

Messages in a smile

Lee Gyoung-mi Teacher
Beolgyo Girls' Middle School
Teachers Bonding Over Chemistry

This year marks the 10th year anniversary of '2012 Come! Fun World of Chemistry'.

On 1 September 2012, as I joined the review session after the anniversary event, it suddenly occurred to me that it has been a long time since the first event. At the same time, I also realized that we should not settle back as we are now but more assertively press on for its development.

A year ago, my daughter who was torn between 'science and liberal art courses' asked for my advice. My recommendation was to choose a science course. At present, I am the mother of a family and a science teacher in society. My daughter seemed to have an aptitude for both disciplines. She does not like to memorize but has excellent comprehensive faculty and analytical skills. Despite her minor complaint that her relatively fair math skills would be a disadvantage to her, she finally selected the science course. All that because the path she loves to follow is the path to science. It makes me smile to see her like that. In fact, I think I have a great affinity with my daughter. So I would like to help her not to leave any lingering desire for study or for the matter of selecting a career as I had. When I was at school, I did not like studying languages and I regarded myself as not equipped for the field of language and consequently did not make an effort.

Time has passed and I am now a science teacher following my knack for science. I cannot deny that while I teach science I sometimes want to study more and conduct research like other people. I used my position as a mother of three children and a daughter-in-law as flimsy excuses not to give it a try. Looking back, however, I think it was a vague fear of the linguistic requirements (report writing, English) hindering my attempt to follow an academic path.

I think math should not be a sunken rock that prevents my daughter from pursuing what she decided to do for further development.

If she compromises now, it will only give her a narrow window of opportunity for greater development or a brighter future. So I always talk to her, stressing the importance of looking further into the future when choosing her study path. If she chooses her career based on her scores, she would certainly be forced into a path that is farther from what she really wants to study.

At present, Korea is economically well off compared to other Southeast Asian countries and enjoys higher status in the world. But no one could unwaveringly say 'yes' to the question 'will it be the same in three decades?' because we all know Korea is facing many challenges now. In a country where people or talented individuals are its only resources, if people avoid studying science or engineering, it will bring about a crystal-clear future. How long could we sustain ourselves with so-called 'K-Pop'! I was so grateful for a recent advertising campaign announcing, 'We Support a Novel Project', which advocates the importance of science and engineering.

I have heard that it is a kind of an unwritten truth that a person who went to a church or a temple even once in their childhood will inevitably return to their religion no matter how far they have strayed away. In this context, 'Come! Fun World of Chemistry' is essential and precious in that it provides a platform for people from elementary school to try and experience science again, especially chemistry. Because, could the childhood and youth experience of 'Come! Fun World of Chemistry' serve to attract these students back to science and easily challenge the path of science in the future? As I proactively joined the event, I have learnt a lot and I take pride in that I have been keeping up with the event. All teachers who participate in the event may have same thought with me.

Normally, the words, chemical industry would bring about a negative image for ordinary people. Though I specialize in chemistry, I also associate words such as synthetic, pollution and toxic with chemistry and had a negative impression rather than a positive and constructive one.

However, as I joined 'Come!Fun World of Chemistry' and prepared for the event, I realized that as a person living in the 21st century, I could not live a moment without the help of the chemical industry. Also, I was aware of the ironical fact that the key to be free from environmental disruption or pollution, which is one of the influences of the chemical industry over human beings, can be found in the industry. I also learnt that the widespread

negative image in our society of the chemical industry was due to half-baked knowledge and misunderstandings of the industry and the lack of proper promotion on the matter. In this regard, I think 'Come! Fun World of Chemistry' provides a valuable opportunity for elementary students or our pillars for the future and their parents to rediscover the chemical industry and to gain a positive impression of it. Therefore, I think this event should be carried on for a long time and the current program should be developed and extended further.

For now, I think it would necessary to collect the opinions of the persons concerned to find more measures to develop the event such as: expanding the program that is currently held locally in regions where chemical industries are present; developing a program that extend its scope from elementary school students to middle/high school students; establishing a new program to invite students' parents to join; and expanding an opportunity for like-minded teachers to share, etc. In this regard, if I could be of help, though it would not be an immense help, I would like to do my best in assisting it.

Writing this essay helped me to retrospect my time in '2012 Come! Fun World of Chemistry' and my teaching career. Now if someone asks me "Are you happy to live as a science teacher in 21st century Korea?" And my answer is "Yes".



DuPont Korea, Presents RC Activities and Emergency Response System

Kim Han-gi
SHE Team captain, DuPont Korea

DuPont was established by the first CEO, E.I. DuPont, in Brandywine River, Wilimington, Delaware as a black gunpowder plant. Under the basic principle of "Safety is the responsibility of the management", CEO E.I. DuPont set the cornerstone to consider safety management as one of the core values of the firm. Since the establishment of the first rule of safety on January, 1, 1811, DuPont put the first priority on safety in running the business for 210 years. The firm officially announced safety as its core value in the 1920s and made it a rule that it is compulsory to first secure safety in all of its business dealings before moving onto the next step. Today, DuPont still maintains it as its key value, putting a priority on safety and health management activities of all employees and its partners in its business activities. The future strategy of DuPont is to be the most dynamic scientific firm in the world that takes the lead in developing sustainable solutions to ensure better, safe and healthy human lives. The firm will continue to grow by gearing toward safety, health and environment for all of its businesses.

