VATIS UPDATE

Ozone Layer Protection

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Apprise yourself with the latest technological innovations

Highlights:

- Climate-friendly low GWP refrigerant
- Bio-renewable cleaner for non-ferrous alloys
- Low pressure water mist gun system
- Eco-friendly polyurethane foam insulation
- New process to eliminate pests from stored grain

APCTT
Asian and Pacific Centre for Transfer of Technology

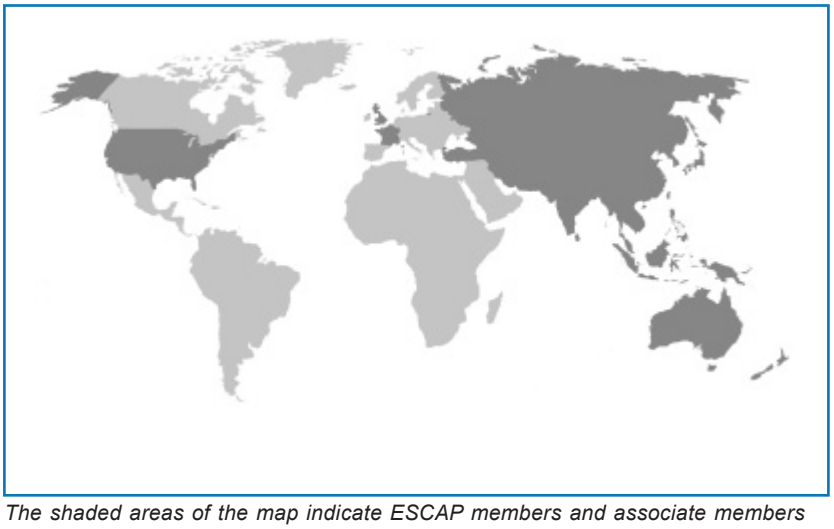
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Ozone Cell
Ministry of Environment, Forest & Climate Change
Government of India

The **Asian and Pacific Centre for Transfer of Technology (APCTT)**, a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives: to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.

The Centre will achieve the above objectives by undertaking such functions as:

- Research and analysis of trends, conditions and opportunities;
- Advisory services;
- Dissemination of information and good practices;
- Networking and partnership with international organizations and key stakeholders; and
- Training of national personnel, particularly national scientists and policy analysts.



The shaded areas of the map indicate ESCAP members and associate members

Cover Photo

Field experiment showing a paladin chloropicrin mixture used in combination with totally impermeable film as methyl bromide alternative

(Credit: University of Florida IFAS Extension, USA)

VATIS* Update
Ozone Layer Protection
is published 6 times a year to keep the readers up to date of most of the relevant and latest technological developments and events in the field of Ozone Layer Protection. The Update is tailored to policy-makers, industries and technology transfer intermediaries.

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ASIAN AND PACIFIC CENTRE FOR TRANSFER OF TECHNOLOGY
Adjoining Technology Bhawan
Qutab Institutional Area
Post Box No. 4575
New Delhi 110 016, India
Tel: +91-11-3097 3700
Fax: +91-11-2685 6274
E-mail: postmaster.apctt@un.org
Website: http://www.apctt.org

OZONE CELL
Ministry of Environment, Forest & Climate Change
Government of India
Zone IV, East Court, 2nd Floor
India Habitat Centre, Lodhi Road
New Delhi 110 003, India
Tel: +91-11-2464-2176
Fax: +91-11-2464-2175
Telegram: PARYAVARAN NEW DELHI
E-mail: ozone-mef@nic.in
Website: http://www.ozonecell.com

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WMO published Antarctic ozone bulletin

World Meteorological Organization (WMO), Switzerland, has published the first issue in the 2015 series of the Antarctic Ozone Bulletin, with information on the state of the ozone layer in Antarctica and surrounding areas. Measurements with ground-based instruments and with balloon sondes from some stations in the Global Atmosphere Watch network show first signs of ozone depletion, according to the bulletin. Satellite observations show that the area where total ozone is less than 220 DU ("ozone hole area") has been significantly above zero since 18 August. This is a relatively late onset of ozone depletion.

The ozone hole area on 27 August was approx. 5.1 million km2, about half the long-term average. The date of the onset of ozone depletion varies considerably from one year to the next, depending on the position of the polar vortex and availability of sunshine after the polar night. In 2015, the vortex has been relatively stable and concentric around the South Pole. This can explain the late onset of ozone depletion. As the sun returns to Antarctica after the polar night, ozone destruction will speed up. It is still too early to give a definitive statement about the development of this year's ozone hole and the degree of ozone loss that will occur. This will, to a large extent, depend on the meteorological conditions.

However, the temperature conditions and the extent of polar stratospheric clouds so far indicate that the degree of ozone loss in 2015 will be similar to that observed in 2014 and 2013 and probably somewhat larger than in 2010 and 2012. WMO and the scientific community will use ozone observations from the ground, from balloons and from satellites together with meteorological data to keep a close eye on the development during the coming weeks and months. The bulletin is issued at roughly two-three week intervals from August to November. The bulletins are based on data provided by WMO Members which operate ozone monitoring stations in the southern hemisphere.

Source: https://www.wmo.int

Ozone depletion slowed by Montreal Protocol

In a recent study done by scientist Dr. Richard McKenzie and other scientists at Dutch and UK universities and co-authored by National Institute of Water and Atmospheric Research (NIWA), New Zealand, have found that atmospheric equivalent chlorine peaked in 1993 and has been declining slowly since then… by 2013 the Montreal Protocol had already achieved significant benefits for the ozone layer. The Montreal Protocol, an international agreement to cease commercial production and use of ozone-depleting chlorine- and bromine-containing substances, was ratified in 1987. The research has been published in the journal Nature Communications.

The NIWA study's 3D atmospheric chemistry transport model predicts that positive patterns will continue, along with a "gradual increase in stratospheric ozone with the Antarctic ozone hole expected to disappear by ~2050." The findings suggest that, had the Montreal Protocol not have been ratified, between 1993 and 2013 the deep Arctic ozone hole would have grown by a staggering 40%. Likewise, the hole over the northern hemisphere would have "more than doubled" in size. The NIWA study asserts that the Montreal Protocol has been an effective agreement, having protected the environment measurably for more than two decades, with "major beneficial impacts, including avoiding an Arctic ozone hole."

It's important to remember that high levels of ultraviolet radiation still pose a risk to humans, particularly in lower-hemisphere regions like New Zealand and Australia, where ozone levels are lower and air is cleaner, resulting in higher levels of skin cancer, but the northern hemisphere is also in danger. According to the Centers for Disease Control and Prevention, although US skin cancer rates have doubled over the last 30 years, "comprehensive skin cancer prevention programs could prevent 20 percent of new cases between 2020 and 2030."

Source: http://www.trakref.com

Ozone treaty 'prevented skin cancer deaths'

According to a new study done by researchers from National Institute of Water and Atmospheric Research (NIWA), New Zealand, the ozone hole over the Antarctic would have been 40 per cent bigger in 2013 if the Montreal Protocol hadn't curbed the production of CFCs (chlorofluorocarbons). In this scenario, Australia and New Zealand would have experienced greater UV radiation, which in turn would have increased the rate of skin cancer. The paper also shows that, by 2011, ozone depletion would have become

a northern hemisphere problem too. The findings of the research has been published in the journal Nature Communications.

