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CONTRIBUTORS



Manav Prakash Sharma
QC Department, Roorkee



Rakesh Joshi
R & D Department



Ravi Kumar
R & D Department



Rishabh Khanna
Business Development



Monish Goyal
Accounts



Sarvesh Gulati
Mentor & Management Consultant



O P Shukla
Production, Roorkee



Ashwini Agrwal
Business Development

MESSAGE FROM THE DIRECTOR



Dear Associates,

Let me, in the present world of changes & challenges welcome you on behalf of The Catalysts Group.

Since 2003, under the banner of Catalysts we are in service to offer our own research based conceptual solutions through our tools which are very well convinced, tried & result oriented in the industries of molasses & grain alcohol, brewing & micro-brewing, malt, fruit processing & sugar.

We all will agree in the highly competitive world of business, just shallow toll claims cannot be sustained for more than 12 years. Our quality assured & cost effective bio technological solutions have always won over the confidence of our end users. Our vendors too have always referred Catalysts name very proudly in their own circle of business.

Our success is based on a combination of team's passion for enzymes and sales force which sports best in class skills and capabilities. Passionate team of Catalysts have been able to successfully establish recently launched concepts like:-

1. Enzymol Protect
During this crisis phase of sugar industry, Enzymol Protect supports stored molasses to maintain its total sugar values & arrests them to drop when have to store for long periods.
2. Enzytreat
Controls contamination coming from water source, be it river water or process water.
3. Ethanol Red Yeast
Brand of world's largest and oldest yeast company from France, is roaring in India market with solutions for high gravity fermentation and increased recoveries.

We are thankful to our valued customers for their constructive suggestions which make our team R&D to bring out innovative solutions from Catalysts test tubes. These research armamentarium are everyday on the acid test by end users not only in India but at international level.

Last but not the least, what makes Catalysts Group unique is our people. Our people represents some of the best minds within the industry. We have a unique culture which is based on meritocracy and fairness. We believe in non hierarchy and that everyone's voice is heard regardless of rank or position. The culture combined with our team and world class unique conceptual products is what makes us one of India's leading biotechnology company.

I once again thank and assure you of our best efforts to bring in newer concepts for industry. I invite you to browse our new website and find out more about our Catalysts Group.

With Warm Regards

A handwritten signature in black ink, appearing to read 'Aditya Malhotra'. The signature is stylized and fluid, written over a light background.

Aditya Malhotra

CATALYSTS FAMILY

“WE ALL STAND TOGETHER”

We at Catalysts don't believe in only saying... Our actions speak louder than our words. In time of need, we all stand together with each other like an extended family.

Catalysts is not only connected by name but also by blood. We at Catalysts, help each other in every sphere of our lives. We happily donate blood for operations etc. required by any of our team members including their families.

Below is a 'Thank You' note from the father of one of our team members with whom we all stood together in his fight against cancer.

Strong connect bond through blood.

We Catalysts family are now merely not just connected through worldly claims of being a family. The acid test has confirmed the same not in the hour of joy but in the dire period of crisis.

I'm fighting out the dreadful horror of cancer and our strong Catalysts family stood by me sincerely & genuinely not only through prayers but by establishing a bondage of blood. Just at a one minute call the Catalysts family members generously came forward to donate their blood which is the most precious jewel with everyone in the world.

I very humbly once again convey my gratitude and bless our Catalysts family to touch new peaks of success day after day.

Warm blessings
Ashok Malhotra

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Use HRP Enzymes in degradation of Phenol in Wastewater

Manav Prakash Sharma, QC Department Roorkee

One of the most important environmental problems faced by the world is management of wastes. Industrial processes generate a variety of molecules that may pollute air and waters due to negative impacts such as toxicity, carcinogenic and mutagenic properties. Phenols are the major organic constituents found in effluents of coal conversion processes, coke ovens, petroleum refineries, phenolic resin manufacturing, herbicide manufacturing, fiberglass manufacturing and petrochemicals. Phenol and its derivatives are a major source of environmental pollutants and possess a high level of toxicity even at minute concentrations. Phenol, a waste product of industrial processes that is introduced into aquatic ecosystems, adversely affects the indigenous biota, including algae, protozoa, invertebrates and vertebrates. They represent a potential danger to human health because it is almost toxic and carcinogenous. So it is very important to remove phenolic compounds from contaminated waters before discharging them into the environment.

Conventional processes for removal of phenols from industrial wastewaters include extraction, adsorption on activated carbon, bacterial and chemical oxidation, electrochemical techniques, irradiation, etc. All of these methods have serious shortcomings such as high costs, incomplete removal, and formation of hazardous by-products, low efficiencies and applicability to limited concentration ranges, therefore enzyme-based treatment methods have been developed. Enzymatic methods have several advantages due to their specificity, efficiency in removing targeted compounds and ease of handling. Peroxidases, horse radish peroxidase, lipase, laccase and bilirubin oxidase, oxidise the aromatic compounds to form aromatic radicals, which in turn combine to form polymeric structures that precipitate spontaneously from the solution due to their low solubility.

CONVENTIONAL METHOD FOR PHENOL REMOVAL IN WASTE WATER

Conventional processes for phenol removal from wastewater can be divided into 3 main categories: Biological, Physical and Chemical

• BIOLOGICAL PROCESS

Biological treatment is appreciated as an inexpensive technique to treat effluents containing phenolic compounds due to the availability of microorganisms capable of degrading organic compounds. Many aerobic bacteria are capable of using aromatic compounds as the sole source of carbon and energy. A typical pathway for metabolizing aromatic compounds is to dehydroxylate the benzene ring to form catechol derivatives and further ortho or meta oxidative cleavage to open the aromatic ring. It was studied the performance of indigenous bacteria from olive pulp for phenol removal via suspended growth and packed bed reactors. The packed bed reactor was found to be more resistant to high phenol concentrations and led to significantly higher removal rates than the suspended-growth reactor. It was demonstrated that it is possible to treat effluents containing high phenol concentrations (up to 1.0 g/L) by activated sludge at typical biomass concentrations of ~10 g/L in membrane bioreactors. Bajaj et al. reported that a high phenol removal rate of up to 2.3 g/(L d) at a phenol/COD ratio of 0.8 and influent phenol concentration of 4.9 g/L was achieved in a fixed bed reactor with stepwise increments of influent phenol concentration. The biological removal of phenol from concentrated wastewater using a Moving-bed Sequencing Batch Reactor (MSBR) has been reported by Moussavi et al. The optimum Hydraulic Retention Time (HRT) achieved for the MSBR is 40h at a critical phenol loading rate of 83.4 g phenol-

3h-1, giving a phenol removal efficiency of 99%. The moving bed contributed 28.1% phenol removal efficiency at the critical phenol loading rate. Biological treatment of phenolic compounds has several limitations such as lengthy start-up for microbial acclimatization, slow rates of microbial degradation due to pollutant toxicity, and the potential for microbial growth inhibition due to high concentrations of phenolic compounds.

