

Impressions

For Private Circulation only

Theme of this
Bulletin:

**Nirbhau- Nirvair
(No Fear - No Hate)**

No. 23/30 – September 2023
(Monthly e-Bulletin)
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Editor
Dr. V.J.S. Vohra

**Fear never
builds the
future,
But FAITH
and Creating
HOPE in the
World does**



Disability leads to Ability of Super Humans YouTube

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Dedicated to Colonel DS Vohra
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DS Bali 'Daman'
Senior Advocate and
famous Shayar of Chandigarh
Mob.: 9878828666

स्वाक छानी मगर बिस्मल न मिला
हूबती कशती को साहिल न मिला
ऐसा ही था शायद मेरा नसीब
किसी से यह दिल न मिला
हर खोज गई रायेगाँ यूँ ही
मेरी उम्मीदों का कातिल न मिला
दुखती रग पे रखने को मरहम
ऐसा कोई भी फाज़ल न मिला
स्वरू आये 'दामन' के कई लोग
कोई उनमें कामिल न मिला

Project Sahyog: Artificial Limbs



In the presence of President Rtn Anchal Khurana and Members of Rotary Delhi Akash Megapolis, Rotary International District 3011, after fitment of below elbow right prosthetic arm, Sahyog Beneficiary Yamuna Prasad was discharged on 23rd September 2023 from Paras Artificial Limb Clinic at Gurgaon, Associate of Nevedac Prosthetic Clinic, Chandigarh.

Our Gratitude to Mr Ritesh Dhingra, Multivac Laron India Pvt Ltd. (Introduced by PP Rtn Aseem Grover of Rotary Panipat South).

On 04th August 2023 Project Sahyog was launched in Rotary District 3011 at Delhi - Gurgaon by Chair Sahyog RI District 3080 PP Salil Bali, who informed that Sahyog was launched in Chandigarh in August 2021 by PDG Ajay Mdan, and since then high quality prosthetic limbs have been provided to over 300 beneficiaries through a professional clinical process as per the norms of Rehabilitation Council of India and WHO. Patients are also given proper follow up service, which is very necessary part of the rehabilitation cycle.



**Donations for the cause of Disability Empowerment accepted under section 80-G of
Income Tax Act. Contact Dr VJS Vohra Mobile / Whatsapp: +91 9814006829**

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Statutory Warning Rehabilitation Council of India



भारतीय पुनर्वास परिषद्
सामाजिक न्याय और अधिकारिता विभाग,
विभागीय पुनर्वास विभाग के अधीन एक स्वीकृत निकाय
REHABILITATION COUNCIL OF INDIA
A Statutory Body under the Ministry of Social Justice and Empowerment
Department of Empowerment of Persons with Disabilities (Divyangjan)



STATUTORY WARNING

Practicing without RCI Registration
In Govt./Non Govt. Organization and by any Private Practitioner
is an Offence under section 13 (3) of RCI Act No. 34 of 1992

It has been observed by the Council that Children with Disabilities (Divyangjan) are being trained/ served by Quacks/Unqualified/Non-registered Personnel/Professionals.

If anyone found serving "Persons with Disabilities (Divyangjan)", without having RCI Certification, shall be prosecuted before the Court of Law under Section 13(3) of RCI Act, 1992 as under:

"Any person who acts in contravention of any provision of sub-section (2) shall be punished with imprisonment for a term which may extend to one year, or with fine which may extend to one thousand rupees, or with both".

General Public is requested to report such instances to the Council along with documentary evidence by post/fax/email to enable the Council to take appropriate action such as filing of FIR against such persons.

"This Statutory Warning is issued in public interest".

Dr. Subodh Kumar
14-5-2019
Member Secretary

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STATUTORY WARNING

PRACTICING WITHOUT RCI REGISTRATION IN
GOVT. / NON GOVT. ORGANIZATION / PRIVATE
PRACTITIONERS IS ILLEGAL UNDER
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"This Statutory Warning is issued in Public Interest".

