



# CSIR IN MEDIA

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## Indigenous technology developed to reduce benzene in petrol: Reliance

### **CSIR-IIP**

*Reliance said there has been an increasing pressure on refiners globally to reduce the amount of benzene and other hazardous air pollutants in petrol/gasoline pool because of health and environmental concerns.*

An indigenous technology to restrict benzene, a carcinogenic element, in petrol and naphtha has been developed in collaboration with the state-run Indian Institute of Petroleum (IIP) in Dehradun, the Reliance Industries (RIL) said on Tuesday.

“In a major technological and scientific breakthrough, the RIL and IIP have come up with an indigenous Benzene Recovery Unit (BRU) which restricts benzene content to 0.2 volume per cent in raffinate (return stream to gasoline),” the RIL statement said here.

“RIL did the construction and the flawless commissioning of the new process named BRU.”

“The RIL-IIP have filed a joint patent for the process to create a strong Intellectual Property (IP) and ‘freedom to operate’ assurance,” it added.

The developers are receiving many enquiries for licensing the technology, the statement said.

The RIL had entered an agreement with the IIP to co-develop an extractive distillation process. Reliance said there has been an increasing pressure on refiners globally to reduce the amount of benzene and other hazardous air pollutants in petrol/gasoline pool because of health and environmental concerns.

In 2011, the US Environmental Protection Agency had made it mandatory for refiners to meet an annual average gasoline benzene content standard of 0.62 volume per cent for all of their gasoline, both reformulated and conventional

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<http://www.financialexpress.com/article/industry/companies/indigenous-technology-developed-to-reduce-benzene-in-petrol-reliance/292200/>

IANS | Mumbai | June 21, 2016

## RIL and IIP Come Together to Curb the Benzene Threat

### **CSIR-IIP**

*RIL joins hands with the IIP to create a Benzene Recovery Unit, to limit the chemical's hazardous effects in a cost-effective manner.*

In the wake of the harmful effects of air pollution, companies worldwide are attempting to devise technologies. These are expected to curb the pollutants arising from industrial work.

Mukesh Ambani led Reliance Industries Limited (RIL) is playing a pivotal role in this regard and has joined hands with the Indian Institute of Petroleum (IIP) to create a Benzene Recovery Unit.

### **Ill effects of benzene**

A harmful carcinogen, benzene is employed as an industrial solvent, used in the preparation of several artificial materials. It is also emitted through gasoline fumes, and cigarette smoke.

High levels of benzene in the atmosphere have been linked to several cancers of the blood cells, especially leukemia. Therefore, international studies have been conducted to control its consequences.

### **Benzene Recovery Unit (BRU)**

Indigenous in its making, this technology will help restrict the amount of benzene occurring in raffinate. The previously employed technology had certain issues which required modification in order to fully optimize the resources.

In order to reduce the air contamination occurring due to high levels of benzene, RIL and IIP decided to co-develop a distillation process. RIL not only commissioned the project, but also constructed the recovery units. On 23rd May, BRU-enabled products were sent for blending and sales.

## **Association of RIL with IIP**

The successful collaboration of a public and private player towards creating an environment-friendly technology is a positive sign of development. By participating in the production of BRUs, Reliance Industries and IIP both have joined the elite developers' league, in terms of technology.

The company stated that global enquiries are pouring in to license this innovation.

## **Benefits of BRU**

The BRUs would help reduce the benzene levels found in raffinate (return streams to gasoline) to a meager 0.2 volume per cent. Present in gasoline and naphtha, the earlier method proved to be truly ineffective.

With the rise in concerns regarding the environment, and the poor air quality, this technology comes as a definite relief to the industry.

## **Environmental Protection Agency (EPA)**

Headquartered in Washington, USA, the agency works towards the betterment of American society through conservation of the environment. The EPA launched the 'Gasoline Benzene Program' in January, 2011.

It set a mandatory 0.62 volume per cent for refiners using both reformulated as well as conventional gasoline. This standard is an annual average for gasoline-related benzene content. Additionally, this would help create sufficient benzene credits for the entire industry.

## **RIL's Initiative**

The Jamnagar Refinery employs two Fluid Catalytic Cracker (FCC) units, which are the world's largest. The high quantity of naphtha produced by them greatly contributes to the benzene pool of the country.