• PHYSICAL PROCESS

Physical process based on adsorption onto the surface of activated carbon is one of the most effective and widely used techniques in treating high concentrations and low volumes of phenolic wastewaters. A comparison between granular activated carbon and other resins for residual phenol removal from coke wastewater showed that granular activated carbon demonstrated higher adsorption capacities. It has been demonstrated that some phenol removal absorbents can maintain high adsorption capacities for a specific number of regenerations. The usage of commercial activated carbon has been limited by its high cost. Attempts have been made in producing low-cost activated carbons from agricultural by-products such as palm seed coat, rice husk ash, bagasse ash and wood charcoal and oil palm shell, with encouraging results. Regeneration of activated carbon, which is challenging due to irreversible adsorption of phenols, is crucial to ensuring that the adsorption process is economically attractive. Thermal regeneration is time consuming and expensive and progressive regeneration involving repetitive heating and cooling damages activated carbon through loss of carbon.

• CHEMICAL PROCESS

Phenol removal can also be achieved through chemical processes. Treatment of phenol-containing water via ozonation has been studied with high removal rate and ozone mass transfer. A comparison of the performances of O_3 with radiation (UV-Vis) and/or Titanium oxide (TiO_2) was conducted by Gimeno et al, and the combination of ozone and radiation showed the best efficiency in terms of phenol removal and also COD and TOC decay rates. As the initial cost of ozone production is high, ozonation is less favorable. Fenton reaction, which uses hydrogen peroxide in conjunction with an iron (II) salt, is recognized as the most economically favorable oxidation alternative due to the simplicity of equipment and the mild operation conditions. In their work on the effect of chloride on Fenton process for phenol removal, Maciel et al. demonstrated that phenol was completely oxidized by Fenton process in saline media (50000mg NaCl L-1) when appreciable concentrations of reagents were used (200mg H_2O_2 L-1 and 55mg $FeSO_4$ L-1). Although Fenton reaction can effectively remediate phenol, acidic pH and stoichiometric excess of hydrogen peroxide are required for efficient reaction and this usually means that significant quantities of ferric salts need to be disposed of after the reaction. The protocol of this study has been approved by the relevant ethical committee related to our institution in which it was performed.

ENZYMATIC REMOVAL OF PHENOL (PHENOL POLYMERIZATION BY ENZYMES)

The use of enzyme-based techniques to remove organic compounds from aqueous solution was first proposed by Klibanov and colleagues and has been continuously improved since then. Peroxidases are the most widely reported enzymes for phenol polymerization when compared with other enzymes. Phenol conversion is activated by H_2O_2 ; the enzyme catalyzes the oxidation of aromatic compounds, forming free radicals which undergo spontaneous polymerization (Wilberg et al. 2002). Soybean seed hulls have been identified as a rich source of peroxidase, the soybean peroxidase (SBP) and being a by-product of soybean food industry, they provide a cheap and abundant source of peroxidase (Wilberg et al. 2002; Hejri and Saboora 2009). Radish roots contain peroxidase enzyme and can be used for the removal of phenol from wastewaters (Naghibi et al. 2003).

COVER STORY

Enzyme (peroxidases) mechanism for degradation of aromatic compounds is as follows:

One-electron oxidation of aromatic substrates (AH_2) catalyzed by peroxidase is depicted by the Chance George mechanism as the following:

1. $E + H_2O_2 \rightleftharpoons Ei + H_2O$
2. $Ei + AH_2 \rightleftharpoons Eii + AH$
3. $Eii + AH_2 \rightleftharpoons E + AH + H_2O$
4. $Eii + H_2O_2 \rightleftharpoons Eiii + H_2O$

The native enzyme (E) is oxidized by hydrogen peroxide (H_2O_2) to an active intermediate enzymatic form called compound I (Ei). Compound I accepts an aromatic compound (AH_2) into its active site and carries out its oxidation. A free radical (AH) is produced and released into solution leaving the enzyme in the compound II (Eii) state. Compound II oxidizes a second aromatic molecule, releasing another free radical product and returning the enzyme to its native state, thereby completing the cycle. The overall peroxidase reaction consists of the reactions described by Eqs. (1) (3).

In the presence of excess hydrogen peroxide, the reaction of Eq. (4) becomes important because compound III (Eiii) is a reversibly inactivated form of the enzyme. This implies that enzyme is inhibited by H_2O_2 in excess. On the other hand, lack of hydrogen peroxide during the reaction step limits the rate of reaction. The semi-batch addition of H_2O_2 to maintain an optimized ratio between hydrogen peroxide and enzyme concentrations was found to suppress this inhibition.

POTENTIAL ADVANTAGES OF ENZYME BASED PHENOL TREATMENT

- Selective treatment, only phenolic and similar reducing substrates removed
- Faster reaction velocity, reduced residence time
- Action on substances which are toxic to microbes
- Operation over a wide range of substrate concentration
- Operation wide range of pH, temperature and salinity
- No shock loading effects, no acclimatization required
- Process control is simpler, reliable and predictable

References:

- Biochemical Engineering & Bioprocess Engineering (T Chiong¹, S Lau¹, E Khor¹, M Danquah¹), Sarwak Malaysia
- Biological removal of phenol from wastewaters (NV Pradeep, S Anupama and K Navya)
- Journal of Environment and Earth Science

Imagine the future of energy

Rakesh Joshi, Research & Development Department



The future might look like a new power plant on the edge of town—an inconspicuous bio-reactor that takes in yard waste and locally grown crops like corn and wood chips and churns out electricity to area homes and businesses. Or the future may take the form of a stylish-looking car that refills its tank at hydrogen stations. Maybe the future of energy looks like a device on the roof of your own home—a small appliance, connected to the household electric system, that uses sunlight and water to produce the electricity that warms your home, cooks your food, powers your television and washes your clothes.