Non-registration can have serious consequences :

- Not eligible to work in Government or Private Sector
- Not eligible to provide service in the field of Disability Rehabilitation and Special Education
- Cannot practice as rehabilitation professional anywhere in India

For Registration apply through your institute from where you have qualified.

RCI
CERTIFICATION
is legally must.



MY RIGHT IS TO BE SERVED BY QUALIFIED PERSONNEL
DAYS OF CHARITY HAVE GONE

For further information please contact:



Member Secretary
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Monthly e-bulletin, 'Impressions' is dedicated to late Colonel DS Vohra, Founder of Ministry of Defence **Artificial Limb Centre**, Pune and Founder of **Nevedac** Prosthetic Centre, Chandigarh, father of Dr VJS Vohra, Founder & CEO of **Nevedac Prosthetic Clinic** / Co-Founder of Nevedac Prosthetic Centre and Hony Prosthetic Adviser to Governments Punjab, Haryana, Chandigarh and Himachal Pradesh.



Padma Awards
Ministry of Home Affairs
(Govt. of India)
Padma Shri (1988)
Col. (Retd.) Darshan
Singh Vohra
Social Work
Chandigarh

Col. D.S. Vohra
(1919-1998)



Nevedac®
Prosthetic Clinic

Dr. VJS Vohra
Sr. Consultant
Artificial Limbs & Orthotics
Rehabilitation Council of India
Certified Prosthetic Orthotic Professional
Regd No. RCI / AA00001

Hony. Prosthetic Adviser:
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Rolls, Tissues & Other Issues: Bamboozled

Living without paper made tissues, towels, napkins, wraps, wipes or rolls is unimaginable in today's world. These products (hygiene paper products) rank second only after the word 'sanitizer' when we think of hygiene. In fact, the first item which got sold out like hot cakes in the beginning of the pandemic was toilet rolls. Over 3 years ago, I wrote about these paper products, describing them as "hygienic", and by now I have several changes to make. The present 'Tissue and hygiene paper products' industry is mired in numerous issues,

I am sure, after reading this article, you might think that we all have been bamboozled. The way forward may also be the simple, backyard bamboo. Tissue and hygiene paper products are used at homes and at medical establishments. These are also used in the hospitality sector like hotels, restaurants and dhabas. Business establishments, offices and public places also use these products. Tissue paper products are used in many other places like electronics repair shops.

These are as follows :Toilet rolls in toilets, Table napkins and hand wipes rolls, Face tissues. Wet wipes, used to clean face, wipes babies face and bottom, Tissue towels, Dry and wet, Kitchen Tissue rolls, Food wrapping tissues, Packaging of delicate items, Industrial use tissues, Car wipes and Some countries use tissues as sealants in roads.

The revenue of Tissue and hygiene paper industry worldwide is expected to hit \$339 billion this year. A third of it is solely by toilet rolls. The market is projected to grow by 5% every year. Till about 5 years ago, India was not even in the top 10 users of such products. After the pandemic, \$40 billion of revenue was generated by these products in India. The yearly growth of this industry is expected to be higher in India, pegged at 5.9%.

The Tissue and Hygiene papers are either made from wood, sourced from trees or from recycled paper. The wood/ recycled paper is converted into pulp. The wet pulp is rolled on a machine to get required thickness. It is then dried in a large steam section and then taken to the cutting section before packaging.

Effects on Humans. Toilet rolls cause skin irritation to start with. Prolonged hard scrubbing with dry paper leads to infections, fissures and haemorrhoids or piles.

Author



Maj Gen Krishan Chauhan
Retired Army Medical Corps
[Former Additional Director, AMC](#)



There is a war on internet between the manufacturers of Hand driers and Tissue rolls for hand drying. Most hotels/ Malls and hospitals put both items for clients to choose. Napkins or rolls kept for long time in humid conditions may have plenty of microbes on them, more harm than benefit.

