



ETMA

Environmental Technology & Management Association

NEWSLETTER

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Editorial Note

Nabil Hijazi | ETMA Director

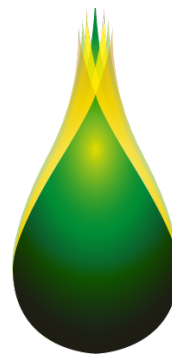
Warm greeting from the board of ETMA (Environmental Technology & Management Association) the Saudi Arabian Section of the Air & Waste Management Association. I would like to share that the 10th PetroEnvironment Symposium and Exhibition was held from May 17-18 2022, Dammam, Saudi Arabia, under the theme of "Environmental Opportunities for Global Sustainability".

PetroEnvironment 2022 was a unique 2-day gathering of environmental practitioners, policy-makers, scientists, end-users and engineers. Held under the patronage of HRH Prince Saud bin Nayef Al Saud, Governor of the Eastern Province, PetroEnvironment offered a platform for all stakeholders from the energy and environmental industry to network, exchange ideas and environmental solutions, and generate business interests.

The event combined three outstanding events under one roof; an interactive symposium where strategic and technical topics were discussed at length;

a commercial exhibition where companies showcased their expertise and services; and a reverse trade show where companies presented their solutions to customers' immediate technical challenges.

The symposium sessions discussed various environmental areas of significant importance to the region and the petroleum and petrochemical industry such as climate change, waste management, plastic waste, air pollution monitoring and control, biodiversity conservation and marine protection.



PETRO ENVIRONMENT 2022

Roses in Saudi Arabia

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Despite being known for its fascinating ancient towns and desert scenery, the Kingdom of Saudi Arabia (KSA) is full of green areas with variety of aromatic flowers and plants that fascinate the soul. Saudi Arabia is making choices that protect the environment, health of the earth, and humans as well as living organisms. The Kingdom supports and aligns with United Nation Sustainable Development goals by establishing Saudi Vision 2030. To support Saudi Arabia's future targets, we can promote the importance of cultivation, especially rose cultivation. Several types of roses can be found depending on the region, including rocky mountains, valleys, and deserts.

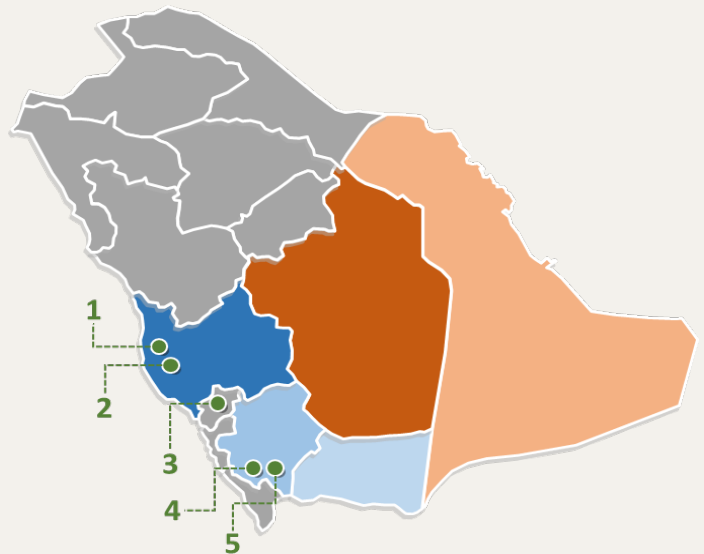


FIGURE 1. The most famous regions with favourable growing conditions for roses in KSA are 1- Al Hada; 2- Taif; 3- Al Bahah; 4- Abha; 5- Khamis Mushait

The most famous regions with favourable growing conditions for roses in Saudi Arabia are shown in Fig. 1. They also export roses to other countries.¹

In the Kingdom, the most famous perennial and seasonal roses are Taif roses. The Taif rose is a light-colored rose (see Fig. 2). Its scent is extracted to produce some of the most luxurious and expensive perfumes in the world. Traditionally, the essential oil that is used to cleanse the outer walls of the sacred Kaaba, is produced from roses in Taif.

As part of the Saudi Vision 2030 program, the Saudi government has made noticeable efforts to enhance its agricultural sector. Increasing efficiency in the use of limited natural resources during developing rural areas is a top priority.

Farming can be classified as an important employment source in the Kingdom.