All these futuristic energy technologies may become reality some day, thanks to the work of the smallest living creatures on earth, microorganisms.

In microbial energy technologies, microorganisms make fuels out of raw organic materials, thereby converting the chemical energy in the biomass into chemical energy in the form of ethanol or hydrogen, for example. In addition, microbes can convert solar energy to hydrogen. Those fuels are then burned to make electrical energy or, in the case of internal combustion engines, kinetic energy to power a car. Another technology that falls under the heading of microbial energy conversion is the microbial fuel cell, a bio-reactor in which bacteria transform the chemical energy in biomass directly into electrical energy. The world faces a potentially crippling energy crisis in the next 30 to 50 years. Global populations are climbing, driving and for energy to power manufacturing, transportation heat, and other needs. “World energy consumption is to increase by 71% from 2003 to 2030”.

Petroleum, the foundation of the current transportation system, world production is projected to peak in the next 25 to 50 years. Moreover, the burning of fossil fuels and the resulting release of carbon dioxide and combustion pollutants has brought about global climate change, the effects of which we are only beginning to

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understand. The means of preventing the twin catastrophes of energy scarcity and environmental ruin is not clear, but one part of the solution may lie in microbial energy conversion.

The American Academy of Microbiology convened in San Francisco, California, to discuss the production of energy fuels by microbial conversions. The status of research into various microbial energy technologies, the advantages and disadvantages of each of these approaches, research needs in the field, and education & training issues were examined, with the goal of identifying routes for producing biofuels that would both decrease the need for fossil fuels and reduce greenhouse gas emissions. Colloquium participants made a number of recommendations for moving forward with research and education in this field. Microorganisms may be used to generate a number of fuels, including ethanol, hydrogen, methane, lipids and butanol. Among liquid, ethanol is relatively easy to store and it can fit into the existing fuel infrastructure. However, ethanol adsorbs water readily and cannot be shipped through common-carrier pipelines, which inevitably contain water. Processes that generate higher molecular weight alcohols, such as butanol, can be produced with similar technologies and are more compatible with existing infrastructure. Currently, the production of ethanol from the most abundant forms of biomass, namely cellulose and lignocellulose, is comparatively difficult and expensive. Future research in alcohol production needs to focus on increasing the productivity and yield of processes that make alcohol from biomass and processes that generate alternative alcohols. Bioethanol is flexible: it can be manufactured from any of a number of different substrates (including starch and lignocellulose), by a selection of different microorganisms, and in a variety of different engineered circumstances

When manufactured from crop sources, like corn or wood, ethanol is commonly referred to as “bioethanol.” Theoretically, bioethanol production should be able to yield 0.5 g of ethanol per gram of raw biomass, which translates into an energy recovery of approximately 90%. Current technologies recover roughly 60% of the energy in raw biomass.

Corn is a common substrate for bioethanol manufacture because the process is relatively free of technical obstacles and because, in the U.S. at least, the use of corn as a substrate for energy production is subsidized by the federal government.

Micro-organisms are involved in the transformation of corn to bioethanol in two ways:

1. They catalyze the hydrolysis of starches using amylases and amyloglucosidases
2. They ferment the resulting sugars to bioethanol.

The fermentation step is generally carried out by yeast, but certain strains of bacteria, including *Zymomonas mobilis* and recombinant strains of *Escherichia coli* and *Klebsiella oxytoca*, are also capable of producing high yields of bioethanol. Lignocellulose includes such diverse sources as switch grass, corn stalks and wood chips. Fungal enzymes and fermentative yeasts are then used to transform lignocellulose first to sugars and then to bioethanol. The low lignocellulose reactivity limits the production of bioethanol, and as a result, the concentration of bioethanol in a lignocellulose reactor does not reach the high concentrations seen in corn reactors. Hence, bioethanol-producing microbes in corn-based reactor systems must be tolerant of higher ethanol concentrations than microbes in lignocellulose reactors. **Consolidated Bio Processing (CBP)** systems, in which anaerobic bacteria produce their own hydrolytic enzymes and ferment the polysaccharide oligomers, also can be used to produce bioethanol. CPB systems bypass the enzyme extraction step, thereby theoretically enhancing the efficiency of bioethanol production.

The scientific community needs a larger inventory of cultivated microorganisms from which to draw for microbial energy development. Bioprospecting can alleviate this shortfall.

References:

- Microbial Energy Conversion Magazine
- Other Journals

Biodiesel Production from Spent Coffee Grounds (SCG) Future Potential Market

Ravi Kumar, Research & Development Department

Biodiesel, a mixture of long-chain fatty acids alkyl esters, is a novel energy source that has grown in importance over recent years. Biodiesel production from vegetable oils and animal fats has gained attention because of its eco-friendly nature. However, biodiesel is more expensive than conventional fuels, which hinders its applications. The major production cost of biodiesel is from its feedstock. To conquer this problem, industries use waste materials to produce low-cost biodiesel.

Coffee is one of the largest agricultural products that is mainly used for beverages throughout the world. **Waste Coffee Grounds (WCGs)** are the main coffee industry residues with a generation of 6 million tons worldwide.

Spent Coffee Grounds (SCG) for biodiesel production. SCG have oil content in the order of 10-20% by weight, which can be recovered and used for biodiesel. Biodiesel can be used in conjunction with the lipid fraction extracted from coffee grounds to produce biodiesel via a transesterification reaction using lipase enzyme. Biodiesel is a biodegradable fuel that can be used instead or added to diesel fuel in internal combustion engines with little or none modifications.

LIPASE ENZYME

Lipases are one of the classes of enzymes most largely employed in industry also because of their potential to work in non-aqueous environments and they are applied at industrial scale for the transesterification of fats and oils in the food sector. However, to the best of our knowledge, there is still a lack of immobilized lipases commercially available and suitable for application in biodiesel synthesis.

Lipase enzyme was used worldwide for converting coffee oil. A combination of Novozym 435 and a cheap commercially available lipase RMIM (from *Mucor miehei*) was used in ratios of 1:1 was found to be the best trade-off between conversion and cost. Coffee oil extracted from SCG could be used for the synthesis of biodiesel by using appropriate commercial preparations of lipases.

Oil from SCG was transformed into biodiesel with yields ranging from 55% to 72%. The synthesis is of particular interest in the perspective of developing sustainable processes for the production of bio-fuels from food wastes and renewable materials.