Face tissues and wet tissues. These may cause allergies in susceptible persons because of the minute quantities of toxic chemicals listed above. The wet tissues cause irritation in the sensitive parts of babies and females. MCI and MI preservatives are known allergens and a proven cause of contact dermatitis in sensitive persons.

Effects on environment. The mass cutting of trees, contamination of water and release of CO2 has already been quantified earlier. It is one of the largest polluter of mother earth which is resulting in Global warming and hastening Climate change.

Unlike toilet rolls which disintegrate in water, all other types of tissues and rolls retain water and swell.

They are a major cause of blocked drains of the world. Cesspool with tissue waste leach out chemicals and the end product is Methane. This is another Green House gas which causes Global warming.

Toilet Rolls are responsible for flushing 9.8 million trees into the drain, every year. These rolls should be minimally used, at least by Indians. Toilet-seat fixed water jets are quite cheap, easily available and simple to install. Alternatively, flexible pipe water sprinklers can be fitted which, in addition to ablution can also help cleaning the toilet. This method should be popularized amongst our NRIs too. I am glad that new hotels in many countries abroad are installing water sprinklers.

As dry garbage, 6.5 million tons per year is generated by these papers in US alone. It's quantity in India is unknown, though we

are increasing rapidly, thanks to a boom in food delivery system in India. The polyester of wet tissues disintegrate into microplastics and comes back into the air, water and food for our consumption. As an aware citizen, I rarely use these papers. We can substitute these papers with other, less harmful products.

Various types of bidets are available in the market, as good replacement of toilet rolls.

Rolls for wiping hands. Paper rolls should be stopped completely. If required, bamboo made rolls should be installed. Personal hankies are most hygienic.

Hotels, restaurants and dhabas. Avoid paper napkins kept on the table. Use no more than one at a meal. Many of these joints are responsible for blocked drains of our neighbourhood. Let us not add to the garbage.

Household. Old towels and cotton clothes meant to be thrown can be cut and used as mops in kitchen counters and for dusting purposes. They can also be used for cleaning/ shining glassware and cars. Recycling old clothes and not purchasing new hygiene paper

Small businesses and Offices. They can also buy 'home made' dusters – made by office employees for use in office.

I feel bamboozled whenever I see such products. They remind me of heat waves of North India and the poor, dying people and birds. It reminds me of cloud bursts and houses falling in rivers. Of floods in plains with cows and buffaloes being swept away. Loss of food grains of the world. Climate change being triggered due to our so called 'luxury and hygiene'. Both are fake.

Let us revert back to simple water for ablution, hankies in pocket and cloth dusters at home. Those who still wish to continue with these papers, please switch on to recycled paper and bamboo made toilet rolls and tissues, available easily.

How to build Public Image

Contributed by



PP Rtn Salil Dev Singh Bali
Director Public Image

It is important that Rotary and Rotaract clubs tell their stories in ways that help communities understand what Rotary does and why our work matters so as to inspire others to get involved. Appointing a club public image team can increase your success at making the club's communications consistent and unmistakably Rotary.

As the Director Public Image here are a few things I have observed:

1. Why you should have a specific public image Team?

When a club promotes itself and its work, they are increasing Rotary's awareness in the community. But it is also difficult for those club members who are organizing service projects to be responsible for marketing them too. A public image team can help with all of that. They can manage the club's public relations, press, and marketing in a coordinated and consistent way throughout the entire Rotary year, across projects.

2. What a club public image team does?

The team is responsible for designing flyers and posters, writing press releases, updating the website, managing the club's social media presence, and making sure the club logo is used properly and consistency.

Ideally, the club public image director would manage a team with the appropriate skills to help, all working together to showcase the club and their members as people of action.

3. What qualifications are needed?

The team should have experience in marketing, journalism, copywriting, or digital media. Photo or video creation and editing is also a plus, as is having contacts to local journalists.

Available resources to help you succeed are
The Rotary Brand Center contains templates that are extremely helpful.

Public image initiatives are very essential for Rotary Clubs. According to Rotary International the Rotary story of the good that is being done, should be told to both Rotarians and the world at large. Public image building exercise should be taken up seriously by all clubs, zones and districts by highlighting the projects that are taken up to serve the community.

