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DEEP FRYING

Current regulations

RENEWABLES

The rise of biosurfactants

Petrobras produces renewable diesel

Brazilian petroleum firm Petróleo Brasileiro (Petrobras) has successfully completed large-scale testing of a renewable diesel that complies with the country's new fuel regulations, Spanish news agency EFE reported on 15 July.

Produced at the company's 208,000 barrels/day Presidente Getúlio Vargas (REPAR) refinery in the southern city of Araucária, Paraná, the fuel now only needed authorisation from the National Agency of Petro-

leum (ANP) in order to be commercialised.

ANP's new fuel specifications are due to take effect in August, according to a 24 June *Oil&Gas Journal* report. They require regular fuel, whether produced locally or imported, to have a minimum specific mass of 715kg/m³ and a minimum octane rating of 92 research octane number (RON).

"The new specification is welcome and will bring the quality of the fuel sold in Brazil closer to that of the American and

European market," Petrobras' director of refining and natural gas Anelise Lara was quoted as saying in Associação Brasileira de Engenharia Automotiva's (AEA) Youtube broadcast 'Sustainable Mobility and the Future of Fuel' on 23 June.

Renewable diesel could be produced in dedicated plants or via co-processing of vegetable oil and animal fats with mineral diesel in units inside oil refineries using the company's H-Bio process, the company said.

IN BRIEF

EUROPE: Finnish renewable fuels producer Neste announced on 27 May that it is teaming up with global polymer firm Covestro to promote the use of sustainable raw materials in plastics.

The collaboration aims to replace several thousand tonnes of fossil raw materials in the production of polycarbonates with Neste's renewable hydrocarbons, made from feedstocks such as waste oils and fats.

In a separate announcement on 19 May, Neste said it had updated its traceability dashboard which provides data on the company's palm oil and palm fatty acid distillate (PFAD) supply chains.

By the end of 2019, 99.5% of its PFAD supply chain had been independently mapped and validated to the supplying mills, with 71% mapped back to oil palm plantations.

Neste's target is to map its entire PFAD supply chain to plantations by the end of 2020 but progress had been slower due to COVID-19 and other factors, it said.

Safflower oil potential hailed by scientists

Researchers are hailing an Australian high oleic safflower oil as a potential replacement for petroleum in industrial products ranging from fuels and lubricants to speciality chemicals and plastics, ABC News reported on 6 June.

Scientists at Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), have succeeded in producing a safflower seed oil – called Super-High Oleic (SHO) safflower – containing over 92% oleic acid, the national science research agency said on its website.

Initial studies showed the safflower oil to be a superior lubricant with lower emissions than conventional petroleum-based products, ABC News said. It also led to reduced friction and wear on engine parts.

The SHO safflower was the culmination of 18 years of research by CSIRO plant scientists.

Conventional safflower, one of humanity's oldest crops which has been used to dye fabric for thousands of years,



contains low levels of oleic acid, but Australian scientists re-engineered the oilseed using gene silencing. This switched off genes that control processes within the safflower seed that limit the level of oleic acid, causing a build-up of the highly desirable oil.

Safflower is a naturally hardy plant but the CSIRO variety is being developed to suit a range of growing conditions.

With its giant tap root, the plant's ability to find deep moisture gives it improved drought tolerance, giving it an advantage over crops like

canola, wheat and lentils. It also thrives in salty and sodic soils, a problem across much of Australia's temperate cropping zone.

CSIRO said safflower was a relatively minor crop in Australia, grown on about 10,000ha, but it expected to see significant areas of SHO safflower in the country by 2023.

The commercial rights to the new safflower variety have been licensed to Australian clean technology company GO Resources, which operates in the industrial lubricant and oleochemical sectors.

Researchers convert algae waste oils into new products

Waste products from algae-based omega-3 oil production are being converted into renewable foams by researchers at the University of California, *Science Daily* reported on 12 May.

The university team worked with oil from the green microalgae *Nannochloropsis salina*, a common source of omega-3 fatty acids that are sold as dietary supplements.

Although more than 70% of the leftover oils are typically thrown away or burned, the researchers developed a process to purify and convert this waste stream into azelaic acid, a building block for flexible polyurethanes.

The team also converted the co-product, heptanoic acid, into a food flavouring and fragrance valued at over US\$500/kg.

Team member Michael Burkart said microalgae contained a variety of metabolic components that were insoluble in water but soluble in algae oil when extracted, inhibiting downstream reaction efficiency. Removing the organic contaminants was therefore key, which the team did by using simple physical methods, along with saponification.