DuPont's safety, health and environment-oriented management activities are based on RC principles and its commitment to safety, health and environment. Its safety, health and environment policies are implemented in its worldwide operations.

The safety, health and environment policies of DuPont consist of safety, health and environment commitment and RC codes. RC activities are the most important elements in the firm's undertaking to safety, health and environment and the firm actively joins and supports RC activities in the chemical industry.

As for safety, health and environment policies, DuPont made it clear that the RC code of practice is paramount in all business divisions and plants

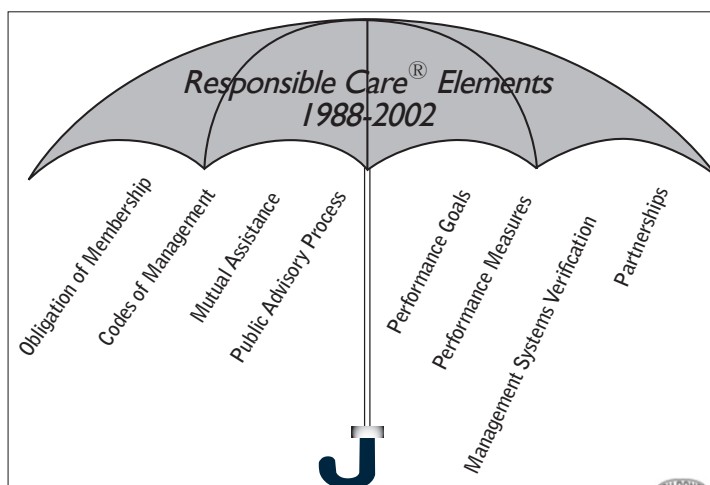
DuPont's safety, health and environment management is divided into the following five sectors:

- Responsible Care

- SHE Standards and Guidelines
- SHE Management System (PSM, Safety/OH)
- Performance Tracking
- Audits

Under the RCMS (Responsible Care Management System) based on RC manual and code, there are safety, health and environment standards and guidelines, and SHE (Safety, Health, and Environment) Management System to implement the standards and guidelines is established and executed and activities to measure the implementation result and to monitor if the standards and guidelines are properly kept.

DuPont's RC activities from 1988 to 2002 stayed to the extent that it provides information to chemical firms and their safety, health and environment management performance.



DuPont's RC codes are composed of the six sectors below:

- CAER
- Pollution prevention
- Employee Safety and Health
- Distribution
- Process Safety
- Product Stewardship

Under these six codes, there are 106 management practices to be implemented. (On page 10)

In 2002, DuPont also introduced RCMS (Responsible Care Management System) that adopts six codes and 106 management practices that were initiated by the American Chemistry Council (ACC). It added Security Code to the existing code system to complete a process to operate Plan-Do-Check-Action (PDCA) based on seven codes, five sections and 27 elements.

RCMS's five sections are as follows:

- 1) Policy and Leadership
- 2) Planning
- 3) Implementation, Operation and Accountability
- 4) Performance Measurement, Corrective and Preventive Action
- 5) Management Review

To summarize the overall RCMS's organization, it is shown as below: (page 12)

To practice the seven codes, DuPont developed the existing standards and guidelines further.

Currently, in implementing RCMS, DuPont conducts gap analysis, defines gaps and develops plans to close the gaps and implements recommendations based on the results. To facilitate the implementation of seven codes in the management, it introduces a management system with the preparation of implementation elements by different codes. The figure below illustrates the operation status of the process safety and risk management system.



DuPont places its implementation results of RCMS (Responsible Care Management System) for

verification by ACC. All DuPont plants in the US should be subject to management certification by ACC.

To present DuPont's implementation case in the Emergency Response (ER) under Community Awareness Emergency Response (CAER) sector, one of the seven codes, it is as below:

With respect to off-site transport incidents in DuPont, there was an accident that occurred on 31 May 1854 and it killed one coachman and two citizens as well as three horses. Since the 1800s, DuPont realized the importance of an emergency response system related to off-site transport incidents.

DuPont divides emergency response system into on-site and off-site to control the system by two standards.

- S4U: Emergency Preparedness and Response for Off-Site Incidents
- S25F: Site Emergency Response Planning

To observe the above standards and guidelines of the emergency response system, the firm organizes and operates emergency response teams at different levels in Global, Regions and Countries.

The figure below shows the emergency response team in the Asia region.