People should be able to feel Rotary's positive and vibrant presence. There has to be proper coordination with the press / media to project Rotary activities.

Rotary members should wear their lapel pins at all times. The wheel that has been the symbol of Rotary, should be on their name board in the work place and place of residence. The 4-Way Test plaque should on their office table.

Building up Rotary public image will lead to membership growth as more people would feel attracted to join our great organization.



Fund Raising for Rotary by Director Public Image PP Salil Bali built over years, sharing his experience with PP Dr VJS Vohra

Diabetic foot - Orthotic and Prosthetic Management

Dr VJS Vohra

Approximately 18 million people worldwide are affected by a diabetic foot ulcer each year, including 1.6 million people in USA. Due to ulcers diabetic patients are liable to have moderate to severe infection and may also result in lower limb amputations. Large number of patients will have diabetic foot ulcer.

There is a great risk for feet of diabetic patients, and they can be hospitalized and may become disabled. In the USA every year over 150,000 diabetic patients have to undergo lower limb amputations due to diabetic foot and related complications. In India also over 100,000 legs are amputated every year due to diabetes and this will keep increasing.

Orthotic treatment for diabetic foot, is to have a proper footwear which is designed by an orthotic clinician, for reducing pressure on the foot ulcer. Proper shoe modifications and orthotic devices can relieve patient's discomfort during walking. A brace or Ankle Foot Orthosis (AFO) is very useful to reduce the pressure on the diabetic foot.

A proper orthotic management / treatment can effectively avoid foot ulcers and even heal it. Ill-fitting footwear is a common cause of foot ulcers, whereas orthotic footwear and devices reduces the risk of foot ulcers.

With the use of good footwear and orthotic supports for diabetic patients it protects the feet from the external environment, unnecessary pressure, and foot deformity can be avoided, as it also helps the patient to get proper movement of ankle and feet.

Orthotic devices and footwear protects the feet from any further harm and prevents occurrence or recurrence of ulcers.

Prosthetists and Orthotists are highly qualified and trained clinicians to provide best prosthetic orthotic care and services. They have updated knowledge of the biomechanics, material technology, digital designs and keep in mind the medical conditions of patients.

Proper orthotic examination and assessment of a diabetic patient by orthotic clinician will result in a well-made customized insoles made of good quality soft materials like polyethylene foam or sponge rubber, which helps in pressure distribution on the foot.

Normally the lower limb amputation in case of diabetic patients is below the knee. It takes about two months for the wound to heal, before going in for the prosthetic leg.

After amputation, it is normal for nearly every patient to experience pain in that part of the limb which is amputated. This is known as Phantom pain. Antidepressant medication may be required. However, stump exercises / physiotherapy followed by proper prosthesis eliminates phantom pain.

The patient has to be referred to a prosthetic clinician who makes a careful assessment of the residual limb / stump.



There are various types of good quality modular prosthetic systems available in India, both indigenous and imported.

The clinical process starts with the plaster cast of patient's stump and measurement taken by the prosthetist.

This is followed by filling of the cast with plaster of Paris to create a positive / solid mould which is modified as per the measurements, taking due care of the pressure points of the stump.

Using resins and allied chemicals the socket is prepared, which is the most essential part of the prosthetic limb. Alignment of the socket and the component parts is done. Soft padding / liners are provided inside the socket.



Gait training is given to the patients in the parallel bar, under the supervision of the prosthetist.

Depending on the patient's age and medical condition, it takes about a week for the patient to walk independently on the prosthetic leg.

The patient has to maintain a regular follow up with his prosthetist as certain adjustments and re-alignment of the artificial leg is required to be done, which is very necessary part of the rehabilitation cycle.



These Orthotic devices provides foot stability, limits the joint movement and controls the deformity of foot.