CONCLUSION

Coffee oil extracted from spent coffee grounds could be used for the synthesis of biodiesel by using appropriate commercial preparations of lipases.

Coffee biofuel had a few advantages over the competition; it has less viscosity, requiring little to no engine alterations in order to burn and does not drive production away from the food industry. About 10-15 pounds of coffee grounds will yield roughly ¼ gallon of biodiesel.

POTENTIAL

The researchers estimated that coffee grounds could potentially produce 350 million gallons of biodiesel and a profit of \$8 million per year. They plan to start a pilot program to produce and test the coffee biodiesel.

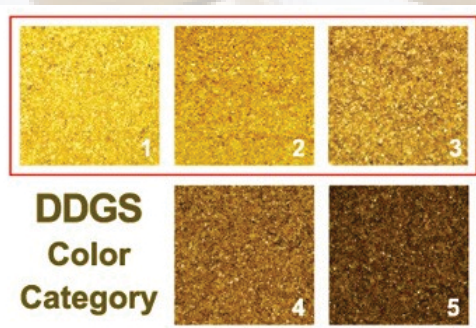
Additional advantages of coffee spent:

- Extraction of bio active compounds, such as antioxidants, for pharmacy, cosmetic or food industry
- The bio diesel production for support of public and private transport
- Energy production for industrial or domestic use
- Biochar from coffee grounds as a soil enrichment

Why is DDGS color a quality issue?

Rishabh Khanna , Business Development Department

There are no grading systems, or defined and regulated quality standards for DDGS (Distiller's Dried Grains with Solubles) like there are for corn and other grain commodities. As a result, misunderstandings can occur between buyers and sellers of DDGS worldwide. Establishing prices, writing contracts and meeting expectations are problematic in the absence of quality standards. While professionals in industry, government, and academia have discussed and attempted to develop quality standards for DDGS during the past decade, attempts failed due to disagreements on the need for defined quality standards, fear of increased transparency, ability to distinguish quality and value differences among DDGS sources. Most U.S. DDGS marketers prefer to focus only on maximum guarantees for moisture and fiber and minimum guarantees for fat and protein. However, because of variability in nutrient content and quality among DDGS sources, many international DDGS buyers often demand more guarantees for specific quality attributes to minimize their risk of obtaining co-products that don't meet their expectations.



The color of DDGS has become a quality factor of great importance for some buyers in the export market and it is being used to differentiate real or perceived quality and value among DDGS sources. Several years ago, some DDGS marketers and buyers developed a subjective color evaluation system using a 5-color scoring card to differentiate color among DDGS sources. Although this DDGS color score card is still used in the market today, many marketers have stopped using it because it is too subjective and resulted in frequent arguments with buyers because of different

interpretations of the actual color score of DDGS. As a result, many marketing contracts that are now being negotiated between U.S. suppliers and foreign buyers (especially in Asian countries) contain a minimum guarantee for a quantitative measure of color (e.g. L^* - lightness or darkness of color). The minimum guarantee currently being used to differentiate lightness of DDGS color is a Hunter $L^* > 50$ to meet some buyer's expectations. Increasing amounts of DDGS continue to be exported to various countries regardless of color, but for some markets demanding a guarantee of light colored DDGS (i.e. $L^* > 50$). There is a significant price premium obtained for those who can guarantee an $L^* > 50$ in the DDGS sources they market.

As a result, some suppliers have become frustrated and question the value of using DDGS color as an indicator of quality, especially if they are unable to supply DDGS that meets the buyer's color expectations. Therefore, the purpose of this paper is to define DDGS quality and the role of using color as a quality indicator in the marketplace and provide a description of a variety of other quality characteristics and measurements that can be used to assess DDGS value.

STORAGE STABILITY

Moisture

Preservatives and mold inhibitors are commonly added to wet distiller's grains (~50% moisture) to prevent spoilage and extend shelf life. However, since the moisture content of DDGS is usually between 10 to 12%,

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there is minimal risk of spoilage during transit and storage, unless water leaks into transit vessels or storage facilities. It is well accepted in the grain handling and feed industry that moisture content of grain and grain by products should be less than 15% to prevent heating and spoilage (i.e. molds and mycotoxins) during transport and storage. Therefore, unless the moisture content of DDGS exceeds 15%, the shelf life of DDGS appears to be many months. No research studies have been conducted to demonstrate that preservatives and mold inhibitors are necessary to prevent spoilage and extend shelf life of DDGS.

“Clumping” or “caking” can occur as a result of loading DDGS into trucks, rail cars, or containers if it has not been cooled and “cured” properly before loading. This often causes flowability problems and difficulty unloading DDGS. The addition of flow agents did not improve flowability of DDGS but low moisture content (9%) improved flowability compared to DDGS containing 12% moisture.

Fat oxidation

In the past, most corn DDGS sources contained 11 to 12% fat (corn oil) on a DM basis, but with the widespread implementation of corn oil extraction technologies, crude fat content can now range from 5 to 12%. Regardless of crude fat content, the fatty acid profile and characteristics of corn oil do not change appreciably. Vegetable oils, like corn oil are high in unsaturated fatty acids. As a result, vegetable oils have a higher unsaturated to saturated fatty acid ratio compared to animal fats. The ratio affects the melting point and energy value of fat, as well as the fatty acid composition in liver, fat, meat and milk of pigs and poultry. The iodine value is a method of estimating U.S. ratio. Each double bond in a fatty acid has the capability of taking up two atoms of iodine. By reacting fatty acids with iodine, it is possible to determine the degree of unsaturation of a fat or oil. The iodine value is defined as grams of iodine absorbed by 100 grams of fat. Because unsaturated fats have more double bonds, they will have higher iodine values than saturated fats. Iodine value can be used to estimate fatty acid profiles of various fat sources. Fats are susceptible to breakdown by oxidation to form peroxides, which are unstable compounds, and can become rancid. Peroxide value is sometimes also referred to as initial peroxide value because it is determined on a sample as submitted. A peroxide value of 5.0 mEq of peroxide/kg or lower is an indication of little or no rancidity. High free fatty acid content may indicate oxidation or breakdown of the fat and potential rancidity. Free fatty acids are those that are not linked to glycerol by an ester linkage, but are in free form. Oxidation of fat produces free fatty acids as a by-product. Moisture in fats and high fat ingredients may increase rancidity.

However, this is of relatively little concern in DDGS because the moisture content is typically only 10 to 11%.