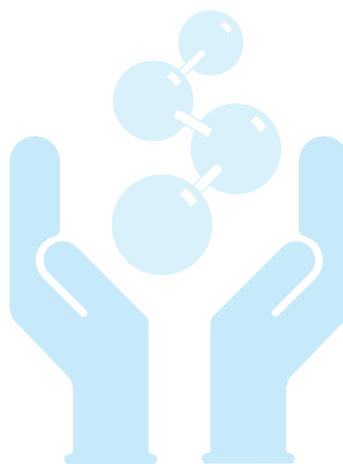
DuPont' emergency response system consists of six elements shown below: (pafe 14)

- A detailed and documented ER Plan
- Trained responders and team leader
- Training and Drill Program
- Dedicated Equipment
- Medical Program
- Reporting and Evaluation

DuPont Korea maintains and manages the emergency response plan for off-site safety incidents and maintains the updated version standards and guidelines in line with the global emergency responses for a year.

Centering on emergency response teams in Seoul and Ulsan plant, DuPont Korea organizes and operates the Korean emergency response team. It prepares for unexpected off-site

emergency incidents by annual training and education. In consideration of characteristics of chemical substances handled and overall conditions, the firm is equipped with emergency equipment and runs a medical program to ensure health of emergency response teams. All of the emergency response system is supposed to be analyzed and assessed for report to management.



LG Chem, selected as an Excellent Climate Change-Response Firm

LG Chem was selected as excellent climate change-response firm. LG Chem was chosen as it demonstrated excellent response to increasingly reinforced GHG emission control and market environment change, etc. due to climate change in the 'competitive climate change leaders award ceremony held in the Korea Chamber of Commerce building on 15 July 2012.

The evaluation criteria to select excellent firms adopted 'competitiveness indexes of climate change' conducted for 496 firms (333 GHG/energy MRV (Measure, Report, Verification) firms and 163 non MRV firms) at the end of 2011.

Honam Petrochemical Corporation to be selected as a model in the field of safety, health and environment

1. Admitted to Asia Pacific Sector for two consecutive years in 2012 Dow Jones Sustainability Indexes (DJSI) Ceremony

On 9 October 2012, Honam Petrochemical Corporation received the plaque of certification for admission to Asia Pacific sector in "2012 Dow Jones Sustainability Indexes (DJSI) Certification Ceremony" organized by the Korea Productivity Center held in Hotel Shilla, Jangchung-dong, Seoul for two consecutive years after 2011.

Dow Jones Sustainability Indexes (DJSI) is a global assessment model developed by two corporations, Dow Jones Indexes (US) and SAM (Switzerland), for comprehensive assessment of a firm's sustainability in terms of its financial, social and environmental performance and values. To be admitted to Asia Pacific Sector, a firm must be within top 20% through assessment of 600 corporations in Asia based on float quoted market value.

2. Selected as a Leader in Raw Materials in 2012 Carbon Disclosure Project (CDP) Korea

Honam Petrochemical Corporation was selected as an industry leader in raw material sectors in

"2012 CDP Korea" for three consecutive years from 2010. Carbon Disclosure Project (CDP) refers to a global project under the commission of global financial investment organizations for key listed companies in the world and provided questions in the form of a survey on governance structure, risks and opportunities, strategies, GHG emissions, accounting, communications, etc. in terms of response to climate change issues and allows respondents to answer in Online Response System (ORS).

3. Won an award from the Minister of Knowledge Economy in 2011 Pilot Project of Tradable CO₂ Emissions Permits Result Assessment in the field of Industry/Development

The Yeosu plant of Honam Petrochemical Corporation was selected as a good participant in the 2011 Pilot Project of Tradable CO₂ Emissions Permits in the field of industry/development and received an award from the Minister of Knowledge Economy for the pilot project of tradable CO₂ emissions permits on 24 September 2012.

The Ministry of Knowledge Economy selected three excellent corporations from 78 participants of the pilot project of tradable CO₂ emissions permits in the field of industry/development carried out in 2011 to bestow prizes.

4. Prize from the Minister of Environment 2012 as a Resource Recycling Leading Company

Honam Petrochemical Corporation Daesan plant won the resource recycling leading company minister prize from the Minister of Environment organized by the Ministry of Environment Resource Recycling Day Organizing Committee in KINTEX on 6 September 2012.

Resource recycling leading company refers to an environmentally friendly business that is acknowledged for its contribution to the improvement of business productivity and low-carbon green growth by restricting waste generation in advance or expanding waste recycling through environmentally friendly technology development, process improvement, or others.

Responsible Care Activities in Japan: Process Safety Activities

Noriyuki Yoshihara
General Manager, RC Department
Japan Chemical Industry Association(JCIA)

In Japan, based on the seven codes of good management practices, chemical companies are conducting Responsible Care activities to ensure chemicals & product safety, process safety, occupational health & safety, environmental preservation, distribution safety and dialogue with society among others, while implementing their Responsible Care management systems. All these activities are important for the Japanese chemical industry, and among them, this article will focus on outlining the process safety activities.

