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Nanofiltration shows the way

CSIR-IICT

26th April 2017

The chemical sector could benefit from a new indigenous technology

Industries, especially in the chemical sector that face the problem of getting rid of waste water, can look forward to some productive options. Thanks to an indigenous technology developed by scientists at the CSIR-IICT (Indian Institute of Chemical Technology), Hyderabad.

It's a simple nanofiltration technique that helps recover water from industrial waste, which then could be recycled for specific uses. A set of low cost membranes ensure the separation of harmful chlorides, cyanide and water from the polluted /contaminated water generated in certain chemical industries. The super thin membrane is economical and the process is low pressure, which can substitute the regularly used Reverse Osmosis for specific applications, say the scientists of the IICT. They have demonstrated the technique in Tata Steel's Jamshedpur plant last year.

In the manufacture process of steel, coke is an important ingredient. It is a solid carbon source used to melt and reduce iron ore. Coke production begins with pulverisation of bituminous coal, which is fed into a coke oven and heated to very high temperatures. After the coke is finished, it is moved to a quenching tower where it is cooled by spraying water. Once cooled, the coke is moved directly to an iron melting furnace for steel production.

The effluent from this quenching tower contains excess chloride and some cyanide, which needs to be removed before the water can be recycled. In January 2017, S Sridhar and his team from the IICT successfully installed and commissioned a nanofiltration pilot plant of capacity 5.5 M3/h capacity (1.1 lakh litres per day) for the removal of excess chloride from steel quenching tower effluent at Haldia, West Bengal.

The trials were performed at an applied pressure of 5 to 7.5 kg/cm2 pressure to achieve separation of chloride from 1500 mg/L in the effluent to an acceptable level of less than 400 mg/L with a water recovery of 75 per cent. In comparison, the Reverse Osmosis will not be able to achieve such high water recovery. The operating cost would be higher at 5 paise per litre for nanofiltration instead of 3 paise per litre.

Operation is full-fledged at the plant and its success could result in replication of similar plants of higher capacity (commercial scale of 150-200 M3/hr) for the steel industry to facilitate zero liquid discharge enforced by State pollution control boards, to minimise environmental contamination, says Sridhar.

Explaining the process, he says, during one of the critical steps of its manufacture, steel from blast furnace is quenched in a tower, which results in the release of excessive chloride and cyanide into the aqueous stream. Chloride levels above 800 mg/L cause corrosion in the blast furnace. These two issues pose a major challenge. The team developed a high flux, low fouling nanofiltration membrane, which provides high water recovery and sufficient chloride separation.

After the trial run for Tata's on a laboratory scale, the design of a pilot plant was taken up under a sponsored project, for prospective installation at Tata Steel's Haldia Metcoke Division. The capital investment for the pilot plant is ₹12 lakh and operating cost including power consumption, filter replacement, chemicals for maintenance among others costs only ₹20 per cubic meter

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CFTRI LAUNCHES SUPER CROP

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The Central Food Technological Research Institute (CFTRI), Mysuru has launched Teff, a new super foodgrain suitable for dry zones in Karnataka.

Being a drought resistant crop, Teff has the potential to yield about 200-250 kg per acre. Teff can be grown in both seasons of Kharif (June-July) and Rabi (October-November) and is suitable for districts with dry zones of agriculture in Karnataka.

In order to blend the crop into traditional forms of Indian food, CFTRI plans to have workshops to sensitise farmers from across the state and help develop recipes for Teff.

In places like Ethiopia, Teff, an ancient grain going back to the civilisations of Abyssinia, is a whole grain cereal crop and is the staple.

Teff is said to be healthy as it is gluten-free and has high resistant starch and low glycemic load.

It is a good choice for those suffering with celiac disease, for better diabetes management and weight control.

Teff also has well-balanced protein with all essential amino acids and is particularly rich in albumin proteins, which is equivalent to the vegetable version of egg whites.

The grain is rich in micronutrients like Calcium, Iron, Vitamin C and other nutrients. As an ingredient, Teff blends well into various foods like dosas, porridges, roti and gluten-free breads.

