Notice inviting Expression of Interest (EoI)

CSIR-Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar, Gujarat – one of the premier National Research Institutes under the aegis of Council of Scientific and Industrial Research (Government of India), has developed several process know-how solutions in the domain of industrial waste management, with thrust on value recovery. One of them being CSIR-CSMCRI's spent wash management technology which enables alcohol distilleries to recover valuable by-products from their effluent while complying with regulatory norms. A status note is appended below with further details about the technology & its projected impact.

In view of the interest evinced by the distilleries & overall size of the sector, CSIR-CSMCRI invites Expression of Interest from reputed engineering firms / process technology marketing firms for empanelment as partner for commercial deployment of the technology on turn-key basis both in India and abroad.

Eligibility criteria	:	Engineering firms / Process Technology Marketing firms, who have: a) registered office in India and b) executed at least 1 turn-key project worth more than Rs. 5 crore in last 3 years, either in distillery sector or in the area of industrial effluent management through 'Zero Liquid Discharge' technology are eligible to apply for empanelment.

General terms & conditions of empanelment are as below:

Tenure of empanelment	:	3 years. May be extended subject to review by CSIR-CSMCRI.
Empanelment fee	:	Rs. 20 lakhs + 18% GST (to be paid by the firm to CSIR-CSMCRI, at the time of signing of empanelment agreement)
Scope of services to be rendered by CSIR-CSMCRI to the empanelled firm(s)	:	▪ Right to market & deploy technology: Empanelled firm(s) will get non-exclusive right to market & deploy CSIR-CSMCRI's spent wash management technology in Indian distillery sector on turn-key basis. ▪ Know-how demonstration: CSIR-CSMCRI will demonstrate the process of product (potash & organics) recovery from spent wash at laboratory / pilot plant to the empanelled firm(s). ▪ Business enquiry referral: CSIR-CSMCRI will advise prospective distilleries, willing to implement the spent wash management technology, about the empanelled firm(s), as preferred partner(s) for commercial deployment. ▪ Technical support for marketing:

		CSIR-CSMCRI will provide process related technical support documents (data, literature etc.) to the empanelled firm(s), for the purpose of marketing the technology.
Responsibility of the empanelled firm(s)		To ensure that the user industry (distillery) acquires related license to practice the KNOW-HOW from CSIR-CSMCRI; To demonstrate the KNOW-HOW to licensee (distillery); To design, manufacture, install & commission required plant and machinery at the designated premises of licensee; To submit operation & maintenance manual of the plant to licensee; To provide sufficient training to licensee's personnel; To hand over the plant to the licensee, for regular commercial operation; To undertake other allied activities, as may be required for fulfilment of the obligations of respective KNOW-HOW licensing agreement(s).

Interested engineering firms / process technology marketing firms, meeting the eligibility criteria, may submit their EoI along with (i) company profile including PAN and GST details, (ii) last 3 years audited annual report, (iii) documentary evidence in support of eligibility criteria & (iv) reference client list not older than 3 years.

CSIR-CSMCRI will evaluate the EoIs and will intimate selected firms in appropriate manner for initiation of empanelment process.

The above terms & conditions of empanelment is valid till 31st December 2018.

CSIR-CSMCRI reserves the right to modify/terminate/resume the process of invitation of EoI for empanelment.

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Technology for spent wash* management: Potash, organics & ZLD compliance

(* sugarcane molasses based alcohol distillery effluent)

Preamble:

Sugarcane is one of the most important cash crop in tropics & subtropics, 3rd most produced crop globally, spanning more than 90 countries. In 2014, area under sugar cane cultivation was over 27 million hectare, corresponding to production of 1.88 billion t cane. India (5 million hectare cultivation, 352 million t cane) is the 2nd largest producer of sugarcane, after Brazil. Apart from catering to traditional demand for sugar, sugar cane is increasingly playing dominant role in addressing global biofuel demand.

Problem of effluent management:

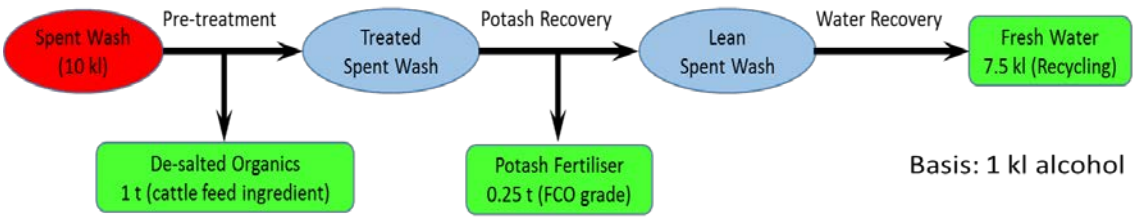
Sugarcane (molasses) based alcohol distilleries generate 8-15 L of effluent (spent wash / vinasse) for each L of ethanol produced. Spent wash is slightly viscous, dark brown coloured liquid with unpleasant odour and very high pollutant loading. This effluent, if allowed to discharge into surface water / river untreated, will cause severe damage to the ecosystem, including destruction of flora & fauna. Going forward, this problem is likely to worsen, particularly in view of rising demand of fuel ethanol.