Top executives of Japanese chemical companies are strongly committed to ensuring safety, and all employees, including not only those engaged in disaster management but also operators working at the manufacturing facilities are highly aware of the importance of safe operation. The “safety first” slogan is posted at various places in the plants, where employees usually greet each other by saying, “Goanzen-ni (Be careful about your safety)!” This demonstrates that these employees are highly aware of safety issues.

The safety measures taken by the Japanese chemical industry are roughly divided into (1) preliminary measures taken to prevent accidents and (2) measures implemented to minimize the impact of accidents that have actually taken place. The following shows specific examples of these measures.

1. Preliminary Measures Implemented to Ensure Process Safety

(1) Basic procedures to be followed in constructing, expanding, and refurbishing chemical plants

Most Japanese chemical companies construct their plants (and expand/refurbish them) according to the following procedures. First, each of the departments in charge of disaster prevention, occupational health and safety, and quality assurance examines the design plan for the plant and makes necessary changes and additions to the plan. These examinations are made not only on the major reaction and refining processes but also on the layout of various monitoring instruments, work safety, and on the stability of quality, and the construction of the plant cannot be started without approvals from the related departments.

(2) Measures for equipment

- Chemical companies are automating their machines as much as possible to reduce the operators' work, thereby decreasing human error.
- They are also installing two supply lines (for electricity and other utilities) for the most important machines to reduce the related risks, and preparing emergency power generators and batteries to ensure the supply of electricity to the critical control systems in case of emergencies.
- Moreover they are simplifying the emergency stop procedures for their plants. Specifically, the plants are designed so that the operation can be easily halted by pressing the emergency stop switch.
- Not a few chemical companies have established the following system to prevent breakdowns of machines and other problems: they input into a computer system information on the maintenance and parts replacement timing for all the machines comprising the plant, including reactors, distillation towers, heat exchangers, pipes, pumps and blowers, and carry out the replacement and maintenance work according to the instructions given by the system. Performing maintenance and repair of the machines on a regular basis before they break down is indeed a very effective means to stabilize plant operation and improve process safety.
- Because Japan is an earthquake-prone country, it is critical for chemical companies in the country to implement anti-seismic measures for their plants. The Japanese national criteria on earthquake resistance were revised in 1981 and of course plants that were built after the revision have seismic resistance that meets the revised criteria. Also the seismic resistance at plants built before the revision of the criteria has been diagnosed and reinforced in a planned manner and according to the priorities. Also, chemical companies are introducing designs that will minimize the damage that could be caused by an earthquake, including adopting a flexible structure for plant pipes and making it possible to close the valves as necessary if a part of the plant breaks down, thereby minimizing the spread of damage. Also most chemical plants are equipped with seismometers. In light of the fact that coastal areas suffered tremendous damage due to the tsunami in the case of the Great East Japan Earthquake, the national and local governments are revising their assumptions on the possible heights of tsunamis that might hit the country in the future, and accordingly, more measures will be implemented at chemical plants, such as increasing the heights of the seawalls and relocating important equipment to elevated places.

(3) Other measures

- Operating manuals: The manuals that describe how to start and stop plant operation need

to be clear and brief. In addition to these manuals, not a few companies have documents that detail the scope of control values and how to deal with cases in which the limit is exceeded.

- Educating operators: By repeatedly educating operators on what kinds of substances make what kinds of reactions within the plant and how the heating, cooling, pressurization and other operations are related to these reactions, chemical companies are helping operators to develop the ability to deal with abnormalities appropriately. In educating operators, quite a lot of companies show them what kinds of reactions are being made within the plant in a laboratory and provide them with first-hand experience through simulations of explosions and fires, and these are indeed very effective educational methods.
- Finger pointing and calling: When an operator works with a machine, the person will point to the machine and say what he/she will do with it. If multiple operators work together, one operator will say what they will do (for example, "Open the ** valve," "Check the temperature and pressure and now switch on the machine.") and all others will repeat his/her words. This effectively helps them avoid making errors.
- Operators can raise their safety awareness effectively by engaging in risk prediction activities, identifying incidents that could have resulted in serious accidents, conducting small-group activities, and having tool box meetings (TBM) at the beginning of their work every day. This will in turn help reduce the number of occupational accidents and improve process safety in a very effective manner.
- As for earthquakes, chemical companies are making better use of seismometers and earthquake alert systems to detect earthquakes and urgently suspend their plant operation before the earthquake actually hits their plants. Further, they have established their own procedures to inspect their plants and suspend operations according to the seismic intensity measured by the onsite seismometer. Some plants have also adopted a seismometer-linked system to automatically suspend plant operation when necessary.