Despite this, the concentration of CFCs continued to rise until 1993, and even today the ozone hole reappears each spring, and this contributes to an increase in cancer-causing UV radiation in Australia and New Zealand. But without the Montreal Protocol it could have been so much worse. Researchers, used a 'chemical transport model' to calculate what would have happened over the past two decades if CFCs had not been controlled.

Importantly, the model is the most accurate to date because it uses real data on winds, which blow ozone into the ultra-cold parts of the South Pole, where ozone depletion occurs at the highest rate. According to the new model, a 40 per cent increase in the size of the Antarctic ozone hole by 2013 would have contributed to an 8-12 per cent increase in ultraviolet levels over Australia and New Zealand. Earlier research suggested that globally, these higher UV levels would have led to a 16-30 per cent increase in non-melanoma skin cancers. But, regardless of future changes in ozone, people in New Zealand and Australia will need to continue to protect themselves from UV radiation.

Source: http://www.abc.net.au

Antarctic ozone hole larger and formed later in 2015

The 2015 Antarctic ozone hole area was larger and formed later than in recent years, according to scientists from NOAA and NASA. On Oct. 2, 2015, the ozone hole expanded to its peak of 28.2 million square kilometers (10.9 million square miles), an area larger than the continent of North America. Throughout October, the hole remained large and set many area daily records.

Unusually cold temperature and weak dynamics in the Antarctic stratosphere this year resulted in this larger ozone hole. In comparison, last year the ozone hole peaked at 24.1 million square kilometers (9.3 million square miles) on Sept. 11, 2014. Compared to the 1991-2014 period, the 2015 ozone hole average area was the fourth largest. The ozone hole is a severe depletion of the ozone layer above Antarctica that was first detected in the 1980s. The Antarctic ozone hole forms and expands during the Southern Hemisphere spring (August and September) because of the high levels of chemically active forms of chlorine and bromine in the stratosphere. These chlorine- and bromine-containing molecules are largely derived from man-made chemicals that steadily increased in Earth's atmosphere up through the early 1990s.

The satellite ozone data come from the Dutch-Finnish Ozone Monitoring Instrument on NASA's Aura satellite, launched in 2004, and the Ozone Monitoring and Profiler Suite instrument on the NASA-NOAA Suomi National Polar-orbiting Partnership satellite, launched in 2011. NOAA scientists at the South Pole station monitor the ozone layer above that location by using a Dobson spectrophotometer and regular ozonesonde balloon launches that record the thickness of the ozone layer and its vertical distribution. Chlorine amounts are estimated using NOAA and NASA ground measurements and observations from the Microwave Limb Sounder aboard NASA's Aura satellite.

http://research.noaa.gov

New technology to reduce global warming

Council of Scientific and Industrial Research (CSIR)-Indian Institute of Chemical Technology, has developed a new technology to manufacture hydrofluorocarbons (HFCs) used in refrigeration systems as a coolant to reduce global warming. As MNCs in the US, UK, France, Japan and China were not transferring the technology to any other country, India had begun its own work in developing the technology.

From the year 2005, the use of Chlorofluorocarbons (CFCs) was banned in all countries as the gas used in home refrigerators and other refrigeration system was hugely contributing to the depletion of the ozone layer. As an alternative HFCs gas to be used by the clique of nations which had already developed the technologies were only interested in selling the gas for a huge amount rather than parting with their technology.

"We developed the technology at the IICT with two industries having come forward to fund the research. The technology has already been transferred to them," said Dr. B. Narsaiah, at CSIR-IICT said. While one industry has already set up a manufacturing plant producing 50 per cent of the need of the country, another 50 per cent is still being imported.

The gas is sold to refrigerator manufacturing companies for use as a coolant. The same technology can now be shared with other manufacturers both from the country and abroad to set up their own plans and not be dependent on developed countries. CFCs, it was found were one of the causes for the depletion of the ozone layer up to 29 million square kilometers over the Antarctica.

The depletion of the ozone layer, among other things causes global warming and also causes cancers. Realising the dangerous effects of CFCs, as per the Montreal Protocol, Canada, for which India is a signatory, it was decided not to use CFCs anymore. But a solution to the problem, the use of HFCs, was only in the hands of some big nations which spurred India to do its own research and come up with manufacturing technologies for HFC134a.

With the deadline approaching, scientists at the CSIR are now focusing their attention on being able to manufacture HFC-32, a lower Global Warming Potential (GWP) refrigerant. However, this can only be done if companies invest money in spurring the research as the technology will be transferred to them.

Source: http://www.timesofindia.indiatimes.com

Steel plant eliminated CFC use

On the eve of World Ozone Day, the Bhilai Steel Plant (BSP), India, has eliminated use of CFC-11 by replacing it by Li-Br based Chiller unit, way before the target date of January 1, 2010. Procurement of Carbon Tetra Chloride (CTC) has been stopped and use of Trichloroethylene has been started. Two projects under the Montreal Protocol have been implemented in BSP for the elimination of use of CTC. Procurement of Halon based fire extinguishers have also been replaced by FM 200 based units. All industrial package air conditioners using CFC-12 were also replaced in a phased manner by units using CFC free refrigerant.

The plant has brought down the use of ozone depleting substances to 3.05 tonnes in 2014 from about 10 tonnes a decade ago. The ozone depleting potential (ODP), a true measure of consumption of ozone-depleting substances, has also been reduced to 0.167 tonnes by BSP in 2014, which is amongst lowest in industries.

Under the ongoing Expansion/ Modernization projects, BSP has taken due care to fully comply with the Montreal protocol in procurement and installation of, Air conditioning/ refrigeration units. It is also ensured that, the fire protective equipment being procured is also fully complying with the Montreal protocol. BSP also understands the importance of spreading awareness on Ozone day particularly amongst children.

Children are important for another reason: they transmit messages and information to their parents, families, and teachers. Children need to know about ozone depletion and its consequences. Every year, numbers of programmes are being organised to raise awareness of the students on the importance of Ozone day. The children of Eco-clubs, functioning in BSP schools take active role in this regard. They have developed models depicting the Ozone layer and its importance, which reflect their creativity and also the concern for environment protection. These activities are helping in cultivating a climate-conscious mind in students who are future citizens of the country.

Source: http://www.dailypioneer.com

Refrigerants market worth $21 billion by 2020

According to a report published by MarketsandMarkets,the global refrigerants market is forecast to reach $21 billion by 2020, growing at a compound annual growth rate (CAGR) of 6 percent from 2015 to 2020. Refrigerants have a variety of applications including domestic refrigeration, commercial refrigeration, industrial refrigeration, stationary air conditioning, and mobile air conditioning. Stationary air conditioning dominates the refrigerants market, accounting for maximum share in terms of volume in 2014. Growing demand in end-user industries such as construction, food, and pharmaceutical is driving the refrigerants market in the stationary air conditioning sector.

The demand for refrigerants in the domestic refrigeration sector is expected to witness the highest CAGR of 7.1 percent from 2015 to 2020, in terms of volume. Increasing annual income and rising standard of living are the major factors contributing towards the growth of refrigerants in domestic refrigeration. Fluorocarbons are the major type of refrigerants. They captured a major market share of the total refrigerants market in 2014.

The major manufacturers have initiated the production of low GWP and ODP refrigerants, such as inorganics and hydrocarbons. Inorganic refrigerants are expected to witness significant growth, with a CAGR of 10 percent from 2015 to 2020. Manufacturers are focusing on the development of natural refrigerants which are based on hydrocarbons (propane, isobutane), carbon dioxide (CO2), ammonia, water, and air. Natural refrigerants have very low GWP and zero ODP.