The previous methods required high capital and markedly increased the operating expenses. RIL foresaw the application of the EPA regulations as a global practice. Therefore, ever since 2011, it had a benzene reduction project in the pipeline.

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<http://www.indiaprwire.com/pressrelease/chemical/20160621411232.htm>

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## RIL, IIP jointly develop benzene recovery process; file for patent

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### CSIR-IIP

Reliance Industries Ltd and Indian Institute of Petroleum (IIP) have jointly filed a patent for a new process for Benzene Recovery, that has helped to create a strong intellectual property (IP) and "freedom to operate" assurance.

Engineering and consulting major Technip was selected as detailed engineering contractor (DEC) for the new process named Benzene Recovery Unit (BRU).

RIL undertook the construction and the commissioning of BRU and on 23 May 2016, the on-specification raffinate product (less than 0.2 vol-% benzene) was sent to storage for blending and sales.

With this technology development, RIL and IIP have now joined the league of technology pioneers and have received several enquiries for licensing the technology, says an RIL release.

RIL and Indian Institute of Petroleum (IIP) Dehradun had, in 2011, signed an agreement to co-develop an extractive distillation process using a robust solvent that will not degrade appreciably in the presence of difficult species and contaminants, and meet the following:

- 0.2 vol-% benzene or less in raffinate (return stream to gasoline)
- 99 vol-% or higher benzene recovery (extracted and upgraded to cyclohexane grade)

It was understood that robust and selective solvent will improve unit operation and performance resulting in higher reliability and availability of the unit.

RIL-IIP team did several experiments in the laboratory and pilot plants, and established that selected solvent is robust and meets the required performance criteria. Based on pilot plant data, process scale-up and process design optimisation was done. All this data and work was used to develop technical information package (TIP) containing simplified process flow diagram, heat and mass balance and preliminary data sheets for critical equipment.

RIL Jamnagar refinery has two of the world's largest fluid catalytic cracker (FCC) units. The light naphtha produced from these units is the major contributor of benzene in the gasoline pool.

Due to health and environmental concerns, there has been an increasing pressure on refiners around the world to reduce the amount of benzene and other hazardous air pollutants in the gasoline pool. In 2011, under Mobile Source Air Toxics (MSAT) gasoline fuel programme, Environmental Protection Agency (EPA) in the USA required refiners to meet an annual average gasoline benzene content standard of 0.62 volume per cent (vol-%) for all of their gasoline, both reformulated and conventional, nationwide. It was evident that, in the near future, Europe and the rest of the world will also impose lower limits on benzene content in gasoline.

In 2011, RIL started to evaluate available technologies to remove benzene from FCC Light naphtha. All available and the claimed proven technologies at that time had the following;

- Higher capital and operating expenditures
- Loss of value due to significantly lower benzene recovery
- Loss of octane barrel due to loss of high-octane olefinic compounds

Also available extractive distillation technology that used solvent to extract benzene from FCC light naphtha was not proven commercially. It is very challenging to extract benzene from light naphtha using solvent because of its rapid degradation by polymerisation in the presence of reactive species such as olefins and di-olefins, and contaminants such as sulphur, nitrogen, chlorides, oxygenates, etc.

[http://www.domain-b.com/companies/companies\\_r/Reliance\\_Industries/20160621\\_patent.html](http://www.domain-b.com/companies/companies_r/Reliance_Industries/20160621_patent.html)

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## RIL, IIP achieve breakthrough with indigenous benzene recovery unit

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### CSIR-IIP

In a major technological and scientific breakthrough, energy and petrochemicals major Reliance Industries Limited (RIL) and the Indian Institute of Petroleum (IIP), Dehradun have come up with an indigenous Benzene Recovery Unit (BRU), which restricts benzene content to 0.2 volume percent (vol.-%) in raffinate (return stream to gasoline).

RIL carried out the construction and the 'flawless' commissioning of the BRU. On May 23 this year, the on-specification raffinate product (less than 0.2 vol.-% Benzene) was sent to storage for blending and sales.

RIL and IIP jointly announced their triumph in finding a means to curb the menace posed by benzene, a known carcinogenic, at Dehradun yesterday.