Source:

- A Guide to Distiller's Dried Grains with Solubles (DDGS), 3rd Edition

VITAMIN D

Health Benefits & Recommended Intake

Vitamin D, also known as the sunshine vitamin, can be produced in the body with mild sun exposure or consumed in food or supplements.

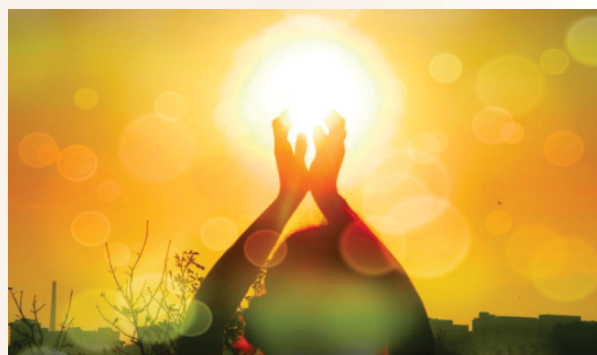
Adequate vitamin D intake is important for the regulation of calcium and phosphorus absorption, maintenance of healthy bones and teeth, and is suggested to supply a protective effect against multiple diseases and conditions such as cancer, type 1 diabetes and multiple sclerosis.

Vitamin D has multiple roles in the body, helping to:

- Maintain the health of bones and teeth
- Support the health of the immune system, brain and nervous system
- Regulate insulin levels and aid diabetes management
- Support lung function and cardiovascular health
- Influence the expression of genes involved in cancer development.

In spite of the name, vitamin D is considered a pro-hormone and not actually a vitamin. This is because the body is capable of producing its own vitamin D through the action of sunlight on the skin, while vitamins are nutrients that cannot be synthesized by the body and must be acquired through the diet or supplements.

It is estimated that sensible sun exposure on bare skin for 5-10 minutes 2-3 times per week allows the body the ability to produce sufficient vitamin D, but vitamin D has a half-life of only two weeks, meaning that stores can run low, especially in winter. Recent studies have suggested that up to 50% of adults and children worldwide are vitamin D deficient. There are several likely factors contributing to vitamin D deficiency, which will be looked at further in this article.



FAST FACTS ON VITAMIN D

Here are some key points about vitamin D.

- Vitamin D deficiency is common, especially in the elderly, infants, people with dark skin & people living at higher latitudes or who get little sun exposure
- Vitamin D deficiency has been seen in up to 80% of hip fracture patients
- 800IU of vitamin D per day reduces the risk of fracture by 20% in the elderly & decreases the risk of falls
- The metabolism of vitamin D may be affected by some medications

RECOMMENDED INTAKE OF VITAMIN D

Vitamin D intake can be measured in two ways: in micrograms (mcg) & in International Units (IU). 1 mcg of vitamin D is equal to 40 IU of vitamin D. The recommended intakes of vitamin D throughout life were updated by the US Institutes of Medicine (IOM) in 2010 and are currently set at:

The sunshine vitamin-Vitamin D, can be produced in the body with sun exposure or consumed in food or supplements.

Infants	0-12 months	400 IU (10 mcg)
Children	1-18 years	600 IU (15 mcg)
Adults	<70 years	600 IU (15 mcg)
	Over 70 years	800 IU (20 mcg)
Pregnant or lactating women		600 IU (15 mcg)

Although the body has the ability to make vitamin D, there are many reasons deficiency occurs. Darker skin

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pigments and sunscreen use can significantly decrease the body's ability to absorb the ultraviolet radiation B (UVB) rays required to produce vitamin D.

Vitamin D supplements are available, but it is best to obtain any vitamin or mineral through natural sources first. It is not the individual vitamin or mineral alone that make certain foods an important part of our diet, but the synergy of that foods nutrients working together and allowing for greater absorption. For example, vitamin D is fat soluble, meaning that its absorption requires dietary fat. In addition, magnesium is needed to convert vitamin D into its active form.

POSSIBLE HEALTH BENEFITS OF VITAMIN D

- **Vitamin D for healthy bones**
Vitamin D plays a substantial role in the regulation of calcium and maintenance of phosphorus levels in the blood, two factors that are extremely important for maintaining healthy bones. We need vitamin D to absorb calcium in the intestines and to reclaim calcium that would otherwise be excreted through the kidneys.
- In adults, vitamin D deficiency manifests as osteomalacia or osteoporosis. Osteomalacia results in poor bone density, muscular weakness and often causes small pseudo fractures of the spine, femur and humerus. Osteoporosis is the most common bone disease among post-menopausal women and older men.
- **Reduced risk of flu**
Children given 1,200 IU of vitamin D per day for 4 months during the winter reduced their risk of influenza A infection by over 40%.
- **Reduced risk of diabetes**
Several observational studies have shown an inverse relationship between blood concentrations of vitamin D in the body and risk of type 2 diabetes. In type 2 diabetics, insufficient vitamin D levels may have an adverse effect on insulin secretion and glucose tolerance.³ In one particular study, infants who received 2,000 IU/day of vitamin D had an 88% lower risk of developing type 1 diabetes by the age of 32.
- **Healthy pregnancy**
Pregnant women who are deficient in vitamin D seem to be at greater risk of developing preeclampsia and needing a cesarean section. Poor vitamin D status is also associated with gestational diabetes mellitus and bacterial vaginosis in pregnant women. It is also important to note that vitamin D levels that were too high during pregnancy were associated with an increase in food allergy of the child during the first two years of life.
- **Cancer prevention**
Vitamin D is extremely important for regulating cell growth and for cell-to-cell communication. Some studies have suggested that calcitriol (the hormonally active form of vitamin D) can reduce cancer progression by slowing the growth and development of new blood vessels in cancerous tissue, increasing cancer cell death and by reducing cell proliferation and metastases. Vitamin D has an influence on more than 200 human genes, which can be impaired when D status is suboptimal.



VITAMIN D FOOD SOURCES

Sunlight is the most common and efficient source of vitamin D. The richest food sources of vitamin D are fish oil and fatty fish. Here is a list of foods riched in vitamin D:

- Cod liver oil
- Mushrooms
- Fish
- Soy Milk
- Oily Fish (Trout, cooked)
- Cheese
- Eggs (Hard Boiled)
- Tofu



21 tips you should follow to secure your banking transactions

Monish Goyal, Accounts Department

The world of banking has evolved too much in last 10 yrs and the way banking happens now is totally different from past. Millions of people across the world still do not take simple precautions while they should ideally take or they are too casual about things and later regret when they lose money in some kind of fraud.