Superfoods like Teff have a proper nutrition profile that upon consistent eating can help improve the health and wellness of our population. Superfoods have the potential of helping reduce malnutrition and help improve the health of those suffering from lifestyle related diseases such as diabetes, obesity, etc.

CFTRI has a MoU with Sri Sri Rural Development Program to extend its efforts to farmers for superfood production and farm gate food processing.

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CFTRI launches superfood 'Teff' for dry zones in K'taka

CSIR-CFTRI 25th April 2017

Central Food Technological Research Institute (CFTRI) Mysuru launched an indigenously developed agrotechnology superfood, Teff, on Tuesday.

The institute noted that being a drought resistant crop, Teff has great potential for the nation yielding about 200-250 kg per acre. Teff can be grown in both seasons of kharif (June-July) and Rabi (October-November) and is suitable for districts with dry zones in Karnataka.

High in micronutrients

They stated that the grain is rich in micronutrients like Calcium, Iron and Vitamin C. Teff as an ingredient blends well with various foods like dosas, porridges, rotis and gluten-free breads.

CFTRI has signed an MoU with Sri Sri Rural Development Programme to extend its efforts to farmers for superfood production and farm gate food processing. It also plans to conduct workshops to sensitise farmers from across the state and help develop recipes for Teff.

In the recent past, CFTRI has also developed agrotechnologies for superfoods Chia and Quinoa to grow in Indian conditions. Earlier, since superfoods were imported, they were very expensive and most Indians were unable to afford it.

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Star of Mysore
Bangalore Mirror
HinduBusinessLine

India's newest Iris species found in Manipur

CSIR-NEIST

26th April 2017

A popular seasonal flower in Manipur, which is annually offered during Manipuri New Year- Cheiraoba in April, has turned out to be India's newest Iris (flower) species, according to Principal Scientist of Council of Scientific & Industrial Research (CSIR)-North East institute of Science and Technology (NEIST) Dr Huidrom Birkumar.

This mauve-blue colour flower Iris Laevagata Fisch, known as Kombirei in local tongue and found in the marshy areas in Manipur particularly in Lamphelpat and Yaralpat wetlands in the outskirts of Imphal city, blooms for about 15 days in the first half of April.

"Earlier, people used to name the said flower wrongly as Iris Bakeri wall. But London-based Royal Botanical Gardens (RBG), Kew confirmed the new species only on April 19 after studying my report," said Dr Birkumar. "The plant grows in Japan and it was also reported in Russia and South East Asian region", he added.

Dr Birkumar, who had been studying the flower since 2000, sent a report to RBG, Kew, on April 13, following a media report that the flower is vanishing from the original habitat. RBG is an international authority on botanical research and education and has a collection of over 40,000 species of plants.

"Four species of Iris were reported in Manipur out of the country's 17 species as per Botanical Survey of India reports," said the scientist who had written a book on economic botany besides publishing 35 research papers. "Unfortunately this beautiful flower, which has very close connections with the traditions of Manipuris since time immemorial, is facing a great threat due to lack of attention."

Whitish colour and height are the major distinct differences between Iris Laevigata Fisch (3.5 ft) and Iris Singuinea (2 ft) besides their leaves. Singuinea has no straight leaves unlike Laevigata.

Even though other species such as Iris Wattii, Iris Singuinea, Iris Kumaon grow wild in the State, this flower grows only in the wetlands of Lamphelpat and Loktak lake. Interestingly, Iris Singuinea which is used as real Kombirei (Iris Laevigata Fisch) during annual Cheiraoba festival in April, is being cultivated in private nurseries in view of the huge public demand.

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Mahagenco Quotes CIMFR Test Results: '90 per cent of SECL coal samples found substandard'

CSIR-CIMFR 26th April 2017

Approximately 90 per cent of the 513 coal samples, which were picked up from the supply of South Eastern Coalfields Limited (SECL) between September 9, 2016 and January 31, 2017, have been found to be of substandard quality by Central Institute of Mining and Fuel Research (CIMFR).

