can result in great environmental benefits and can be the answer to the burning Urban pollution issue.
- At least 20% diesel consumption can be reduced in next 5-7 years and will result in a savings of 26000 Crores annually. Rs. 6000 Crores can be annually saved from reduced bill in LPG in the next 3 years itself. The Methanol blending program with Gasoline will further reduce our fuel bill by at least 5000 Crores annually in next 3 years.

Way forward:

- Make in India program will get a further boost by both producing fuel indigenously and associated growth in automobile sector adding engineering jobs and also investments in Methanol based industries (FDI and Indian). However, Coal and Stranded Gas linkages are import policy initiatives to be taken.
- The final roadmap for 'Methanol Economy' being worked out by NITI Aaayog is targeting an annual reduction of 100 Billion $ by 2030 in crude imports in line with our Hon PM's vision.
- To promote this renewable, alternate fuel a "Methanol Economy Fund" is also being contemplated. A cabinet note on Methanol in Inland Waterways and Marine Sector and overall adaptation of "Methanol Economy" will be moved shortly.