"With the successful culmination of the private-public venture, RIL and IIP have joined the league of elite technology developers. Enquiries are pouring in from across the globe, seeking to license the cost-effective, indigenous technology," a press release from the company said.

RIL-IIP filed joint patent for the process to create strong Intellectual Property (IP) and "freedom to operate" assurance.

The TIP was handed-over to Technip, which was selected as Detailed Engineering Contractor (DEC) for this new process, the release said.

RIL's Jamnagar Refinery in Gujarat has two of the world's largest Fluid Catalytic Cracker (FCC) units. The light naphtha produced from these units is the major contributor of benzene in the gasoline pool.

Due to health and environmental concerns, there has been increasing pressure on refiners around the world to reduce the amount of benzene and other hazardous air pollutants in the gasoline pool.

In 2011, under Mobile Source Air Toxics (MSAT) gasoline fuel program, Environmental Protection Agency (EPA) in USA required refiners to meet an annual average gasoline benzene content standard of 0.62 volume percent (vol.-%) for all of their gasoline, both reformulated and conventional, nationwide. It was evident that, in the near future, Europe and the rest of the world would also impose lower limits on benzene content in the gasoline, the release said.

In 2011, RIL started to evaluate available technologies to remove benzene from FCC Light naphtha. All available and the claimed proven technologies at that time had disadvantages such as higher capital and operating expenditures; loss of value due to significantly lower benzene recovery; and loss of octane barrel due to loss of high-octane olefinic compounds, it said.

Also, available extractive distillation technology that used solvent to extract benzene from FCC light naphtha was not proven commercially. It is very challenging to extract benzene from light naphtha using solvent because of its rapid degradation by polymerization in the presence of reactive species such as olefins and di-olefins, and contaminants such as sulphur, nitrogen, chlorides, oxygenates, and so on, it said.

In 2011, RIL and Indian Institute of Petroleum (IIP) Dehradun signed an agreement to co-develop an extractive distillation process using a robust solvent that will not degrade appreciably in the presence of difficult species and contaminants, and meet the following targets: 0.2 vol.-% benzene or less in raffinate (return stream to gasoline) and 99 vol.-% or higher benzene recovery (extracted and upgraded to cyclohexane grade benzene).

"It was understood that robust and selective solvent will improve unit operation and performance resulting in higher reliability and availability of the unit," the release said.

According to the release, IIP's strengths included strong understanding of solvents chemistry; very good understanding of liquid-liquid extraction and extractive distillation processes; and excellent laboratory and pilot plant facilities.

RIL brought to the partnership its technical leadership and "can do" attitude, strong operations experience of large size extractive distillation units and strong project implementation capabilities. It also ensured "freedom to operate" by generating strong IP portfolio and restricting claims of competitors by challenging their Indian patents.

The process development passed through the following steps: Proof of Concept (Chemistry and Separation) demonstration at lab scale; Pilot Plant Studies & Scale-Up; Process Design Optimization; and Development of Technical Information Package.

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<http://netindian.in/news/2016/06/21/00038466/ril-iip-achieve-breakthrough-indigenous-benzene-recovery-unit>

NetIndian News Network | Mumbai | 21 June 2016

## RIL collaborates with Indian Institute of Petroleum

### **CSIR-IIP**

*The indigenous Benzene Recovery Unit developed by RIL and IIP will restrict benzene content to 0.2 volume per cent (vol.-%) in raffinate (return stream to gasoline).*

Reliance Industries in a collaboration with Indian Institute of Petroleum (IIP) Dehradun has developed an indigenous technology to restrict benzene, a carcinogenic element in gasoline and naphtha.

Report says that the indigenous Benzene Recovery Unit developed by RIL and IIP will restrict benzene content to 0.2 volume per cent (vol.-%) in raffinate (return stream to gasoline), the company said.

Reliance Industries Ltd is currently trading at Rs. 983.65, down by Rs. 6.9 or 0.7% from its previous closing of Rs. 990.55 on the BSE.