Source: http://www.achrnews.com

Magnetic refrigeration market to grow at 98.7%

According to a research done by RnRMarketResearch, the magnetic refrigeration technology is expected to be commercialized by 2016. It is likely to emerge as a viable alternative for refrigerants which are ozone depleting and have GWP. This technology is expected to be commercialized first for commercial applications due to which the latter is expected to dominate the Magnetic Refrigeration Market. Industrial is another application after commercial that is expected to hold a major share as magnetic refrigeration is expected to be increasingly adopted in refrigerators, cabinet displays, freezers, beverage coolers, and ice-cream cabinets.

Industrial is one application where magnetic refrigeration is expected to grow significantly wherein, food & beverage processing & storage is expected to be major market for magnetic refrigeration in the industrial sector. Due to the ban on the use of refrigerants with a high GWP in the industrial sector, there is an increasing demand for an alternative which is environment-friendly and also has a long lifetime. Any ban or phase-out of refrigerants has the highest impact on the industrial segment as it consumes the largest amount of refrigerants than the other segments.

Magnetic refrigeration market report includes the magnetic refrigeration market size and forecast from 2016 to 2022. The studied market is expected to reach USD 315.7million by 2022, at an estimated CAGR of 98.7% between 2017 and 2022.

The report covers the magnetic refrigeration market segmented based on application into domestic, commercial, transportation, and industrial. The report talks about the premium insights; different drivers, restraints, opportunities, and challenges that are likely to shape the magnetic refrigeration market along with the competitive landscape and company profiling of the top players.

Source: http://www.benzinga.com

Daikin offers worldwide free access to patents

Daikin Industries Ltd, Japan, the world's leading air conditioner and refrigerant manufacturer, is offering companies worldwide free access to 93 patents, to encourage companies to develop and commercialize air conditioning, cooling and heat pump equipment that use HFC-32 as a single component refrigerant. Daikin's action is aimed at encouraging manufacturers worldwide to adopt sustainable comfort cooling and heating technologies that use HFC-32, a refrigerant with a lower global warming impact than commonly used refrigerants.

HFC-32 (difluoromethane) is a next generation refrigerant that addresses a range of environmental considerations in a balanced manner. It is a non-ozone depleting substance, is energy efficient, affordable, is easier to recycle, and has GWP that is one-third of that of R-410A, the most commonly used refrigerant.

The avoided carbon emission benefits of a transition to HFC-32 would be very significant. If all presently used R-410A refrigerant is replaced by HFC-32, the total CO2 equivalent impact of HFCs could be reduced by up to 24% in 2030, compared to business as usual scenarios.

There is no patent that covers the HFC-32 chemical itself and it is readily available from suppliers other than Daikin. This free access to certain patents allows manufacturers to utilize Daikin's technologies for air-conditioning, cooling and heat pump equipment using HFC-32 single component refrigerant and encourages the global industry to grow responsibly, as well as meet rising demand.

Last year, the European Union enacted the revised F-gas regulation to reduce the global-warming impact of refrigerants. In the United States, the Environmental Protection Agency (EPA) is in the process of revising its regulations that establish acceptable alternatives for ozone depleting and high-GWP refrigerants.

Source: http://www.japantoday.com

South Asian ozone centre in Sri Lanka

The International Ozone Secretariat has announced that an international centre to study the ozone layer will be established in Sri Lanka. The construction of the facility for South Asia has been started on September 16 in collaboration with the department of meteorology.

"The centre would help Sri Lanka by way of allowing research opportunities on damage to the ozone layer," said Janaka Gunawardena, Director of the national ozone unit. Sri Lanka has done away with 55 of the 96 gases that harm the ozone layer, and the use of 40 others will be terminated by 2030.

Source: http://www.srilankamirror.com

Sri Lanka takes steps to protect ozone layer

Sri Lanka's government has taken strict action to minimize the damage caused to the ozone layer by release of industrial chemicals. At the national ceremony to mark the International Day for the Preservation of the Ozone Layer, Sri Lankan President Sirisena said that 54 chemicals out of 97 chemicals that cause damage to the ozone layer have been removed from use as a result of strict action taken by the Government of Sri Lanka.

The President pointed out that the natural resources of this country have been destroyed by the undue influences of some powerful businessmen and politicians. "The sand, soil and gem industries have become rackets to destroy the environment," he added. The President proposed to hold this national ceremony to mark the International Day for the Preservation of the Ozone Layer next year with participation of the businessmen and the owners of the factories that produce or emit chemicals or gases damaging the ozone layer.

Source: http://www.colombo page.com

China promises control of ozone eaters

China's environmental department promised to do more to control the emission of ozone depleting substances. Chen Jining, Minister for Environmental Protection, has announced that China will eliminate the use of ozone depleting substances, industry by industry with clear deadlines. "The government will offer preferential policies for small business that are willing to replace outdated technology with more eco-friendly varieties," said Chen.

This year marks the 30th anniversary of the Vienna Convention for the Protection of the Ozone Layer. The Earth's protective ozone layer is on track to recover in the next few decades thanks to concerted international action, according to a report from the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) last September. The effort led to decreases in the atmospheric abundance of gases, such as CFCs and halons, once used in products such as refrigerators, aerosol sprays and insulation foam.

Source: http://www.usa.chinadaily.com.cn

Green public procurement adopted in china

The municipality of Shenzhen has become the first city in China to adopt a green public procurement policy when the first set of R-290 air-conditioners was officially procured for Shenzhen University on 28 June 2015. 243 sets of air-conditioners using R-290 [propane], a natural refrigerant, were purchased at the university with the participation of Xiao Xuezhi, of the Foreign Economic Cooperation Office of Ministry of Environmental Protection (FECO/MEP). Under the HCFC

Phase-out Management Plan (HPMP) of the Montreal Protocol, Shenzhen is the only city in China implementing a demonstration project for the servicing sector.

The city has already started many activities aiming to promote ozone and climate-friendly alternatives. One of these efforts is through a green procurement policy applying at the local government level. Shenzhen Habitat and Environment Commission (SHEC) worked closely with the Municipal Government Procurement Center (MGPC) and Finance Bureau (FB) to draft the new municipal procurement policy. It stresses that only those businesses and services complying with the rules and following the good practice when servicing HCFC-based equipment will be eligible to service government buildings.

The process was technically supported by The Project Management Office (PMO) and the Technical Supporting Institution (TSI). Two consultation workshops were organized accordingly this year involving stakeholders from local enterprises, organizations, and departments to collect inputs. The collective new policy was submitted and approved by the Municipal Government of Shenzhen in April 2015. SHEC plays a very vital role in the enforcement once the new policy has come in place. This includes providing information and advice to Shenzhen University about the technical specifications, environmental benefits, energy saving and safety issues associated with different air-conditioning technologies.

Source: http://www.unep.org

Viet Nam celebrated international ozone day

Viet Nam's Ministry of Natural Resources and Environment (MONRE) held a meeting in the northern province of Nam Dinh on September 16 to celebrate International Ozone Layer Protection Day. According to Nguyen Khac Hieu, at MONRE, the Montreal Protocol was signed in 1987, and approved and implemented by all 196 countries.

As part of the protocol, by January 2010 all member countries had to eliminate use of all substances that deplete the ozone layer, including CFCs, cut down the production and consumption of hydrochlorofluorocarbons (HCFCs) and completely eliminate use by 2030. Since its approval in 1994, Viet Nam has fully implemented the Montreal Protocol. The country prohibited the import of harmful substances, such as CFCs, as of January 1, 2010.