2. Responses to Accidents and Disasters

(1) Measures for equipment

- Fire extinguishing equipment and system

A fire hydrant and an in-house firefighting team: A set of a fire hydrant and a fire hose is installed at important points within the plant and an in-house firefighting team composed of employees carries out a drill on a regular basis so that they can conduct initial fire extinguishing activities in an appropriate manner in the event of a fire. To foster firefighting activities at chemical plants, competitions on the operation of a fire hydrant are held in a range of districts under the instructions of local fire departments.

[Joint firefighting organizations of chemical complexes and the equipment]

In a chemical complex, if one of the companies located within it has an accident, it will have an impact on the operation of the entire complex. In light of this fact, some large plants are equipped with a set of three firefighting tools (a large ladder truck, a large chemical fire engine, and a foam liquid carrier), but it is not easy for small- to medium-sized plants to have all these fire extinguishing devices in place. Accordingly, most chemical complexes have a joint firefighting organization so that companies in the complex can give mutual support in case of a fire.

[Wide-area joint firefighting organizations of chemical complexes and the equipment]

Because chemical plants store a range of hazardous substances, large explosions and fires that could not be dealt with by the joint firefighting team or local fire department might take place within the complex. To be able to respond to such a disaster, a foam fire extinguishing system with a capacity that is 10 times that of the aforementioned set of three tools is established across Japan in 12 districts. Upon a request from a complex, the system will be carried to the site to extinguish the fire.

- Preventing the spread of leaked oil and harmful substances and recovery: In order to prevent oil and chemical substances spreading and leaking into the sea and subsequently to recover them, chemical complexes are equipped with oil fences, recovery vessels and adsorbents (spill collecting agent).

It is mandatory for complexes to have the aforementioned equipment and organizations in place under the Japanese Act on the Prevention of Disaster in Petroleum Industrial Complexes and Other Petroleum Facilities.

(2) Other measures

- Notification/communication systems: In some cases in the past, the person who detected an incident at the plant notified the department in charge and then the department made a decision on whether to report it to the local fire department and other external organizations. In recent years, however, more plants have adopted a system in which the person who has detected an incident directly notifies the external organizations through the department in charge of industrial safety. Also quite a lot of plants have hotlines exclusively for the purpose. Many plants have loudspeaker vehicles to inform local inhabitants to evacuate in the event of a disaster and have concluded agreements with local governments so that they can use the community wireless system for disaster management.
- Drills: Emergency drills are regularly conducted at chemical plants so that employees can use the aforementioned emergency equipment timely and smoothly in the event of a

disaster. In the comprehensive disaster drills performed under the instruction of the local fire department, all employees, not limited to members of the department in charge of industrial safety, learn about firefighting as well as how to give aid to victims, communicate important information and evacuate employees.

In addition to these emergency measures, an increasing number of companies are formulating business contingency plans (BCP), the importance of which has been more recognized in recent years, to continue their business even in the event of disasters by measures such as supplying alternative products and raising funds, thereby fulfilling their social responsibility.

3. Measures Implemented by the Japan Chemical Industry Association (JCIA)

The JCIA has been giving a range of support to help its member companies introduce process safety activities.

- (1) Commendation for safety activities: Every year, from among the applying companies that have excellent safety results, a selection committee composed of third-party members carries out paper screening and onsite inspections to choose one winner for the JCIA's Safety Award and four winners for the Safety Effort Award.
- (2) Sharing process safety information: The JCIA holds a meeting for its members to exchange information twice or three times a year, in which study groups focusing on each of the RC activities, including process safety activities, exchange and share information on the best practices implemented by JCIA members.

As described above, companies belonging to the JCIA have been making efforts to ensure process safety. During the past year, however, an unfortunate series of serious accidents happened at member companies that had been leading Responsible Care activities in the industry. The JCIA takes this fact seriously and is urgently implementing measures to prevent the recurrence of such accidents. It is impossible to ensure 100% safety even with the use of all the useful equipment and system, but companies can minimize safety-related risks by raising and maintaining safety awareness of all employees engaged in plant operation, including onsite operators based on a strong safety commitment made by their top executives. The best and only one way for companies to ensure safety is to establish and nourish a "safety culture" within their organizations. This indeed means to adhere to the Responsible Care ethic.

Efficacy of various teas

Efficacy of teas

Along with coffee and cocoa, tea is known as one of the three most popular beverages in the world and has the longest history of them all. In general, tea is often regarded as an oriental beverage; however, it is consumed by more than two billion people in around 200 countries throughout the world with the annual consumption of over three million tons.

Before the development of science like today, people used tea for medicinal purposes based on accumulated experience. With the advancement of science, however, many scientists discovered biologically active substances in teas and have been conducting more specialized research on teas. In particular, the five substances of teas such as catechin, caffeine, sugar, vitamins, theanine are popular subjects of research to be applied for their excellent efficacies.

Catechin, effective in antioxidant effect and diet

The most representative active ingredient of tea is a type of polyphenol and has the bitter taste found in green tea. Catechin is excellent in antioxidant defense and very effective in aiding weight loss.