Lets talk about simple tips and precautions which you should take in your banking and while transacting with debit/credit cards online.

1. SCRATCH YOUR CVV NUMBER

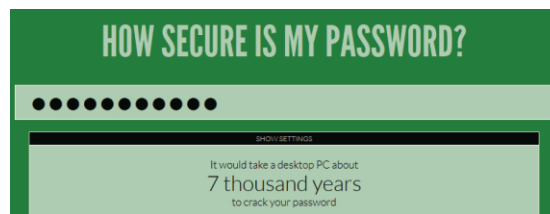
It's one of the most common mistakes almost every credit card and debit card holder does. On the back of your card, there is a 3 digit CVV number, which is very critical information and only you should be aware about it. The first thing you should do after getting the card is that you should memorize and write it down somewhere and then scratch it, so that someone else can't have a look at it.

Precaution: This step will secure your CVV, but then you have to remember it, you can't retrieve it back if you forget it yourself!



2. MAKE SURE YOUR INTERNET BANKING PASSWORD IS VERY STRONG

Your password for internet banking is probably the most important thing you have to take care of. Make sure you keep it very strong. Do not use your date of birth, name, etc in password, so that one can't guess it and it's only known to you. Make sure you have Capital Letters, numbers, special characters in the password (anyhow, now-a-days it's mandatory in most of the banks portals).



And if possible keep a long password, which makes it tougher to crack and even if someone is watching your fingers typing movement, it becomes extremely tough for them to remember. It's a good idea to check your password strength on the password strength calculator.

3. MAKE SURE YOU HAVE SMS ALERTS ENABLED FOR ANY AMOUNT

Make sure you have SMS alerts for all the debit and credit transactions. A lot of online frauds are series of transactions like buying 10 times on a similar site or couple of recharges to various mobile phones. If you get notifications on your phone even for small amounts, it will help you identify the start of a fraudulent activity.



4. MAKE SURE YOU BUY INSURANCE FOR YOUR WALLET AND ITS CONTENTS

Companies like OneAssist and CPPIndia have products like wallet insurance, which will cover you from theft and other frauds which are possible in day to day life. Not just that, they have much more than just insuring your credit and debit cards.

5. DON'T LET OTHERS PUNCH YOUR PIN AT RESTAURANTS OR PETROL PUMP

I have seen tons of people who share their debit card CVV number at hotels while dining or even at petrol pumps just because its shortcut, and in 99% cases, nothing happens too and you are safe. But that 1% case is dangerous where someone looks at your expiry and CVV number, and then do the online transaction without requiring your OTP password (6 digit) on international websites (that last level authentication is just applicable for Indian websites only)



6. DO NOT SAVE YOUR BANKING PASSWORDS IN PHONE OR EMAIL IN PLAIN ENGLISH

It's a human tendency to take the shortcut route all the times, but when there is your money involved, it's better not to!! Do not store your banking passwords etc (I would say any password) in plain English in your emails or drafts or phone. Always make sure it's in some format which only you understand, like interchange the alphabets one after another (e.g. 12A47*

becomes 214A*7), so that you

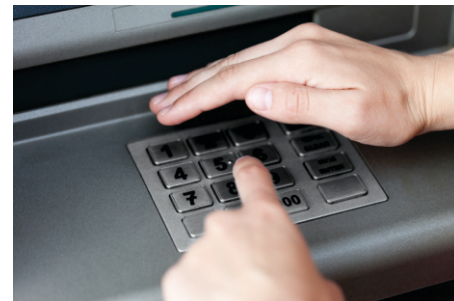
know what is the password, but even if someone gets access to it, has to spend some time to crack it. If you can avoid that also, it's much better. The other thing you can do is, you can just store start, middle and end 1-2 characters, because most of the times, we just need the start (most of us have multiple passwords). So if your password is MANISH987_FAKEpassw0rd, then you can store it as MA...98...FA...rd , and that's all. You will most probably be able to recall it considering you are using it from long time, but someone else will not.

7. NEVER SHARE YOUR CVV/EXPIRY DATE TO ANYONE ON TELEPHONE OR EMAIL EVER

Being financial literacy at low levels, millions of people are not aware which information is critical and which is not when it comes to credit cards, debit cards and online banking. Things like CVV, your Expiry dates etc are never ever asked by any bank customer care. They ask things like card number, start date, date of birth etc for verification purpose. But there are scams going on internationally where scammers pose as actual customer care and in name of verification call, they ask for CVV number and Expiry Date, which is extremely confidential information and no one other than the cardholder should know.

8. WHILE USING YOUR ATM CARD, MAKE SURE YOU BLOCK THE VIEW OF OTHERS

Looks are deceptive. You never know who is watching you and your activity and what's their plan? It's always a good idea to cover your hand while punching the PIN and make sure no one is looking at you. If its ATM, make sure no one is around you.



9. MAKE SURE YOUR COMPUTER FIREWALL IS TURNED ON AND HAVE RUNNING ANTIVIRUS SOFTWARE

A lot of people turn off their firewall to increase the speed of internet. Make sure you avoid keeping it off. The firewall of your computer is extremely important to protect you. Also, make sure you have a good antivirus installed in your computer and keep cleaning it from time to time. You never know what bad thing got installed while you were downloading something over the net.

Secure your Banking NOW!

I know that most of the people might be following a lot of things mentioned here. Now it's time for you to follow the other things mentioned here. Banking is one of the core element of your financial life, which can be considered the central element I would say. It's extremely important to take care of it with highest level of security.

KEEP READING NEXT EDITION FOR MORE TIPS...

Source: Jagoinvestors.com

Q&A

ON SOFTSKILLS

Sarvesh Gulati, Mentor & Management Consultant

Q How can I improve my communication skills?

A Communication is a two way process. There is a sender who sends the information. Then there is receiver who receives the information. The communication is complete only if the receiver has received the information in the manner that the sender wanted to communicate. This can be confirmed through proper feedback. Ensure that effective feedback is taken.

The ownership of communication is that of the sender. The greatest illusion about communication is when it is complete. The communication is complete when the receiver has understood the message.