In the 90s, Viet Nam consumed 500 tonnes of CFCs yearly. Viet Nam has eliminated over 200 tonnes of CFC-12; 3.6 tonnes of CFC-11 in the textile industry; 5.8 tonnes of CFC-12 used in vehicle air conditioners; and 40 tonnes of commercial refrigeration CFC-12. The MONRE has also called on ministries, sectors and people from all walks of life to continue efforts to preserve the world's ozone layer and protect the environment.

Source: http://www.en.nhandan.org.vn

Thailand to promote eco-friendly refrigerant

In a process to reduce global warming and stop refrigerant from destroying the ozone layer, Thailand's Department of Industrial Works (DIW) urges the producers of air conditioners in the country to shift to the use of the refrigerant HFC-32 or R-32 instead of the current HCFC or R-22. "The new refrigerant available for use by all air conditioning companies in the near future, will help to reduce the impact of air conditioning units on the environment by 2.68 times.

The traditional R-22 refrigerant has an ODP rate of 0.05 while having a GWP rate of 1,810. The new R-32 refrigerant however does not damage the ozone layer (ODP = 0) while having a lower GWP rate of 675," said Dr. Pasu Loharjun, at DIW.

Despite the higher cost of new equipment, the higher cost of buying the new liquid, and having to redesign the unit to work well with the new refrigerant, the department will be helping air conditioner producers through funding and technology sharing, involving support by both Japanese companies and th e Japanese government. Dr. Pasu emphasized that the new refrigerant, despite having a 10% higher purchasing cost, is more efficient, meaning less refrigerant liquid is required to generate cold air from the unit, resulting in an air conditioner smaller by 30-40% while having about the same capacity as before to cool down a domestic living room .

Source: http://www.thainews.prd.go.th

Solar Chill

This global initiative is developing a solar-powered vaccine cooler to improve the health of children in developing countries.

For more information, access:

http://www.solarchill.org

New refrigerant to replace R410A

Chemours, the United States, has launched a new refrigerant blend to rival R32 in the search for a lower GWP alternative to R410A in air conditioning systems. According to Chemours, the new gas, DR-55, has a very similar GWP to R32 but with better efficiency, lower discharge temperatures and a lower flammability. In tests, DR-55 has exhibited better performance than both R410A and R32 when used as a drop-in in an R410A system. Chemours is seeing this as a replacement for R410A in direct expansion air conditioning, heat pump and chiller applications. A drop-in comparison test has been carried out by Chemours, with a 8.8kW York residential ducted split air conditioning/heat pump system designed for R410A.

Led by Daikin, Japan, R32 is currently being promoted by most of the Japanese manufacturers as the alternative to R410A in new, small split systems. R32 had previously been considered when chemists were first looking for a replacement for R22 in the late 80s, but, at the time, its flammability, albeit very low, was considered unacceptable. The flammability suppressant R125 was ultimately added in a 50/50 mix to create R410A. With the current drive towards lower GWP refrigerants, however, a degree of flammability has come to be considered inevitable to meet HFC phase-down targets. In addition, soon to be altered standards will allow A2L refrigerants to be used in larger systems.

A number of potential R410A replacements are currently under test from the major refrigerant producers. Most appear to mix R32 with an HFO. Honeywell, the United States, has been toying with blends of R32 and the HFOs 1234ze and 1234yf. Chemours, itself, has DR-5A, designated by ASHRAE as R454B, a 68.9%/31.1% blend of R32 and 1234yf. DR-55 seems to be a further development of that, reducing the amount of yf and adding R125 in a blend formulated as 67% R32, 7% R125 and 26% R1234yf. In layman's terms, DR-55 is a form of R410A with added R1234yf. Besides, lower discharge temperatures than R32, tests have shown that DR-55 also exhibits a slower burning velocity and higher minimum ignition energy requirement when compared to R32.

Source: http://www.coolingpost.com

Climate-friendly low GWP refrigerant

Trane, a brand of Ingersoll Rand, Ireland, presented an air-cooled demonstration chiller using the new next-generation, low GWP refrigerant DR-55 at the International Institute of Refrigeration's (IIR's) International Congress of Refrigeration. This chiller is a Trane AquaTrine™, which is designed for top-grade apartments, luxury villas, office buildings, small restaurants, retail stores, and hotels. The company said it uses a high-efficiency hermetic scroll compressor and evaporator technology to provide stable, reliable, and highly efficient operation.

DR-55 refrigerant, marketed by the Chemours Co. as Opteon™ XL55, is an olefin-based blend that is currently being evaluated by the HVAC industry for use in unitary and residential equipment. "We expect high-performance HVAC systems to be available with next-generation refrigerants like DR-55 within the next 12-18 months pending regulatory approval. This demonstration project is one way that Ingersoll Rand is delivering on our environmental commitment to identify, test, and introduce technologies that are safe, increase efficiency, and reduce climate impact," said Randal Newton, at Ingersoll Rand.

The University of California at Davis (UC Davis), the United States, recently completed testing of DR-55 as a design-compatible alternative to R-410A in a Trane Precedent™ rooftop heat pump. "DR-55 should be considered as a possible replacement for R-410A because of the relatively low GWP and refrigerant charge requirements," said Curtis Harrington, at UC Davis. Oak Ridge National Laboratory (ORNL), the United States, also recently completed a demonstration testing to assess the overall performance of DR-55 as a design-compatible alternative to R-410A in commercial unitary systems or rooftop units (RTUs). RTUs provide more than half of the cooling for U.S. commercial building space.

Source: http://www.achrnews.com

New low GWP refrigerants launched

Chemours, the United States, has announced that two new Opteon™ refrigerants with low GWP are now commercially available in the United States. The company said these are the first in a portfolio of low-GWP stationary refrigerants that it will introduce to the U.S. in the next few years. The U.S. Environmental Protection Agency (EPA) recently approved these new products, Opteon XP40 (R-449A) and Opteon XP10 (R-513A), under the Significant

New Alternatives Policy (SNAP) program for use in commercial refrigeration and air conditioning applications. The SNAP program supports the transition away from ozone-depleting compounds by identifying permitted substitutes that offer lower overall risks to human health and the environment.

Recently, Chemours has significantly increased capacity for Opteon YF (HFO-1234yf). As a leading producer of HFO-1234yf, it is uniquely positioned to support its customers' growing need for low-GWP products in commercial refrigeration, mobile air conditioning, and other applications. "There is a significant shift within the HVACR industry toward offerings with low-GWP. Opteon provides critical solutions in response to the regulatory and sustainability demands throughout the world. These solutions not only enable our customers to meet these stringent demands, but they also improve energy efficiency and thereby further reduce the overall climate impact," said Thierry F.J. Vanlancker, at Chemours.

Chemours said contractors as well as supermarkets and other equipment owners can rely on the Opteon family of refrigerants to ease the transition away from high-GWP refrigerants such as R-404A, R-507, and R-134a. Opteon XP40 delivers a 67 percent lower GWP and an 8-12 percent gain in energy efficiency compared to R-404A. Opteon XP10 offers a 56 percent lower GWP than R-134a. Both products have been approved by major original equipment manufacturers.

Source: http://www.achrnews.com

Next-generation centrifugal chillers

Mitsubishi Heavy Industries, Ltd. (MHI), Japan, has developed a new series of centrifugal chillers, dubbed the "ETI-Z Series," adopting a new refrigerant, HFO-1233zd(E), that offers outstanding environmental compatibility. The ETI-Z series marks the world's first small-size centrifugal chillers to adopt the new refrigerant. The ETI-Z Series carries on the fundamental product concept of the ETI Series: high performance combined with compact size. The ETI series with built-in inverter panel have been widely spread in to the market since the first models were introduced in 2008. Models in the new ETI-Z Series have a cooling capacity within a range of 80 to 700 refrigeration tons (RT).