In general, rose cultivation can help the Kingdom towards increased economic profitability, a healthy environment, and social equity.

Taif: The City of Roses

Taif is located in the southwest of Saudi Arabia. The secret behind the uniqueness of Taif roses is the elevation of the city. The ground surface of the city is about 1700 m above sea mean level.² It creates a microclimate that influences the fragrance of the rose. The Taif rose is usually irrigated with rainwater, mist, and dew.

Roses have become an essential part of Taif's economy. So much so that it is locally called the city of roses. Approximately about 2000 farms in Al Shafa and Al Hada cultivate roses producing more than 300 million flowers.² The crop is then taken to factories and distilled into rose oil or rose water, which is widely used in perfumes locally and internationally.



FIGURE 2. Rose Farm in Taif City ³

Advantages of Roses Cultivation

Plants are beneficial to our environment and ecology. Roses are a type of plant. They produce much of the oxygen in the atmosphere via the photosynthesis process. During the photosynthesis cycle, plants absorb carbon dioxide from the air by their leaves. Using minerals from the soil, water, and sunlight, plant absorbs nutrients and free oxygen into the atmosphere.

An increase in the number of plants improves the air quality. Hence, cultivating bushes, trees, and flowers is a great way to make our environment a better place. (see Fig. 3).

Roses can be classified as the queen of all flowers for their beautiful look and aroma. The most noticeable and significant benefit of rose plants is their environment transforming power. Their petals can be used in a variety of ways.

For instance, they can be used for rose oil, rose water, bouquets, cosmetics, use in medicinal, culinary purposes, perfumes and scented products. Taif roses can be added to drinking water to give a wonderful flavor. Also, women can use roses to decorate crowns on the head and around the neck at weddings.

Rose Festivals in KSA

In the Kingdom, we have annual flower festivals that attract tourists from all over the world. Visitors usually enjoy learning about rose cultivation and the stages of distillation. Such events include the Taif Rose Festival, Riyadh Spring Festival, Rose and Fruit Festival in Tabuk, and Garden and Flower Festival in Yanbu.

UN Sustainable Development Goals (SDGs) and Vision 2030

In 2015, United Nations Member States adopted the 2030 Agenda for Sustainable Development, which provides a shared plan for peace and prosperity for people and the planet, now and into the future. The agenda has 17 Sustainable Development Goals (SDGs) at its core. The agenda aim for ending poverty and other deprivations, improving health and education, reducing inequality, and spurring economic growth, all while handling climate change and acting to protect our forests and oceans.⁵

Saudi Vision 2030 supports several valuable projects, programs, and initiatives that are linked towards the achievement of sustainable development. The Ministry of Economy and Planning (MEP) has conducted a review to evaluate the adjustment of Vision 2030 with the SDGs.

Several programs and national strategies were added and assessed for consistency with the SDGs, in order to get a multi-dimensional picture. Sub-strategic objectives of Vision 2030 have been classified to reflect a precise picture of the actual alignment of the SDGs.⁶ (see Fig. 4).

Rose Factories in KSA

As per recent statistics of the Ministry of Agriculture and Water in Taif, rose distillation and production factories have reached about 70 factories in Taif Governorate.⁷ As part of recycling food waste, farms convert food waste into organic fertilizers. Taif farms use organic fertilizers. The aroma of roses is 100% natural; no scent stabilizers or chemicals are used in the manufacture of perfumes.

In alignment with Saudi Vision 2030, several rose factories have started hiring local women to work in cosmetics manufacturing. They provide deluxe products by following modern and international standards in manufacturing and packaging materials.