Some tips on improving communication skills:

- Clarify your ideas before expressing
- Examine the true purpose of communication
- Consult with others in planning for having complete information
- Be mindful of your tone while communicating
- Convey something of help or value to the receiver
- Always be open and ready for receiving feedback
- Be a good listener
- Improve your vocabulary
- Use simple language
- Avoid grammatical errors
- Be brief and concise

Q How do I improve my vocabulary for effective business communication?

A For business communication the language to be used should be simple. Our objective is to make others understand our message, rather than display our repertoire of words. The words used in English newspapers are sufficient for us.

Everyday while reading any English newspaper identify 3 words that we do not know the meaning of. Write down the words alongwith the sentence in which it has been used, in a notebook. Refer a dictionary for the meaning and pronunciation.

During the day try and make use of the words in conversation or written communication. This routine is to be followed till the time we are able to find words, which we do not understand.

Q How can I achieve work-home balance?

A This is a question that plays on the mind of a lot of people. The answer however lies in your clarity of your vision and prioritization accordingly.

During the course of day sometimes we do not have a choice, but sometimes we do and choose not to use the opportunity of going back home on time.

REASONS GIVEN BY PEOPLE ARE VARIED:

- Our boss does not expect us to go back on time
- It looks bad if I go home when my colleagues are still working (they all think the same and usually most of them are not even working)
- It is the culture of the organization
- I am overloaded

FEW FACTS:

- A recent survey has shown that most evaluations these days are performance based and not on account of impressions and opinions
- Every boss needs subordinates who meet their targets, because only then will their target be met
- It is very difficult for a person to actively work more than 8-9 hours regularly

SUGGESTIONS:

- Focus on your responsibilities and targets at work
- Do not waste time on Time Wasters-frequent breaks, chatting, personal call, smoking sessions, procrastinating etc.
- Give priority to Home and plan your day accordingly
- Learn to say "No" to unreasonable commitments in a pleasant manner
- Start by making small promises—to reach home on time 1-2 times in a week
- Learn to delegate work (others can do it as well)
- Take regular vacations (atleast once a year) for atleast 7 days and go out of town with family
- Plan outings with family over the weekend (do not waste time sleeping or watching cricket)

Q What are the qualities of a good leader in today's corporate environment?

A Some of the qualities that we need in today's highly competitive and stressful working environment are:

- Have a positive attitude in stressful situations
- Be creative in your approach to finding solutions. Believe in the saying-there's always a better way of doing anything.
- There is no replacement to intelligence and knowledge. You need to have answers for others queries.
- You should have the ability to stimulate, excite and motivate others
- Flexibility is very important as the environment and requirements are dynamic. You should be willing to adapt to situations.
- Be strong against adversity and pressure. All leaders need to soak pressure from both ends.
- Reliability and integrity are the proven traits of the leaders
- Believe in delegation to your juniors
- Be willing to pass knowledge down the line

Q I have problem in communicating with people I do not know. How to change that?

A This problem usually arises when we have an introvert personality or we are short on confidence. We can eliminate this problem by developing self-confidence. We must look in the mirror and start liking what we see. Smile and tell yourself that you are great!

SERIES 01

Cultivate the habit of reading about different subjects and be updated on current affairs. This helps in giving you knowledge to converse or indulge in small talk on different subjects. Dress well and appropriate to the occasion. Dressing and personal grooming helps in building your confidence.

Take initiative and introduce yourself to new people. Positive body language, smile and firm shake of hand will help you in breaking ice.

Do not go back into shell if the other person does not reciprocate (which may happen) sometimes. Move on!

KIDS CREATIVITY



Aanya Sinha, Class IV
N/o Surbhi Sinha Agrawal



Pushkar Srivastava, Class IV
S/o P D Srivastava



10 Communication Secrets of Great Leaders

O P Shukla, Production, Roorkee

No one ever became a great leader without first becoming a great communicator. Great leaders connect with people on an emotional level every time they speak. Their words inspire others to achieve more than they ever thought possible.

Put these secrets to work in your communication and watch your influence soar.

1. THEY KNOW THEIR AUDIENCE

Great communicators don't worry about sounding important, showing off their expertise, or boosting their own egos. Instead, they think about what people need to hear, and how they can deliver this message so that people will be able to hear it. This doesn't mean that leaders tell people what they want to hear. Quite the opposite—they tell people what's important for them to know, even if it's bad news.

2. THEY ARE EXPERTS IN BODY LANGUAGE

Great communicators are constantly tracking people's reactions to their message. They are quick to pick up on cues like facial expressions and body language because they know this is the only feedback many people will give them. Great communicators use this expertise to tailor their message on the fly and adjust their communication style as needed.

3. THEY ARE HONEST

The best leaders know that for communication to be effective it has to be real. They can't have people parsing every word trying to separate fact from spin. When great communicators can't share certain information, they come right out and say it because makeshift, half-truth answers breed distrust and anxiety. In good times and bad, honesty builds trust.

5. THEY SPEAK WITH AUTHORITY

Great communicators don't try to cover their backs by being ambiguous, wishy-washy, or unassertive. Instead, they stick their necks out and speak very directly about how things are and how they need to be.

8. THEY USE PHRASES LIKE "IT'S MY FAULT," "I WAS WRONG," AND "I'M SORRY"

When great leaders make a mistake, they admit it right away. They don't wait for someone else to find and point out their blunder. They model accountability for their words and actions, even when they could have easily "gotten away" with the mistake. And they do it matter-of-factly, without drama or false humility.

6. THEY SPEAK TO GROUPS AS INDIVIDUALS

Leaders rarely have the luxury of speaking to one person at a time. Whether it's a huddle around a conference table or an overflowing auditorium, great leaders know how to work the room and make every single person feel as if he or she is being spoken to directly.





7. THEY HAVE EARS (AND THEY USE THEM)

Great leaders know that communication is a two-way street and what they hear is often more important than what they say. When someone else is speaking, great communicators aren't thinking ahead and planning what they'll say next. Instead, they're actively listening, fully focused on understanding the other person's perspective.

9. THEY'RE PROACTIVE

Leaders with the best communication skills don't waste time playing catch-up. They're quick to head off the rumor mill by sharing bad news in a timely manner. They also give clear, concise goals and directions so people don't waste their time heading in the wrong direction.

4. THEY ARE AUTHENTIC

Great communicators don't try to be someone they're not just because they've stepped behind a podium. There's a reason Mark Zuckerberg presented Facebook to investors in a hoodie and jeans. Great leaders know that when they stay true to who they are, people gravitate to their message. They also know the opposite happens when leaders put on an act.