Creating Hope with Mindfulness

Author



PP Rtn Dr Rita Kalra

When we talk about finding space for one another — creating comfort and care within Rotary — we can all empathize with and support one another. Whatever we are facing in life, Rotary is a place where we know we're not alone. We spend so much time helping our world, whether it's working to end polio, cleaning up the environment, or bringing hope to communities that need it most.

Sometimes we can lose track of the need to apply some of our energy and care to our fellow members and partners in service.

The comfort and care of our members is the single greatest driver of member satisfaction and retention. We need to ensure that it remains a priority — and that we further strengthen these bonds by helping each other in hour of need. That is why I'm so heartened by Rotary International President Gordon McNally's wonderful vision to help improve the global mental health system, not only for Rotary members, but for the communities we serve. Rotary service brings hope to the world and joy to our lives. We are People of Action, and behind that action is care, compassion, empathy, and inclusion. Studies show that performing acts of kindness is an effective way to reduce stress and improve our own mental and physical health.

Although a duck may appear to be peacefully swimming on water its feet are rapidly flapping under the surface. He alone knows what it takes to present an image of peace to onlookers. The strength a man portrays outwardly may not always be existent within him. There is possibly a different commotion in his mind that is unable to reach our perception or that he skilfully and with a lot of effort hides behind his happy face. Finally we mustn't forget that even though we see the beautiful Taj Mahal standing tall before us, underneath it lies a tomb.

What would happen if you spend millions to build a dam without an outlet? It is bound to break at one point when water pressure exceeds a tipping point. Therefore along with the dam the outlet is of prime

importance. The human body is like a dam made out of the five elements. When problems arise and accumulate rapidly it will reach a tipping point and the dam will breakdown. Is it surprising?

Why Ambala flood after heavy rainfall? Due to lack of outlets. Therefore keep your outlets wide open at all times. Open your mouth to share your problems with your people. Take the help of regular meditation to open the outlet for your heart. If and when possible, the biggest outlet in the world which is your eyes, try to keep them open. Let the dam of tears overflow and release all stress, sadness, frustration. This is why take a shoulder is important to lean on. This shoulder is called a friend. Open your mind to this friend. Your family and friends are the best outlets. Laugh! Talk! Cry! Fight! Express! Free yourself! Such friends are rare these days. Selfishness is seen everywhere. Take care. Instead of "MISS YOU", after they are gone, say "WITH YOU" while they are still around. It takes good fortune to have people who care.

In an era marked by the fast-paced nature of modern life, it has become increasingly crucial to prioritize our health and well-being. Our bodies and minds are the foundation on which we build our lives, and neglecting them can lead to adverse consequences. As health care provider, I aim to shed light on the significance of making health a priority, offering valuable insights and practical tips to empower you all on the journey towards holistic wellness. Promoting Preventive Care is undeniably better than cure, and it highlights the importance of proactive healthcare.

Encouraging people to engage in regular health screenings, vaccinations,

and check-ups, we aim to create awareness about the significance of preventive care.

Physical activity not only improves physical fitness but also positively impacts mental health.

The Power of Physical Activity offers a myriad of benefits of exercising, from boosting cardiovascular health and strengthening muscles to alleviating stress and enhancing mood.

From practicing mindfulness and stress management techniques to engaging in regular exercise, you can discover strategies to maintain a harmonious mind-body balance. The mind and body are intricately linked, and nurturing this connection is pivotal for achieving overall well-being. Adopting a holistic approach will highlight the importance of mental and emotional health alongside physical fitness. Good nutrition forms the cornerstone of a healthy lifestyle. Nurturing Nutritional Habits emphasizes the significance of mindful eating and provides guidance on making informed dietary choices that will empower to enhance the vitality and reduce the risk of mental illness.

Sleep is often overlooked in our busy lives, yet it plays a vital role in our mental health. Restorative Sleep for Optimal Health delves into the importance of quality sleep and offers strategies for improving sleep hygiene.