The scrip opened at Rs. 995 and has touched a high and low of Rs. 995 and Rs. 980.2 respectively. So far 831936(NSE+BSE) shares were traded on the counter. The current market cap of the company is Rs. 321180.46 crore. The BSE group 'A' stock of face value Rs. 10 has touched a 52 week high of Rs. 1089.5 on 15-Jan-2016 and a 52 week low of Rs. 819 on 24-Aug-2015. Last one week high and low of the scrip stood at Rs. 993 and Rs. 965 respectively.

The promoters holding in the company stood at 45.15 % while Institutions and Non-Institutions held 32.38 % and 19.5 % respectively.

The stock is currently trading below its 100 DMA.

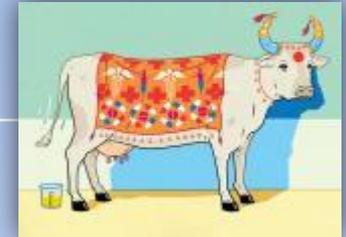
[http://www.indiaonline.com/article/news-top-story/ril-collaborates-with-indian-institute-of-petroleum-116062100040\\_1.html](http://www.indiaonline.com/article/news-top-story/ril-collaborates-with-indian-institute-of-petroleum-116062100040_1.html)

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## BJP's obsession with patenting cow urine

### CSIR

*The ruling Bharatiya Janata Party is famously obsessed with the cow, which is venerated in Hindu cosmology. Most Indian states have now banned cow slaughter. The Punjab government wants to tax alcohol to pay for shelters for stray cattle.*



Last year, after a Muslim man in Uttar Pradesh was lynched by a mob for eating beef, a cabinet minister from the BJP demanded to know who else was “involved in the crime” – meaning the beef eating, not the man’s killing.

It should probably come as no surprise, then, that the BJP is also touting the medicinal virtues of consuming cow urine. The therapy is mentioned in the Ayurveda.

In the early 2000s, when the BJP led the governing coalition of the day, the Council of Scientific and Industrial Research (CSIR), a state-funded network of research laboratories, started promoting cow-urine technology as a treatment for diabetes, infections, cancer and even DNA damage.

Today, the government holds more than a dozen patents related to cow urine and has filed applications for them in nearly 150 countries. Many nations, including the United States, France and South Korea, have recognised these, but not India, which has much stricter standards for patents. For now.

The BJP government released India's first National Intellectual Property Rights Policy last month, and it is dangerously misguided. Although the paper reaffirms the basic tenets of India's admirably farsighted patent laws, it also calls for protecting traditional remedies like cow urine. Taken to its logical conclusion, this policy could open the door to many more exceptions, playing into the hands of patent-happy international pharmaceutical companies.

Big Pharma justifies aggressive patenting by claiming that profit-making drives invention by giving labs and companies an incentive to invest in research. Indian law takes the opposite view: Higher standards for legal protection leave more room for innovation. Unlike many other countries, India does not allow patents for natural substances, traditional remedies, frivolous inventions or marginal innovations.

This is a good thing – a great thing, in fact. Having fewer patents means more competition for more generic drugs, which means more affordable medicine for more people. Imatinib, a drug used to treat a form of leukemia, is available in India at about one-tenth the price it costs in much of the world.

In 2000, when the only anti-retroviral drugs for HIV/AIDS available were produced by Western companies, the annual cost of treatment was about \$10,000. The price has dropped to about \$350, at least in the developing world, thanks to generic equivalents that were developed in India.

Naturally, all this drives Big Pharma mad. Its business model relies largely on patenting small tweaks to existing technologies, which multiplies financial returns with only minimal investment in research.

This, being precisely what Indian law prohibits, has made India a fixture of the “Priority Watch List” of the US Trade Representative's Special 301 Report, a kind of most-wanted roster of the world's intellectual-property deviants.

Ahead of Prime Minister Narendra Modi's visit to the United States two weeks ago, 17 US industry associations, including the Pharmaceutical Research and Manufacturers of America, wrote to President Obama to complain about India's business environment, in particular its patent laws.

Back in 1970, India withdrew drug patents in order to support its generic-drugs industry. They were reintroduced, with caveats, in 2005 when the country's entire intellectual property regime was updated to comply with World Trade Organisation rules.

Acting on the advice of public-health activists, a group of Communist parties that formed an indispensable minority of the governing coalition forced the Congress to go along with innovation-friendly restrictions that remain today.