10. THEY SOLICIT FEEDBACK

The best communicators never assume that the message people heard is the exact same one they intended to deliver. They check in to verify that their message was understood correctly, and, if it was not, they don't blame the audience. Instead, they change things up and try again.

Bringing It All Together

Great communicators stand out from the crowd. They're honest. They're authentic. They listen. They excel in communication because they value it, and that's the critical first step to becoming a great leader.

6 Unwritten Rules of Productive Office Environments

Ashwini Agrawal, Business Development

Everyone has different strengths and weaknesses, so it's hard to find a suitable one-size-fits-all approach that works for everybody. Here's how to help your entire team perform their best.

Cultivating an office atmosphere that encourages productive, satisfactory work can be challenging for any entrepreneur. Everyone has different working preferences and different strengths and weaknesses, so it's hard to find a suitable one-size-fits-all approach that works for everybody.

Nevertheless, there are structures and policies you can put in place that help your entire team perform their best, on a regular basis and not all of these structures need to be formally written rules. In fact, there are many informal policies and procedures you can gently guide into existence that will develop the best possible environment for your workers:

1. EVERY OPINION COUNTS

You shouldn't have a formally written rule that mandates every worker to share his/her opinion on everything. That would just cause people to make things up in order to fulfill a requirement. Instead, let people know that their opinions are important, and encourage them to vocalize them regularly. This will create an office environment where people are comfortable speaking their minds and most employees will appreciate that quality. The added morale boost will make it so employees are more willing to work hard for the company, and the opinions you collect will do wonders for finding and solving infrastructural problems.

Ask people honest questions in public, about their workloads, responsibilities, and the office environment in general. Show people that you care what they and their coworkers have to say, and don't discount anybody's personal opinion.



Your
opinion
counts!!!

2. THE INTERNET IS A FORGIVABLE TEMPTATION

A decade ago, using the Internet for anything other than work was a serious infraction, and a waste of company time. Today, social media and the Internet as a whole are so ingrained in our lives that they're completely unavoidable. Creating a rule that says "it's fine to play around on the Internet" is a bad idea for obvious reasons. But there's nothing wrong with informally letting people know it's okay to spend a few minutes here and there, checking in on Facebook. People are going to fiddle on the Internet regardless of what you do--so if you catch someone using the Internet for personal reasons for a few minutes, don't crack the whip.

Instead, let your coworkers know that personal Internet usage is permissible, but shouldn't be abused. There's a big difference between catching up on a news feed and doing hours of home shopping.

3. BREAK TIME IS BREAK TIME

Too many offices have a culture that discourages lunch breaks and other types of breaks. If a worker goes out for 30 minutes, they're seen as less productive than someone who works through lunch or eats at their desk. But breaks are an important part of the workday and can actually boost productivity when taken as real breaks--not just continued work with the addition of food.

CAREER TIPS

Take breaks yourself to set an example for your workers, and follow up with employees who don't appear to take breaks often. Ask them why they prefer not taking breaks, and let them know it's acceptable and encouraged to take advantage of the outlined acceptable breaks in your organization. Doing so will raise company morale, and even though you'll lose a few collective hours of work, the work you retain will be far more productive.

5. CAMARADERIE IS IMPORTANT

You can't force teamwork; it has to come naturally. But you can create an environment that naturally encourages teamwork, and foster the development of camaraderie between your workers. Use team building exercises, games, and company events to help your employees get to know one another and if you see people talking personally among themselves, encourage those conversations to continue. Help your workers develop strong bonds with one another and they'll be more likely to work together for common goals.

You can also encourage these kinds of developments by breaking down office walls and creating a physical layout that allows for more personal interactions. When your workers feel isolated, their productivity will suffer, but when they feel like they're truly a part of a team, they'll be able to perform their best.

5. ADJUSTMENTS FOR COMFORT ARE ACCEPTABLE

Let your employees know that it's okay to move things around and make adjustments to their workspace in order to maximize their personal comfort levels. Moving furniture, posting pictures and personal items in their office space, and making upgrades to their equipment is all perfectly acceptable-people work better in environments they've created, because most people understand what works for them.

6. THE BOTTOM LINE IS WHAT MATTERS

Take the time to remind your employees that what counts is the bottom line-the amount of work that gets done in a given day. You can work 9 to 5 in a suit and tie in a stuffy cubicle, skip your lunch break and stay heads-down and still get less done than someone who comes in at 9:30, takes several breaks, dresses casually, and communicates with his/her coworkers often. Productivity isn't about following the rules strictly, it's about creating an environment where you can do your best. It's good to have on-paper rules, because they provide structure and go-to legal documentation, but most of your office rules should be informal and flexible. Give more power to your employees and let them know that what they do is more important than how they do it.

These unwritten rules may not work or be appropriate for every business, but they've done wonders for both productivity and morale. Your office should not be a militaristic place full of rules and boundaries, nor should it be a free-for-all with no structure. Instead, leverage the power of "unwritten rules" to give your workers a flexible yet solid structure and get the most out of your team.

Source: <http://www.inc.com/>

COMPANY TRIP 2015: BAROG



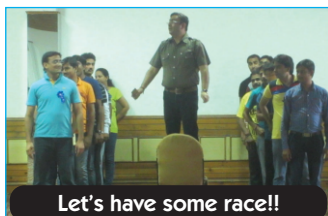
Train Journey



Trekking to Barog Railway Station



DJ Time...



Let's have some race!!



Activity 2... Human Tank



Childhood Memory...



Just for Fun



Activity Winner Team 1



It's a tie... Winner 2



It's a tie... Winner 2



Activity Winner Team 3



SALES QUARTELY AWARDS: Mr Jasvinder Singh, Mr Mithlesh Choubey, Mr Pradeep Kumar, Mr Prabhat Yadav, Mr Ashish Kakar



Group Photo

welcome



NAME : Monika Chaudhary
DEPARTMENT : HR
DATE of JOINING : August 8, 2015



Spot the difference

There are 15 differences in these pictures. Can you find them?
Send your entries at info@thecatalystsgroup.com to win gift.



Identify the Logos

Identify the logos.
Send your entries at info@thecatalystsgroup.com to win gift.



Vol 18 Winner

Mr Harpreet Singh
Sr. Manager Purchase
Wave Industries, Noida