Superlative performance is achieved by reducing motor drive-energy loss through the adoption of a compressor with high-speed direct motor drive, the elimination of step-up gear and use of fewer bearings. Together these features enable achievement of a rated COP (coefficient of performance) of 6.7 in the 200 RT class. Reliability has also been enhanced through structural simplification. HFO-1233zd(E) features the same low GWP as carbon dioxide (CO2), i.e. 1, and an ODP of 0. Owing to this minimal impact in terms of greenhouse gas emissions and no impact vis-a-vis ozone depletion, the new refrigerant is not subject to Japan's Freon Emissions Control Law.

This means that HFO-1233zd(E) is not regulated in terms of curbing emissions or leakages, recovery and destruction for disposal, etc. Compared to MHI's current refrigerant, however, the volume of refrigerant gas is about 5 times greater, therefore to achieve the same capacity, generally the size of the compressor and heat exchanger will be increased. In the ETI-Z Series, a more compact size has been realized by applying the latest blade shape, increasing the motor speed, and by adopting and optimizing the arrangement of the high-performance tubes. Going forward, MHI plans to enhance its lineup of centrifugal chillers featuring the new refrigerant by progressively developing and launching models up to the 1,500 RT class, including fixed-speed models.

Source: http://www.acnnewswire.com

Guidelines for the safe use of hydrocarbon refrigerants

This handbook provides sound and reliable information on precautions that can be taken to prevent any untoward accidents. It is targeted at an audience concerned with the introduction of HC refrigerants at all levels from national policies to equipment design and manufacturing, installation, maintenance, servicing and end-of-life disposal. The handbook shall function as a guidebook for policy-makers involved with designing nation-wide policies to support the use of natural refrigerants (i.e. regulatory aspects, standards, etc) and also for manufactures and installers of HCFC and HFC equipment to reliably assess the suitability of hydrocarbon options and subsequently implement them.

For more information, contact:

GIZ Proklima
Dag-Hammarskjöld-Weg
1-5 65760 Eschborn, Germany
Tel: +49 6196 79-1022; Fax: +49 6196 79-80 1022
E-mail: proklima@giz.de

Eco-friendly cleaner, degreaser

Kafko International, the United States, has introduced an oil eater cleaner-degreaser line for high-volume users. The degreaser safely dissolves grease, oil, and grime from machinery, motors, tools, concrete floors, and more. The powerful, eco-friendly, water-based cleaner features a unique formula that eliminates the need for multiple cleaning solutions.

This ultra-concentrated, biodegradable, non-toxic, and non-flammable cleaner-degreaser is water-based and does not contain any acids, abrasive, or petroleum solvents. It can also be used in parts cleaning and pressure washing machines. *Contact: Kafko International, 3555 W. Howard St., Skokie, IL 60076, USA. Tel: 800/528-0334, Web: www.oileater.com*

Source: http://news.thomasnet.com

Defluxing and vapor degreasing solvent

NuGenTec, the United States, has developed a proprietary blend of nonflammable hydrofluoroethers (HFEs) and trans-1,2-dichloroethylene (t-DCE) and alcohol engineered for defluxing as well as white residue removal. FluoSolv™ AP is a drop-in replacement for defluxing blends of n-propyl bromide (nPB) and similar vapor degreasing solvents. It can also be used as a substitute for other cleaners such as Asahi AK-225 (blend of HCFC-225 ca/cb) & HCFC-141b both of which are ozone depleting substances and have been banned from production.

The solvent is ideally balanced to deliver performance, worker safety and desirable environmental properties: non-ozone depleting chemical; drop-in replacement; no equipment modifications; low GWP; low toxicity; high allowable exposure limit (AEL); no ceiling on instantaneous exposure; and chemically stable. *Contact: NuGenTec, 1155 Park Ave Emeryville, CA 94608, USA. Tel: 404-229-2406; E-mail: fluosolv@nugentec.com*

Source: http://www.nugentec.com

Plant oil-based cleaning agents as CFC alternatives

In a study conducted by a team of researchers from Inha University, Gachon University, Korea Basic Science Institute (KBSI) and WIZCHEM Co. Ltd., Republic of Korea, bio-surfactants incorporating two oils, soy bean and canola, were prepared, and bio-surfactants in water in oil (W/O) and oil in water (O/W) types were produced, respectively. The phase behaviors of the as-prepared lauryl alcohol, caster oil, and oleic acid bio-surfactants were investigated under temperatures ranging from 4 to 60°C to find the optimal single phase. The bio-surfactants additionally were analyzed for biodegradability, cleaning efficiency, and degree of corrosion of several metals and plastics, taking into due consideration the industrial cleaning process for chemical impurities. For removal of flux (i.e., abietic acid that constitutes most of rosin) from 25 to 60 °C temperature by sonication treatment, first, the biodegradability (%) of the four bio-surfactants, namely the W/O- and O/W-formulated soybean methyl ester (SME) and canola ethyl ester (CEE) types, were determined to be 94.66%, 95.60%, 94.43%, and 93.87%, respectively. Compared with trichloroethylene (TCE)'s cleaning performance for oil-contaminated brake pads, the W/O SME bio-surfactant showed better (~99%) cleaning efficiency in <5 min. The research has been published in *Chemical Engineering Journal*.

Source: http://www.sciencedirect.com

Nonflammable fluorinated solvent

Zeon Corporation, Japan, and National Institute of Advanced Industrial Science and Technology (AIST), Japan, has developed new fluorinated solvent ZEORORA®. This solvent is inflammable and cause little burden on the environment. "ZEORORA®-H" is used as solvent for many applications, and "ZEORORA®-HTA" is cleaning solvent. ZEORORA® HTA is suit for degreasing engineering oil (light – medium) with "single solvent washing"and supply higher level of cleaning finish in "co-solvent washing" with hydrocarbon system solvent (for example), rinsing and vapor washing with ZEORORA® HTA.

ZEORORA®-HTA consumption achives less than 1/3 of HCFC-225. Low consumption rate contribute to "saving cost" and "environmental conservation". The Significant New Alternatives Policy (SNAP) Program of United States Environmental Protection Agency (EPA) identified ZEORORA-H as "acceptable (to be produced without limitation)" substitute for the ozone-depleting chemical. *Contact: Zeon Corporation, 1-6-2 Marunouchi, Chiyoda–ku, Tokyo, 100-8246, Japan. Tel: +81-3-3216-0542; Fax: +81-3-3216-1303.*

Source: http://www.zeon.co.jp

Low pressure water mist gun system

The Centre for Fire, Explosive and Environment Safety (CFEES), India, has designed and developed a portable, hand-held and backpack, low pressure twin-fluid water mist gun system for fighting class A, class B and electrical fires in naval platforms like ships, submarines, POL stations, defence stores, trains, process industries, civilian buildings, hotels, warehouses, village farm stockyards, etc. The system successfully passed fire tests as per international standard EN 3:7-2004 for B233, A55. A patent on design of the system has been filed and technology transferred to Aska Equipment Pvt Ltd, India, for commercialisation.

Source: http://www.drdo.gov.in

Water mist sprinkler series for marine industry

Marioff Corporation Oy, Finland, has launched the new generation HI-FOG® 3000 sprinkler series for marine applications. Marioff is a leading developer of high pressure water mist fire protection technology and supplier of system solutions worldwide under its innovative HI-FOG brand. Marioff is part of UTC Building & Industrial Systems, a unit of United Technologies Corp., the United States.