Reactive oxygen in our body is the major culprit of cell oxidation, causing various diseases such as cancer, heart disease, apoplexy, myocardiac infarction among others. The removal of such reactive oxygen is called an antioxidant effect and the antioxidant capability of catechin is 200 times stronger than the well-known antioxidant, vitamin E and 100 times stronger than vitamin C. Also, organic acid and vitamin C contained in tea will produce synergy effect with catechin to result in greater antioxidant power.

Also, catechin works to reduce the density of glucose, fatty acids, cholesterol in blood to control fat synthesis and to promote lipolysis. As catechin gets rid of fat and cholesterol in blood

and promotes blood circulation, it is very helpful for patients suffering from high blood pressure, apoplexy and myocardiac infarction.

Theanine, a natural sedative to calm the nervous system

Theanine is a typical amino-acid that could not be found in other substances other than teas and utilized a lot following catechin. When we drink a cup of tea, we can feel that our body is released from tension and relaxed and calm. This is because theanine controls brain neurotransmitter (BNT) and stabilizes our nervous system to ease tension.

Currently theanine is applied to tranquilizer, depression cure, dementia cure, sleep aid, and others and has no side effect commonly found in normal chemical-based medicine so it has recently been brought into the spotlight as a natural health supplement and become popular research subject.

Caffeine, stimulating the central nervous system

Caffeine is a type of alkaloid contained in various plants and its proper use helps to stimulate the central nervous system, clarifying mind, dispelling sleepiness and promoting thinking faculty. However, excessive application for a long time could lead to caffeine addiction.

Coffee is a major source of caffeine and some people call it a “wonder drug for love” as it stimulates the central nervous system. However, some people experience side effects of coffee manifested in symptoms such as faster heart rates and breathing rates. It is a negative effect of caffeine and also called Cafenism.

If this is so, why is a person who experiences Cafenism okay with drinking a large quantity of tea? Though tea and coffee have caffeine in the same chemical structure, unlike coffee, theanine in tea controls the caffeine effect to mitigate stimulation of the central nervous system and help slow down the body absorption process to result in a positive effect. In other words, tea minimizes the negative effect of caffeine and helps gain a positive effect.

Sugar and vitamins

The fourth notable substance is sugar. Along with catechin, sugar in tea controls the rise of blood sugar and is effective in curing diabetes. Polysaccharide effective in preventing diabetes and with clear therapeutic effects is contained more in cheap tea made up of fully-grown loose tea, rather than premium tea from baby leaves.

Lastly, there are vitamins. Tea has a range of vitamins including vitamin C, vitamin B2, β -carotin, vitamin E etc. Vitamins are key antioxidants, preventing aging, brightening skin tone and helping our body to fight cancer. In the case of vitamin E, its content in tea is 25 times higher than that in spinach and it increases wholesome HDL cholesterol and reduces harmful LDL cholesterol, effective in preventing arteriosclerosis.

Variety of Teas

1. Black tea

Black tea contains more caffeine than coffee pound for pound. However, black tea requires substantially less amount of tea for brewing, eventually containing half the caffeine of coffee. In addition, theanine, amino acid contained in black tea debilitate the activities of caffeine to prevent side effects of caffeine.

<How to drink>

- ① Place a tea bag in a tea cup.
- ② Pour boiling water into the cup to about 400cc and wait around two to three minutes.
- ③ Add milk or sugar according to your preference.

2. Yuja (Chinese lemon) Tea

The main ingredient of Yuja tea, Yuja or Chinese lemon is described in DonguiBogam (Encyclopedia of Medicine) as removing bad energy in stomach, curing hangovers and getting rid of bad breath from a heavy drinker. Yuja tea is effective in promoting an antioxidant effect and preventing early ageing. As Yuja tea has the triple the content of vitamin C as lemons, it is a

great cure for coughs, colds and dyspepsia.

<How to drink>

- ① Prepare cold or warm water.
- ② Put one or two teaspoons of Yuja or more than mix well.

3. Persimmon Leaf Tea

In 100g of persimmon leaves there is around 200 mg of vitamin C, two or three times higher than mandarin. Also tannin in persimmon leaf reduces swelling by edema and detoxifies harmful substances such as lead, arsenic and mercury. Persimmon Leaf is rich in carotin that has the same effect as vitamin A and beefs up bodily resistance to disease and is effective in preventing and curing hangover.

<How to drink>

- ① Boil water at 100°C then cool it down a bit to 90°C.
- ② Add 4 to 5g persimmon leaf or more and leave it for about two to three minutes.
- ③As a substitute for drinking water, 10g for 1L of water would be appropriateu

Introduction of new members: Styrolution Korea (CEO Lee Jong-hoo)

Styrolution Korea is the product of an active joint venture between BASF, the German chemical group, and INEOS, the UK chemical firm in the styrene business division. Styrolution Korea is the Korean corporation of the Styrolution Group and currently runs Seoul office and Ulsan plant making universal styrene products such as ABS and PS as well as specialty products like ASA. From CEO to all executives and employees, as Styrolution Korea is active in environment, safety and health sectors, it is expected that the company will take active and voluntary participation in RC activities via KRCC membership.