Last month, when the BJP announced its new intellectual property policy, it in effect repeated India's longstanding response to its critics: Tough luck; our patent laws comply with WTO standards, and that's that.

Or, as Modi himself put it when he addressed the US Congress last week: "India's ancient heritage of yoga has over 30 million practitioners in the US. It is estimated that more Americans bend for yoga than to throw a curve ball. And no, Speaker, we have not yet claimed intellectual property rights on yoga."

### **'Traditional knowledge'**

But there's yoga and then there's cow urine. Even as the Modi government's new policy paper reiterates the need to limit patents in the name of public health, it repeatedly argues for plucking "traditional knowledge" out of a multimillennial cultural commons and patenting it.

With this move, the BJP is picking up unfinished business from its previous excursion in power, when it led the NDA government between 1998 and 2004. That was the time when the CSIR and the Centre for Research in Cow Science, an outgrowth of Hindu nationalist groups, first tried to patent cow-urine technology in India.

According to the Hindustan Times, over the last decade the CSIR has spent around \$50 million on patent applications, including for using cow urine in health tonics, energy drinks and chocolate. The health ministry's special department for traditional knowledge, AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy), was elevated to a full ministry after the BJP won in 2014.

Patenting cow urine is a natural extension of the Hindu right's obsession with the cow. It makes ideological sense for a nationalist party that rides on a wounded Hindu psyche to claim that Indian science was well ahead of Western science. But this is bad history. A large part of what India claims as its indigenous heritage isn't exclusively ours: Unani medicine comes from Persia; the origins of homeopathy are German.

The BJP's nativist, Hindu-pride approach to patents is also bad economics. It unwittingly serves the interests of Big Pharma, and in time this will undercut India's own pharmaceutical industry, which generates some \$15 billion in annual revenues even while producing affordable drugs that benefit the public.

India's patent laws, currently under consideration as a model in South Africa and Brazil, are a world-class innovation; our cow-urine technology, which has yet to garner much interest abroad, is not. To patent cow urine isn't just silly. It also endangers a remarkably innovative patent system that has served India's people and many others around the world so well.

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<http://www.deccanherald.com/content/553428/bjps-obsession-patenting-cow-urine.html>

Achal Prabhala , Sudhir Krishnaswamy | 21 June 2016 | INYT

## Forget fish, healthy seaweeds coming

### CSIR

Seaweeds may soon become our culinary delight due to their high nutritional value and easy processing. Thanks to the first-ever pilot project by the government-funded scientists, seaweed, commonly called thread algae, found in abundance in Sunderban delta has been converted into power for use in making breads, cookies and ice creams.

It was part of a climate change project undertaken by the Council of Scientific Industrial Research (CSIR) aimed at generation of alternative livelihood for the coastal dwellers. The CSIR is now linking the villages with the bakeries and ice cream companies for sustainable income to the coastal dwellers.

The purpose is to help the coastal communities to come up with measures of mitigation and adaptation to climate change with stress on improving sustainable solutions for livelihood, says Dr J Sundaresan, lead scientist and coordinator of the CSIR.

In Sunderban, the thread algae (*Enteromorpha intestinalis*) is being used as a step in this direction, says Dr Abhijit Mitra, an expert on oceanography from the Department of Marine Science, University of Calcutta.



His team collects samples of the seaweed from the remote islands while sensitising the local communities on their importance and means of extraction in at least six villages in the area. The CSIR is forwarding the technique developed by the team to various coastal states to explore the seaweeds found in abundance at the sea shores.

Experts say seaweeds can be an excellent value addition in case of ice creams to reduce the nutritional deficiencies caused by sugar and artificial flavours as they can be enriched with wide range of constituents such as iron and calcium as minerals, protein, with all essential amino acids, vitamins and fibre.

The technique perfected by the team involves extraction of the seaweed mass using steam to drip out seaweed bundled and tied up to a cloth suspended over steam. The green extract that starts pouring out is collected. As a team member underlined, the technique is not expensive or hi-tech since it has been developed for the target communities with low means.

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<http://www.freepressjournal.in/webspecial/forget-fish-healthy-seaweeds-coming/875722>

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