By understanding the significance of restorative sleep and implementing effective sleep practices, you can experience enhanced cognitive function, improved mood, and increased energy levels. The path to holistic wellness starts with prioritizing personal health. By adopting a mind-body connection, embracing nutritious eating habits, practicing preventive care, engaging in regular physical activity, and prioritizing restorative sleep, you can unlock the potential for a healthier, more fulfilling and mindful life.

Remember, investing in your health today is an investment in a better tomorrow. Becoming champions of mental health is not only the right and kind thing to do, it is the tool that can foster hope, reduce stigma, and promote understanding.

Importance of Environment

Author



Dr Jaswant Singh Puri

Doctor of Letters (Honoris Causa)
Social Activist, Punjab Rattan

The earth is weighed down by a huge biomass of human beings alone. The world environment means our surroundings, our living conditions, human beings and animals living on the earth, their ecosystem. Environment is the basis of our life, our pillar of life which provides us with air to breathe, water to drink, food for consumption and place for living. So, the surrounding conditions, both biotic and abiotic play a dominant and strong role in our lives and this is called environment. Environment is the only science that explores the past, present and future of the earth. It is related with ecology, the branch of science that discovers human science demography, community, biodiversity and environmental science. Ecology helps us to understand the biotic and abiotic factors of environment. The environment is under constant process of change, its various factors also under go changes which may be rapid and slow. The biosphere and the geographical surroundings of a place are referred to as its ecology.

Environment is the most precious gift to humans on this earth. There is a need to focus on the existence of environment because nature should not be taken for granted. That is why World Environment Day is celebrated worldwide to upkeep its status and take steps to prevent it.

Environment day is celebrated on 5th June to create awareness about it and prevent further damage caused by human activities. The idea of celebrating World Environment Day is to create a beautiful world which is free of pollution without any scarcity of natural resources.

Time is running out and nature is in emergency mode. Global Warming is one of the reasons to pollute the environment. The Indian Government has introduced stringent laws regarding vehicles. Fifteen year old vehicles run on diesel will be phased out. Moreover, electric two wheelers and four wheelers are being introduced to reduce pollution. More and more trees should be planted to reduce pollution. In the name of development and construction of roads, there is a need to uproot trees but more trees should be planted than the number of uprooted trees. Minerals and industrial progress have also led to environmental pollution. The pollutants and other chemicals extracted by the factories are thrown ruthlessly

which cause pollution. It leads to the death of aquatic flora and fauna. So, the present-day polluted environment is not only due to natural powers but technological development and human concepts of development that contribute to pollution.

Plastic is the largest and the most harmful that causes marine litter. More than 100 million tons of plastic is produced every year, most of which ends up in lakes, rivers, seas and pollutes ecosystem from mountains to oceans. There is an urgency to ban plastic items to solve this crisis. Many governments have taken steps to ban plastic utility items.

About 175 UN Member States endorsed a historic resolution to end plastic pollution. Plastic products create greenhouse gas emissions.

Indian Prime Minister also initiated 'Swachh Bharat Mission' Programme and 'Clean Ganga Project' to reduce the calamity of environmental pollution. The World Environment Day of 2011 was hosted by India and its theme was: 'Forests-Nature at Your Service'.

Life and environment are deeply related to each other. Environment is a safety umbrella for human beings. Environmental pollution has caused adverse effects on Ozone gas which protects us from ultraviolet rays reflecting from the sun. These are very harmful for our health. It also causes the loss of immunity among human beings leading to skin cancer. Moreover, the smoke emerging from the factories and the urbanization of rural areas is engulfing the fertility of land. Sri Guru Nanak Dev Ji had laid emphasis hundreds of years ago that air is the vital force,

water is progenitor; the vast earth is the mother of all and nights are nurses, fondling all creation in their lap. Guru Nanak Dev Ji supported an integrated approach between human life and nature. If we realise this, we cannot harm our environment as we are a part of it. Guru Nanak Dev had written in 'Japuji Sahib'.