Globally, common practice among the major sugar cane producing countries is to utilise the nutritive values of spent wash (viz., potassium nitrogen, phosphorus, trace minerals as originally present in the sugar cane juice) through ferti-irrigation. However, indiscriminate & unregulated use of spent wash in ferti-irrigation may lead to groundwater contamination, loss of soil structure & agricultural productivity, as evidenced in major sugarcane producing countries, viz., Brazil, India, Mexico etc. In order to prevent large scale and long term environmental contamination of soil, ground water and river water ecosystem, MoEF&CC, Government of India, is implementing "Zero Liquid Discharge" (ZLD) norm for alcohol distilleries though either 'bio-compost' or 'evaporation – incineration' route.

Transforming problem into opportunity - technology solution from CSIR-CSMCRI

Currently in-vogue protocols operate on the premises of getting rid of the problem (spent wash). However, spent wash contains appreciable amount of potassium – an important agri-nutrient. In Indian context this is of particular interest. India imports the entire requirement of potash fertiliser – ca. 2.76 million t K_2O in 2013-14, whereas domestic molasses based alcohol distilleries discharge about 0.29 million t K_2O annually through effluent.

In 2015, CSIR-CSMCRI started to explore the possibility for utilization of distillery spent wash as a potential resource for potash fertiliser and developed economically viable process for production of fertiliser grade potassic salts from spent wash along with recovery of residual organics. In course of further collaboration with M/s. Chem Process Systems Pvt. Ltd. (Sanand, Gujarat), the know-how have been integrated into a complete technological solution for valorization of spent wash while complying with the statutory 'Zero Liquid Discharge' norm.



Values are indicative. Case-by-case validation is recommended.

The broad product profile is:

1) **FCO Grade Indigenous Potash fertilizer** – critical agro-input, partial self-reliance in terms of national potash requirement.
2) **Desalted Spent Wash Organics** – binder for Cattle/Poultry Feed formulation as an alternative to molasses, palatability validated by National Dairy Research Institute (Karnal, Haryana).
3) **Water** – suitable for recycling in process, would eliminate possibility of ground water table contamination and riverine eco-system damage.

Present status:

Spent wash from diverse geographical locations of the country (viz., distilleries located in Karnataka, Maharashtra, Gujarat & Uttar Pradesh) was evaluated to ascertain efficacy of the process. In February, 2017, the process was scaled-up to 2.5 m3/batch level & on-site pilot scale demonstration was organised, through a tri-partite initiative between CSIR-CSMCRI, Chemprocess Systems & Kamrej Sugar (distillery). The event was attended by delegates across several distilleries from different regions of India.


Delegates visiting the pilot plant

Likely benefits to the stakeholders:

- **Distilleries** – more revenue from sale of by-products, enhancement of ethanol production capacity due to delinking of distilleries from sugar mills, since the former would no longer require any press-mud for spent wash management,
- **Farmers** – faster & enhanced income realisation, since sugar mills / distilleries would be able to clear cane arrears more quickly due to improved cash flow and profitability,
- **GoI/ Policy** - augmented ethanol production will help in addressing the fuel blending target,
- **GoI/ Fiscal** - additional revenue for government exchequer by way of taxes realized from sale of additional products.

Pan-India perspective

- *Sugarcane ethanol sector in numbers*
  - Ethanol production: **2 million m^3 pa (approx.)**
  - No. of units (distilleries): **> 300**
  - Location: **Spread across the country, around sugar cane production zone**
  - Major states: **UP, Maharashtra, TN, Karnataka, MP, Punjab, AP, Gujarat etc.**
  - Area covered (sugarcane production area): **5 million hectare (approx.)**
  - People/ families engaged (farming and downstream activities): > **50 million**
  - Spent wash generated: **20 million m^3 pa (approx.)**
- *Potential impact: CSIR-CSMCRI process for spent wash management*
  - Potash (as K_2O) : **0.26 million t pa**
  - Potassium nitrate production potential : **0.57 million t pa**
  - Annual revenue : **₹ 2700 crore (@ ₹ 48,000/t) (approx.)**
  - **Additional revenue** from by products (de-salted organics)
  - Water recovery & recycling : **15 million m^3 pa**
  - Reduction in GHG / CO_2 emission : **1 million t pa (animal feed vis-à-vis incineration)**