The new generation HI-FOG 3000 sprinkler series, is designed to protect accommodation, public and service areas on ships. It replaces and provides even greater efficiency and wider coverage than earlier HI-FOG 1000 and HI-FOG 2000 sprinkler series. Marioff has carried out comprehensive testing of the new generation HI-FOG 3000 sprinkler series, which is designed, tested and type approved according to International Maritime Organization (IMO) Res. A800(19) as amended in IMO Res.MSC.265(84).

"With the launch of this new generation of HI-FOG 3000 sprinklers, we are offering to our marine customers enhanced HI-FOG systems with faster activation, more efficient suppression and improved passenger and crew safety. We take reliability and robustness of sprinkler systems to the next level, leveraging our three decades of field experience in marine fire protection systems," said John HemgaÌŠrd, at Marioff.

Source: http://www.superyachtnews.com

Low pressure water mist fire suppression system

AMF Systems Ltd., the United Kingdom, has developed water mist systems which use smaller water droplets compared to that of standard sprinkler systems. It is the surface area of water which absorbs heat, the use of smaller droplets increases the surface area and therefore heightens the efficiency of heat absorption. On absorbing heat the droplets are converted to steam around the fire plume, thereby displacing the oxygen and disrupting the combustion process.

The ability of these small droplets to absorb heat and create steam around the fire source is key to the effectiveness of water mist systems in suppressing and extinguishing fires. With the reduction in droplet size, the water requirement of our system is also significantly reduced to 13.94 litre per minute per nozzle at 7 bar pressure and this leads to some key advantages when compared with standard sprinkler systems and other water mist systems. *Contact: AMF Systems Ltd., Unit 5 - Russell Street, Wakefield, West Yorkshire, WF1 5QS, U.K. Tel: +44-192-456-6320; E-mail: info@amfsystems.co.uk*.

Source: http://www.amfsystems.co.uk

Water mist system for maritime applications

Autronica Fire and Security AS, Norway, has developed a new water mist nozzle for the FlexiFOG® water mist system based on the concept LESS IS MORE. The FlexiFOG® micro accommodation water mist system from can be integrated into a single-supplier fire detection and suppression system. The FlexiFOG® water mist fire suppression system can protect accommodation areas, machinery space areas as total flooding and local protection with one single pump package. FlexiFOG® micro accommodation water mist system provides a highly efficient water mist fire suppression system with low weight, easy installation and state-of-the-art design.

The pump pressure of the FlexiFOG® micro accommodation water mist system is only 20% of similar high-pressure systems, and in combination with its low water consumption, the power consumption is reduced with more than 50%. The design on a medium sized ferry with approximately 1500 nozzles, enables a weight reduction of approx. 2 tons. The back-up tank for one minute operation covering 280m^2 will be reduced with more than 70% compared to traditional sprinkler

systems. The weight of the zone valves is reduced with more than 50% compared to the other low-pressure systems offered. The nozzle can be flush mounted, measuring only 8 mm below the ceiling. Client-specified colours mean it can also be adapted to any surrounding environment.

FlexiFOG® micro accommodation water mist system from Autronica Fire and Security AS can be integrated into a single-supplier fire detection and suppression system. The FlexiFOG® water mist fire suppression system can protect accommodation areas, machinery space areas as total flooding and local protection with one single pump package. Additionally, the control system can be integrated with AutroSafe fire detection system including AutroMaster 5000 presentation system.

Contact: Autronica Fire and Security AS, Haakon VII´s Gate 4, Trondheim, 7483, Norway. Tel: +47-7358-2500; Fax: +47-7358-2501.

Source: http://www.thebigredguide.com

High-pressure water mist

The SEM-SAFE® water mist system, developed by Danfoss Semco, Denmark, is a unique fire fighting system. By forcing water at a high pressure through nozzles, an extremely fine mist is created. Water is supplied via a pump unit.

The SEM-SAFE® pump unit can supply all water mist applications. This is beneficial because you only need one unit for all applications, and it is easy to add more sections and applications, if needed. In addition, servicing of only one unit is easier and less costly.

On stand-by, the system maintains a pipe pressure of approx. 12 bar. When the temperature exceeds e.g. 57 °C, the heat-sensitive glass bulbs mounted in the nozzle heads melt. At this point, the high-pressure pump is automatically activated and water is forced through nozzles at high-pressure (60 or 100 bar depending on nozzle type) to create a fine mist. Only nozzles with melted bulbs are activated. This means that only the heat-affected area will be actively sprayed.

On stand-by, the system has dry piping. This system will activate manually or when sensors have detected heat, smoke or a flame, depending on type and application. The nozzles are grouped in sections and all the nozzles in the activated section will be released.

During operation, the high-pressure pump draws water from the tank on unit (a non-pressurised stainless steel tank) and forces it through a non-return valve to a high-pressure manifold. From here, it is distributed to the relevant section(s) via the section valve. A pressure relief valve controls the pump pressure and is designed to return the full pump capacity to the tank on unit.

Contact: Danfoss Semco A/S, Middelfartvej 9, DK-5000 Odense C, Denmark

http://www.danfoss-semco.com

Water mist fire suppression

The Fike Micromist® fire suppression system developed by Fike Corporation, The United States, produces a fine mist to extinguish fires quickly with very little residual water. In fact, the Micromist system releases 100 times less water than traditional sprinkler systems, yet effectively extinguishes the fire. That translates into less run-off, less damage and easy clean-up.

The Fike Micromist fire protection system employs single fluid, intermediate pressure – which reduces installation and maintenance costs associated with redundant and high-pressure piping networks / fittings. Offered in two convenient cylinder size configurations, Micromist is a self-contained (great for applications with or without available water source), single-fluid, pre-engineered water mist fire suppression system and comes pre-assembled, tested and packaged with all necessary valves and actuation components for system operation (system nozzles must be ordered separately). That's portability, reliability and simple installation in one easy package.

In addition, because the Fike Micromist system uses water it is naturally environmentally safe, non-toxic and people friendly. Combine Micromist with the intelligent, peer-to-peer speed of the Cheetah Xi detection and control system and you have a cost-effective, fast fire protection system ideally suited for total compartment protection of machinery spaces, compartmentalized gas turbine generators (FM approved) and many other applications.

http://www.fike.com

New all-water-blown polyurethane foam

At the UTECH Asia/PU China 2015, Xinyutian Chemical, China, presented the all-water-blown polyurethane foam it developed in 2014. The foam is used in building and pipeline insulation. According to the company, it has high flame retardant performance without additional flame retardants, and is dimensionally stable.

Xinyutian has eight plants across China and also facilities jointly set up with local partners in Viet Nam, Pakistan and Iran. The all-water-blown foam is produced to sell mostly to clients in northern China, but the company is looking to expand sales to overseas markets.

The company also makes polyether polyols, PU resins for synthetic leather and shoe soles, systems, adhesives and coatings. Last year the company saw nearly RMB3bn ($470m) revenue, close to its 2013 performance. "We've been selling at lower prices under the economic slowdown to maintain profitability. I believe the sector is moving towards more segmented, technology-intensive products," said Feng Li, at Yutian.

Source: http://www.utech-polyurethane.com

Biodegradable alternative to polystyrene

The Biopolymer Network (BPN), New Zealand, has partnered with plastics maker Barnes Plastics, Auckland, and the partnership has reportedly created a PLA-based biodegradable foam called ZealaFoam for packaging application particularly for the fish and aquaculture export industries where fish boxes need to maintain their integrity throughout a 24-48 hour period. The bio-foam is reportedly being tested by a large global company in the US.