Environment has to be saved at all costs by growing trees, banning plastic production, reducing greenhouse gases, optimum use of fertilisers and insecticides, saving the ozone layer, adoption of organic farming, adhering to government laws and following the message of Sri Guru Nanak Dev Ji who persuaded human beings to look at nature very lovingly. A quote from Franklin D. Roosevelt, "A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people".

Some strict guidelines should be issued by the authorities like the use of B.I.S. marked electrical goods which cause lesser radiation. Trees can be planted in huge numbers which absorb carbon-dioxide. Peepal trees, Neem trees etc. should be planted which lessen the amount of carbon-dioxide and give out oxygen. Social media sites like radio, television, newspaper, posters should be used to preach the valuable aspects of pure air, pure water and save the planet earth from hazards. Solar power plants may be installed on rooftops to reduce the consumption of electricity.

It is a nice attempt on the part of the United Nations Decade, an Ecosystem Restoration from 2021 to 2030 to combat climate change, safeguard biodiversity, food security and water supply. The Role of Sunderlal Bahuguna in 'Chipko Movement' was remarkable in the 1970s due to his role in anti-Tehri Dam protests.

Delhi, Ludhiana, Jalandhar, Moga and other developing cities are facing the onslaughts of polluted environment. There is need to save the species of birds and animals so that these do not become extinct. Organic farming should be encouraged and farmers should be taught how to use optimum amount of fertilisers and insecticides. Sacred plants and trees like *Harshingar*, *amla*, *parijat*, *akarkara*, *ashwagandha*, *amaltas*, *giloy* etc. are valuable medicinal trees and plants.

Novel Techniques for Preservation of Microorganisms

Dr. Swaranjit Singh Cameotra



The normal practice of a culture collection to maintain microorganisms for long-term is to preserve them by at least two different methods viz. Freeze drying (lyophilization) and by storage under liquid nitrogen. Some microorganisms do not stand these preservation techniques and thus, alternative techniques have to be applied to preserve them long term. Such microorganisms can be preserved under mineral oil (m.o.), in silica gel and in liquid medium with periodic transfers to fresh medium. Interestingly, these methods are very useful for laboratories that use simple and economic preservation techniques. The microbes are viable for several years by storage under mineral oil.

Conservation of stock cultures of bacteria and fungi in mineral oil (m.o.) has been successfully used by many researches. Heavy m.o. is as good as light oil for use as an overlay material. Owing to the slower growth of cultures under m.o., subculture periods may be lengthened from four weeks to as many months and years, with savings in effort, labour, time, and materials. In some cases subculturing has to be done for microbial cultures viable on slants/plates only every month and this is labour-intensive.

Frequent subculturing also leads to changes in the characters of the culture. Same is the case with preservation of some *Thiobacillus*, *Sulfolobus* and

Acidophilium cultures that have to be maintained in liquid medium only. In all cases microorganisms under m.o. survived longer than in the control tubes without m.o. layered over them. In our laboratory we routinely use m.o. layering of about 1.5 to 2.0 cm above the culture slants and the cultures are viable for 20-25 years or more. This method of preservation was started in 1987 in the Microbial Type Culture Collection (MTCC), Chandigarh that is now an International Depository Authority (IDA).

Many fungi cannot stand Freeze Drying like the bacterial strains. Culture collections therefore, preserve such cultures by m.o. overlays. Some examples of fungi that are maintained by this method are isolates of *Phytophthora*, *Pythium*, basidiomycetes and mycelial forms which do not readily survive freeze-drying. Apart from the m.o. overlay, the cultures unable to stand freezing are preserved in silica gel and good results are obtained. The genetic stability of cultures

stored in m.o. is poor, however, this method is used as an alternative method for storage due to its efficiency and convenience. Storage in silica gel on the other hand, is good for genetic stability in microbes. Some other methods used in conjunction are preservation in soil, gelatin beads and water. The genetic stability in the case of preservation in soil is moderate to low and is moderate in water.

Dr Swaranjit Singh Cameotra is Scientist, Institute of Microbial Technology (IMTECH), Chandigarh. He may be contacted at: ssc@imtech.res.in

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