Yeocheon NCC : Appoint Joint CEO Chung Jin-won

Yeocheon NCC (Co-CEOs Park Jong-Guk and Chung Jin-won) appointed Chung Jin-won the previous executive manager of Hanhwa Chemical on 5 September 2012. CEO Chung Jin-won graduated from Korea University, specialized in economics and worked as CA Business Manager in Hanhwa Chemical, and General Management and Sales Management in Yeocheon NCC.

Introduction of Social Contribution Program of Dow Corning Korea

1. 'Surprising Silicon' science class for elementary school students in Chungbuk region

Leader in the field of silicon/solution, Dow Corning Korea held 'Surprising Silicon' science class for forty students participating in 'Green Energy Club Contest' in Jincheon plant, Chungbuk on 29 June 2012.

Through 'Surprising Silicon' science class, Dow Corning Korea provided students in the Chungbuk region with an opportunity to learn and have hands-on experience of the unlimited possibility of silicon that contributes to a wide range of industries including solar energy, LED, architecture, etc.

The event was joined by around 40 elementary school students from six schools in the 'Green Energy Club Contest' organized by Dow Corning Korea and they were able to experience the

interesting and vivid world of scientific silicon offered by Dow Corning Korea's executives and employees as they shared their field experience.

Also, they conducted various experiments such as 'silicon printing' to make cool T-shirts with silicon, 'silicon in skin care products' in which students directly made toners and moisturizers and joined Dow Corning Korea's plant and research institute visit program, a platform for vivid science education.

2. '2012 Green Energy Club Contest' Award Ceremony – eight Youth 'Environment Clubs' to win

Organized by Dow Corning Korea and hosted by the Korea Environmental Education Association '2012 Green Energy Club Contest' award ceremony was held in Dow Corning Korea's Jincheon plant, Chungbuk on 2 November 2012.

The 1st prize went to 'Green Guards' from Yeonpung elementary school in the elementary school division and to 'Lily voluntary Services' from Cheongju Girls' High School in the middle and high school division. The winners were awarded with certificates of merit and 1 million won, respectively and eight clubs won 2nd and 3rd prizes, receiving a total of 5.6 million won.

Marking the 3rd anniversary from its debut, 'Green Energy Club Contest' was established with a view to offer wider environmental and science education opportunities and support creative club activities by selecting excellent environmental clubs in Chungchungbuk-do. The event is a social contribution program of Dow Corning Korea with the purpose of fostering future talents aware of the environment and equipped with environmentally friendly attitude. It won a prize from the Ministry of Environment in 2011 for its contribution to the expansion of youth environmental education and the increase in environmentally friendly awareness.

The program was divided into elementary and middle/high school divisions for more tailor-made education and integrated the existing environment-experience activities with a program to cultivate scientific creativity, thereby offering more colorful experiences and in-depth learning opportunities to participants. The participating clubs carried out certain tasks such as school energy saving campaign and implementation for about six months from last May and completed a series of missions such as producing UCC to exert influence over the local community, conducting an energy-saving campaign and suggesting alternative-energy invention ideas among others.

CEO Kim Chang-gyou KP Chemical to be elected as an auditor of KRCC

The Korea Responsible Care Council (KRCC) designated Mr. Kim Chang-gyou, CEO of KP Chemical as an auditor as part of the resolution '2012 1st Board of Directors Meeting and The 13th Ordinary General Meeting' on 28 September 2012.

The newly appointed Kim Chang-gyou auditor graduated from Seoul National University with specialization in industrial chemicals and served as the director of Daeduck Research institute of Honam Petrochemical Corporation and currently assumes the position of CEO of KP Chemical.

Also, Kim Chang-gyou received the presidential award in the first Chemical Industry Day event and makes a lot of efforts to develop the chemical industry as he also has been working as a vice-president of the Polymer Society of Korea.

2012 RC Annual Workshop

KRCC held the annual RC workshop in Shinville Resort on Jeju Island, from 22 Nov. to 23 Nov. 2012. The workshop was attended by around 60 people including KRCC Huh Jong-pil, Management president Jeong Bum-shik from Honam Petrochemical Corporation, Moon Hee-chol Vice-chairman of Dongwoo Fine-Chem, CEO Shin Woo-sung from Basf Korea, CEO Kim Chang-gyou from KP Chemical and CEO Yim Jeong-taik of DuPont Korea and CEO Ko Je-woong of Lanxess Korea among others.

The annual workshop presented a CEO lecture by HUH Jong-pil from KRCC and best practices for RC implementations from DuPont Korea, Dow Chemical Korea and Honam Petrochemical Corporation.