Maharashtra State Power Generation Company Limited (MSPGCL), also known as Mahagenco, which is one of the main buyers of coal from SECL, disclosed to The Indian Express these test results while talking about serious quality issues that are still present. SECL is the largest subsidiary of Coal India Limited and it has been facing major questions regarding quality of coal supplied.

"All the rakes loaded and dispatched from SECL are sampled by third-party agency. Currently, CSIR-CIMFR is working as third party agency and during 9.9.2016 and 31.1.2017, it has sampled around 513 samples. On the basis of results issued by CIMFR, around 90 per cent samples have been found to be deviating from the declared grade," Mahagenco told The Indian Express.

On December 29 last year, SECL told the Parliamentary Standing Committee on Steel and Coal that it has been taking various adequate measures to improve the quality of coal. The SECL also told the committee that Mahagenco has filed total 13 complaints — 10 complaints were about "oversized" coal and three were about "quality" issues — in between April, 2016 and September, 2016.

A coal seam is a bed of coal usually thick enough to be profitably mined. The SECL told the panel it is stopping the extraction "from the seams where due to geo-mining condition, quality has deteriorated". Other steps to improve quality include revision of grade of mines and sidings, no dispatch of coal to power sector from siding (railway line) where crushing arrangement is not available till date, and installation of two washeries at Kusmunda and Raigarh area.

Between April 2016 and September 2016, JPL filed 11 complaints with the SECL on coal supply quality from the latter's Raigarh area. As per SECL data, JPL had filed ten complaints related to "quality" issues, while it submitted one complaint related to "oversized" coal issues. NTPC's Sipat plant and GWEL submitted five complaints each with SECL in the same time period.

"SECL has entered into tripartite agreement with CIMFR and power utilities for third party sampling of coal being supplied to power utilities," the SECL told Parliamentary committee. Meanwhile, for better coal quality supply, the SECL told the Parliamentary committee that it has also established laboratories "with NABL (National Accreditation Board for Testing and Calibration Laboratories) accreditation for coal sampling analysis".

According to the SECL, the area labs of Kusmunda, Gevra, Dipka, Sohagpur, Johilla, Hasdeo, Bhatgaon and Bishrampur have been accredited by the NABL. "Two areas Baikunthpur and J&K area are in the process to get accreditation from NABL, and three areas — Raigarh, Korba and Chirmiri — are to file the application in this regards," SECL told the Parliamentary Committee.

As per coal quality supply agreement between the SECL and Mahagenco, the former is required to supply coal having size less than 100 mm. Any coal having size more than 100 mm is deemed "oversized" or "lumpy" coal. The SECL did not reply to the queries sent by The Indian Express.

"As soon as Mahagenco receives lumpy coal from any company, it is general practice to bring it to the notice of concerned coal company through letter. Generally, the SECL does not reply to such letters of Mahagenco. However, Mahagenco expects improvement in the quality of coal dispatched. Between October 16 (in 2016) to March 17 (in 2017), Mahagenco has filed around 14 complaints for oversized coal and around 7 complaints related to quality of coal with the SECL. The deviations in the grade of coal is still observed," Mahagenco told The Indian Express.

Coal India's largest subsidiary South Eastern Coalfields Limited (SECL) received 55 complaints from power generation companies — including Jindal Power Limited (JPL), NTPC Ltd and GMR Warora Energy Limited (GWEL) — regarding poor quality of coal supply between April 2016 and September 2016. Maximum 13 complaints against SECL came from Mahagenco only. Mahagenco's issues were related to coal supply from areas such as Kusmunda, Gevra, Raigarh and Bishrampur.

As the number of complaints from power utilities have been quite high, the SECL has been taking various steps for coal quality improvement. On December 29 last year, the SECL told the Parliamentary Standing Committee on Steel and Coal that it has put a "quality regime" in all areas under its supervision. It has suspended the production from the "mine where thin seam workings deteriorated the quality of coal produced".

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