BPN's process involves expanding small PLA beads using carbon dioxide (CO_2) as a blowing agent. ZealaFoam can be produced using the same machinery that makes traditional polystyrene. If the US deal pans out, BPN is hopeful to start commercialization scale-up by the end of the year where production is expected to stay in New Zealand. The technology can be licensed to other manufacturers when used for packaging. BPN has retained full ownership of the IP.

BPN was set up in 2005 and is jointly owned by three of the government's Crown Research Institutes, Scion, Plant & Food, and AgResearch. BPN focuses its research on four key areas: bio-based foams and resins; aqueous extracted proteins and starches; tannin extracts and derivatives; and liquid CO_2 processing.

Source: http://www.greenchemicalsblog.com

Water blown foam agent

Developed by BJB Enterprises Inc., the United States, the TC-274 A/B is a two-component water blown flexible polyurethane foam system specifically developed for low-density molding. Nominal density of the finished product is in the range of 4 pounds per cubic foot, when open blown or not restricted. Higher densities may be obtained in closed or restricted mold. BJB's 6800 Series Pigments may be added to the "B" side for developing a wide range of colors. TC-274 A/B can be hand mixed, machine dispensed, or mixed with a Jiffy Mixer®.

The blade shears the material and provides a thorough mix within the 5 to 8 second periods generally established for achieving a uniform blend. The material should have a uniform blended appearance. Mixing too long or not enough can result in poor material performance.

Once mixed, the material should be immediately poured. If too much time goes by, the foam will rise in the mix container and the batch may be lost. When pouring the foam, avoid trying to scrape any material from the container sidewalls or bottom. Generally, there isn't enough time to do this and more importantly there may be material that is not well mixed on the container sides.

The mold should be well sealed and released. Foams will seek moisture through release waxes and stick to mold surfaces if an insufficient seal exists. Sealing can be accomplished by using lacquer or other similar sealers.

The mold should be warmed to between 75-85°F (24-29°C) prior to casting the first part. Once a mold is heated and cycled it will maintain heat for continued production. The best molds for production (rather than prototype or limited production parts) are either machined aluminum molds or epoxy molds. Epoxy molds offer the least expensive method for long term use when cycle times allow slower heat dissipation.

Source: http://www.bjbenterprises.com

New process to eliminate pests from stored grain

Scientific Advice in Water Studies (ACEA), Mexico, has developed an engineering process for the elimination of pests, sanitation and preservation of stored grains such as corn, beans and wheat using ozone, which is non-toxic and reduces the costs of grain fumigation by 60 percent. Technological innovation is of great importance for agricultural states like Sinaloa in the North of Mexico, the leading producer of white maize in the country, but the hot and humid climate favors the proliferation of all kinds of pests. The project involves injecting ozone, which is obtained from ambient oxygen via electric shock, into the industrial silos.

The produced ozone is efficiently distributed within the silo using a mobile system, which easily travels from one container to another to serve a greater number of silos. The researcher explains that "ozone is triatomic (molecule composed of three atoms) oxygen, which is very reactive and has the virtue of not polluting or leaving toxic residues, while eliminating odors and fungi and sanitizing grains such as corn, beans, wheat, sorghum and rice," said Llanes Ocaña. Moreover, the process replaces chemicals like phosphine and methyl bromide used in traditional spraying methods, which are toxic and carcinogenic.

The chemical expert explained that the common spraying method is used in doses of four tablets of phosphine per ton of grain. The researcher and his team developed the project over 12 years and registered the patent in 2011, which was validated by the laboratory of the Research Center for Food and Development (CIAD). The study began in a laboratory of the University of Sinaloa, then moved to the industrial level with the acquisition of the patent. This technological innovation is currently marketed in Mexico and Canada by a private company (Empresa Operadora de Granos Almacenados SA de CV) through a contract and confidentiality agreement with Scientific Advice in Water Studies (ACEA).

Source: http://www.phys.org

Irradiation to replace fumigation

USDA Agricultural Research Service (ARS) scientist Peter Follett have developed irradiation protocols to use on insects that infest Hawaiian commodities such as coffee and ornamental flowers. They have also been working to protect others, such as table grapes and a variety of berries grown in California. Since starting work for the ARS, Follett has helped develop irradiation techniques to control a range of agricultural pests, including the mango seed weevil, the oriental fruit fly, the Mediterranean fruit fly, and the melon fly. The first irradiation facility in Hawaii opened in 2000. The ionizing radiation comes from electron beams, gamma radiation, or X-rays.

In an article in International Innovation, Follett notes that in the past several years, India, Mexico, Pakistan, South Africa, Thailand, and Viet Nam, have reached agreements with the U.S. on using irradiation on fruits and vegetables and are exporting millions of pounds of these commodities. Developing an irradiation protocol involves a several-step process, Follett explained. Initially, researchers must develop a system to raise large numbers of an insect pest. Next comes the development of a range of doses to determine how much is needed to either sterilize the pest or prevent it from becoming an adult in the commodity to be irradiated.

Following that are large-scale tests at the radiation dose they predict to be effective. Finally, the USDA's Animal and Plant Health Inspection Service reviews the data and establishes a protocol for the use of radiation. The countries that would import the irradiated commodities also have to approve the protocol. Follett and his colleagues have found the appropriate dose of radiation to control the western flower thrips and the coffee berry borer in Hawaii, and to control the European grapevine moth and the spotted wing drosophila, both of which are pests in California. Follett and his colleagues are now working towards making the irradiation process simpler.

Source: http://www.entomologytoday.org

Root removal may improve raspberry's growth

A research done by Washington State University (WSU), Mount Vernon Research Center, the United States, has found that root removal, especially when combined with fumigation, may be an effective strategy in lowering disease pressure and nematode populations in continuous red raspberry systems. Lead Researcher Lisa Wasko DeVetter, at WSU, and her team found that populations of root lesion

nematodes (*P. Penetrans*) were reduced by an astounding 99.8% right after root removal.

Soil borne diseases Fusarium and Pythium were reduced by 16% and 21%, respectively, but when combined with fumigation using Telone C-35 and chloropicrin, those percentages jumped to 64% and 69%, respectively. With fumigation clearly being a huge factor, DeVetter can see why a grower might like to just to fumigate like he always has. But the problem is that fumigants are only labeled for plant tissue of a certain size and to a certain soil depth. But perhaps most important is that growers no longer have access to what some have called the ultimate fumigant, methyl bromide.

When you consider that growers in the Pacific Northwest harvest more than 10,000 acres of red raspberries each year with an estimated production value of $67 million, DeVetter said her team's research will have some impact, and not just in Washington and Oregon. "It is a piece of the research puzzle in trying to understand more about the soil borne pests and diseases that affect red raspberries in the Pacific Northwest with a goal to better manage them. But the research absolutely has application elsewhere.

Source: http://www.growingproduce.com

New biopesticides to protect horticultural crops

Scientists at the Central Tuber Crops Research Institute (CTCRI), India, have developed two new biopesticide formulations found to be effective in protecting horticultural crops against sucking pests. The research team led by C.A. Jayaprakas, at CTCRI, has standardised the use of the biopesticides for pest management. The products named Shreya and Nanma have been taken up for field application by the Sanghamythri Farmers Producer Company at Pallichal near here. Among the sucking pests, mealybugs, which are common in almost all vegetable crops, are highly resistant to insecticidal treatment as their body is well guarded by a waxy coating.