In particular, this year's workshop featured the introduction of the RC Award system to award three members (DuPont Korea, Lanxess Korea, Samnam Petrochemical) and RC coordinator (Lee Chang-soo executive director of Dow Chemical Korea and four others) to raise interest in RC activities for members.

2012 Come! Fun World of Chemistry'

KRCC held 2012 'Come! Fun World of Chemistry' in Yeosu (1 Sep.), Busan (8 Sep.) in Ulsan (15 Sep.) and Seosan (22 Sep.) with a view to provide 4th and 5th year elementary school students with the opportunity enjoy easy and fun-filled chemistry experience through chemistry 'experience activities' and 'playground' programs and to build a network to bind local communities and the chemical industry together.

With 1,400 elementary school students from around 250 schools in Yeosu, Busan, Ulsan and Seosan, '2012 Come! Fun World of Chemistry' was successfully held with great interest and response. The event meets for its 10th anniversary this year and activities revolving around chemical experiments, science playground and video data on chemical industry helped draw students' attention to chemistry in our daily lives and provided an opportunity to interest them in being key players of the future chemical industry.



KRCC views encouraging children who are both future customers and leaders of the future chemical industry to have a dream to be sought by our industry and to make a sustained effort to develop the chemical industry through outreach programs.



Tour to petrochemical plant for 'Come! Fun World of Chemistry' by participating teachers

KRCC organized a field trip to petrochemical plants for teachers' groups participating in '2012 Come! Fun World of Chemistry' (Seoul, Ulsan, Yeosu, Busan) on 10 November 2012 (Saturday).

The event is a part of 'communication with local communities' recommended by RC and around 40 outreach group teachers paid a visit to Daesan plant of LG Chemicals.

The RC secretariat introduced Responsible Care to science teachers participating in the event and delivered the message that it offered an opportunity to review the meaning of outreach events. The reviews of "2012 Come! Fun World of Chemistry" laid the foundation for more successful events for next year.

The field trip allowed participating teachers on the RC Outreach event to raise awareness of responsible care and widen their understanding of the chemical industry by visiting the plant.



Participation in 2012 APRO Meeting

KRCC attended APRO (Asia Pacific Responsible Care Organization) meeting held in Singapore in July 2012 to share key RC issues with RC members in Asia. The meeting was attended by 18 people from nine country including the chairman of APRO, Mr. Yoshihara, (Japan Chemical Industry Association (JCIA)).

The agenda of the meeting included new membership for APRO (Myanmar, Vietnam), introduction of a process safety index under development by ACC and CEFIC, budget support status for RC activities, presentation of RC activities regarding eight fundamental features of each country, and implementation status of GPS and its challenges, etc.

Aside from the meeting, JCIA proposed a group meeting with KRCC for the purpose of strengthening RC exchange and more concrete sharing of RC activities.



KRCC-JCIA RC Meeting

KRCC held a KRCC-JCIA RC meeting on 10 October 2012 (Wed.) so as to strengthen exchange and cooperation with other Asian RC countries and share current RC issues and key activities.

The meeting was joined by KRCC secretariat and Mr. Yoshihara and Mr. Murata (JCIA, RC committee) to present each group's RC organizations and key RC activities on eight fundamental features.

Also, it is expected that in-depth discussion of the third-party verification system and the provision of the third-party verification system checklist developed by JCIA would be of great help in the introduction of an external advisor assessment system to KRCC.

Participation in 2012 RCLG Meeting

KRCC attended the annual RCLG meeting held in Goa, India from 15 Oct. to 17 Oct. 2012. Around 40 participants from 30 countries including Chairman Peter Cartwright joined the meeting and discussed global RC issues and RC implementation status of each country.

Key items of the meeting are as follows:

- Presentation of RC implementation cases (China, India)
- RC Implementation Performance and RC status report (Korea, UK, US, etc.)
- Introduction of the process safety codes and data of members (Japan, US)
- Approval of new RCLG membership (Sri Lanka, Myanmar)
- Discussion of fund support rules for RCLG Capacity Building
- Introduction of RC Certification System (RC14001)
- Discussion of 2013 meeting schedule and others

The RCLG meeting for the first half of 2013 is scheduled to be held in Beijing, China in April and the verification workshop will also be held during that period. APRCC (Asia Pacific RC Conference) is planned to be held in Thailand (October).

Revision and publication of RC code compilation

To adjust and modify the existing RC code to fit into changed business sites, KRCC passed a vote for the revision project in the 11th regular general meeting held in 2010 and pursued the project for around two years. To elevate the RC implementation and to reinforce site applicability, Singapore code guidebook was referred to in the revision project by six code leaders from the executive committee.

As a result, RC code compilation was published in June 2012 and distributed for the RC implementation of members. The following are the revised parts:

- Revision in code names
 - Pollution Prevention → Environment Protection
- Addition of PP Standards(Referred Singapore code guidebook and corporate implementation cases)
- Revised terms and implementation examples to fit into the conditions of business sites