Shreya was found to be capable of killing the mealybug larva by dissolving the protective coating. Nanma was effective against other sucking pests like aphids, thrips and scale insects that infest vegetable crops and as a prophylactic measure against pseudo stem weevil, a borer pest in banana. The team has also designed a new stem injection syringe for application of Menma, a cassava-based biopesticide found to be effective in protecting banana and coconut crops. The special applicator ensures targeted discharge of the biopesticides and kills the pests in their juvenile stage.

CTCRI, along with the Centre for Innovation in Science and Social Action (CISSA), India, has launched a programme for the management of pseudo stem weevil in Thiruvananthapuram, Malappuram, and Kasaragod districts. The first phase of the programme had covered 30,000 banana plants in farmers' fields in the three districts. The trial was later extended to over 1.5 lakh plants across the State. A package has also been formulated for the management of rhizome weevil. The researchers are also developing a cassava-based bio-fumigant for potential use in godowns where food grains are stored.

Source: http://www.thehindu.com

Biofumigation on post-harvest diseases of fruits

In a study researchers from Beijing Engineering Research Center of Seed and Plant Health (BERC-SPH), China, Beijing Key Laboratory of Seed Disease Testing and Control (BKL-SDTC), China, Zhejiang University, China, and the University of Maine, the United States, have found that a variety of volatile organic compounds (VOCs) produced by Ceratocystis fimbriata have strong bioactivity against a wide range of fungi, bacteria and oomycetes. Mycelial growth, conidial production, and spore germination of fungi and oomycetes were significantly inhibited after exposure to cultures of C. fimbriata, and colony formation of bacteria was also inhibited.

Two post-harvest diseases, peach brown rot caused by Monilinia fructicola and citrus green mold caused by Penicillium digitatum, were controlled during a 4-day storage by enclosing wound-inoculated fruits with 10 standard diameter Petri plate cultures of C. fimbriata in a 15 L box.

The fruits were freshly inoculated at onset of storage and the cultures of C. fimbriata were 6 days old. Percentage of control was 92 and 97%, respectively. After exposure to C. fimbriata VOCs, severely misshapen hyphae and conidia of these two post-harvest pathogens were observed by scanning electron microscopy, and their pathogenicity was lost or greatly reduced.

Source: http://www.ncbi.nlm.nih.gov

RECENT PUBLICATIONS

The Montreal Protocol and Human Health

This booklet summarizes how the successful implementation of the Montreal Protocol has protected human health. It describes how ozone depletion would have led to increases in UV radiation and, based on current understanding of the mechanisms by which UV affects biological processes, how that would have led to a dramatic increase in skin cancers, cataracts and affected human health in other ways.

Financing the Climate Co-benefits of the HCFC Phase-out

A guide for Low Volume Consuming Countries – HCFCs are being phased out worldwide under the Montreal Protocol on Substances that Deplete the Ozone Layer. The Parties to this treaty encouraged countries to promote the selection of alternatives to HCFCs that minimise environmental impacts, in particular impacts on climate. The Protocol's Multilateral Fund encourages developing countries to explore potential financial incentives and opportunities for additional resources to maximise the environmental benefits from HCFC Phase out Management Plans (HPMPs).

Safe Use of HCFC Alternatives in Refrigeration and Air Conditioning

An Overview for Developing Countries – Many of the alternative refrigerants to HCFCs have particular characteristics in terms of toxicity, flammability and high pressure which are different from those used previously. It is therefore important that the refrigeration and air-conditioning industry adapts to both the technical and safety issues concerning these refrigerants. It provides guidance for National Ozone Units and other interested parties in developing countries on how they can advise and assist their national stakeholders in the selection and implementation of alternative refrigerants.

For the above three publications, contact: UNEP DTIE OzonAction Branch, 15 rue de Milan, 75441 Paris CEDEX 09, France. Tel: +331 4437 1450; Fax: +331 4437 1474; E-mail: ozonaction@unep.org

TECH EVENTS

2016

25–27 Feb
Mumbai, India

ACREX INDIA 2016
Contact: ISHRAE
K-43 (Basement), Kailash Colony
New Delhi-110 048,
India
Tel: +91-11-4163-5655
E-mail: acrex2015@ishraehq.in
Web: http://www.acrex.in

7–9 Apr
Beijing, China

China Refrigeration
Contact: Chinese Association of Refrigeration(CAR)
Fl.10,Yindu Tower,67 Fucheng Rd.,
Haidian District, Beijing-100142, China
Tel: +86-10-6871-9984
Fax: +86-10-6842-0694
E-mail: wqzhong@car.org.cn
Web: http://www.cr-expo.com

23–25 May
Kuala Lumpur, Malaysia

International Refrigeration, Ventilation and Air-Conditioning Event (REVAC 2016)
Contact: UBM ASIA (Thailand) Co Ltd.
503/23 K.S.L. Tower
14th Floor Sri Ayuthaya Road
Kwaeng Thanon Phayathai
Khet Rajathewee, Bangkok-10400,
Thailand
Tel: +66-2642-6911 Fax: +66-2642-6919
E-mail: info@cmpthailand.com

15-17 May
Taipei, Taiwan province of China

8th Asian Conference on Refrigeration and Air Conditioning
Contact: Congress Secretariat
5F., No.18, Ln. 36, Xinhu 1st Rd.,
Neihu Dist.
Taipei City 114, Taiwan province of China
Tel: +886-2-2790-4606;
Fax: +886-2-2791-2538
E-mail:acra2016@acrt.org.tw
Web: http://www.acra2016.org

14-15 Sep
Seattle, USA

14th International Conference on Advances in Foam Materials & Technology (FOAMS® 2016)
Contact:
Dr. Xiaoxi Wang
E-mail: wang0213@gmail.com
Web: https://www.eiseverywhere.com

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Fax: +49 911 8606 1200 68
Web: https://www.chillventa.de

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Chillventa – the Exhibition for Energy Efficiency, Heat Pumps and Refrigeration
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Germany
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BOOKS

	Indian Rupees* (India, Bhutan and Nepal)	US Dollars*
❑ Managing Innovation for the New Economy: Training Manual, 2002 Volume 1: How to Guide & Quick reference materials Volume 2: Articles & Lectures	1,000.00	50.00
❑ Regional Capacity-building for the Adoption of ISO-14000 and Transfer of Environmentally Sound Technology: Training Manual, 2000	600.00	30.00
❑ Small Rural Industries in the Asia Pacific Region: Enhancement of Competitiveness of Small Rural Industries in a Liberalized Economic Environment and the Impact of Poverty Alleviation, 2000	600.00	30.00
❑ Technology Transfer and Technological Capacity-building in Asia and the Pacific		
❍ Volume 1: Big Countries and Developed Economies, 1999	600.00	30.00
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❑ Institutional Development for Investment Promotion and Technology Transfer, 1999	500.00	25.00
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❑ ODS Phase-out: A Guide for Industry, 1998	500.00	25.00
❑ Proceedings of the Consultative Meeting on Technology Management Education and Training for Developing Countries, 1997	800.00	40.00

Notes: Amount less than Rs 500 should be sent through a demand draft only. Otherwise, payment should be made by cheque/demand draft/ UNESCO coupon in favour of the Asian & Pacific Centre for Transfer of Technology, payable at New Delhi.

Six issues per year. A print version for distribution to a select target group is supported by the Ozone Cell, Ministry of Environment & Forests, Government of India.

* Amount to be sent to APCTT with the order for covering costs and handling charges.