FIGURE 3. Taif Roses After Harvest ⁴

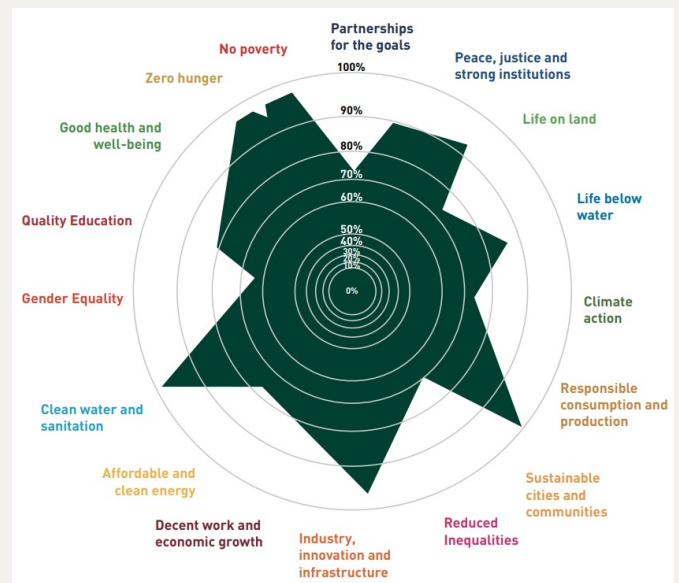


FIGURE 4. The alignment of all existing national plans with the SDGs ⁶

Bulgaria (One of The Biggest Rose-Oil Producers in The World)

As part of the cooperation between the Kingdom of Saudi Arabia and the Republic of Bulgaria, the Ministry of Environment, Water and Agriculture has organized a visit to the Republic of Bulgaria for several farmers.⁸

The visit was conducted to increase the productivity of strategic harvests to maintain balanced rural development, expand the agricultural production base in rural areas, and raise the sustainable and optimal utilization and efficiency of water resources.

The farmers visited several villages and farms that are known for rose cultivation. They were also introduced to the leading factories and commercial companies specialized in rose cultivation and distillation, and the production of rose oil for use in aromatherapy oils, cosmetics, and medicines.



FIGURE 5. Bulgarian rose valley near Kazanlak

The main features of SDGs are economic, social, and environmental achievements. In general, the 17 SDGs are connected; each goal can participate in achieving other goals. For instance, rose cultivation business can help in reaching decent work and economic growth (Goal #8). Thru reducing the unemployment rates and achieving good revenue, we can reduce the poverty level (Goal #1). Utilizing women's power in rose industries can promote achieving gender equality (Goal #5). Rose farming in our cities can help in maintaining sustainable cities (Goal #11) and achieving green landscaping (Goal #15), which reduces greenhouse gases and helps in maintaining good climate conditions (Goal #13) as well as good health and wellness (Goal #3). (see Fig. 6).

The Future

Rose cultivation can support increasing livelihood, and economic growth, thru reducing the unemployment and increasing female contribution to the labor market.⁹

The Kingdom of Saudi Arabia places emphasis on the environment and sustainability, and has embarked on major tree planting initiatives to reduce greenhouse effects. Many programs have been established to increase green landscaping.

For instance, in Riyadh city, five million annual flowers have been planted in squares and streets, which create positive environmental impacts.⁶ An annual flower completes its life cycle from seed to flower within a single growing season, which is less than a year. It dies annually, however, the inactive seed crosses the gap between one generation and another.



SUSTAINABLE DEVELOPMENT GOALS



FIGURE 6. SDGs can be achieved via roses cultivation

Contribution of Biotechnology

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Saudi Arabia's Vision 2030 aims at protecting and enhancing the Kingdom's natural environment by taking a holistic view of precious ecosystems. It is also fostering sustainable practices across the Kingdom that will help to provide citizens and residents with safe, high-quality local food, whilst maintaining water balance and supporting the restoration of biodiversity.

The Sustainable Development Goals (SDGs) are a global call to action to end poverty, protect the earth's environment and climate, and ensure that people everywhere can enjoy peace and prosperity. These are the goals the UN is working on in Saudi Arabia. SDG 6 addresses Clean Water and Sanitation, with the aim to ensure availability and sustainable management of water and sanitation for all.

Goal 6 targets include:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all.

- By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

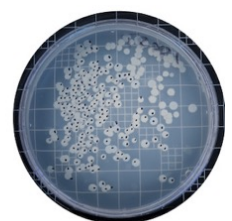
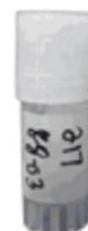
The last couple of years have witnessed increasing environmental issues associated with the use of harsh chemicals. As well, ecological protection policies and increased health awareness continue to evolve. These factors are driving the market demand for sustainable and more natural cleaning products. Consequently, effort and investments in innovation and development of new technologies have been ramping up.

Harsh chemicals have negative impact on our water resources and present health and safety risks for users. As eco-responsible alternative, cleaning products using biotechnological active ingredients like natural and safe bacterial cultures and enzymes are continuously gaining market awareness and share.

Biotechnology - A Path to Innovation and Sustainable Solutions

The development of biotechnological cleaning products is relatively new. It requires highly specialized technological knowledge and skills, which may not be widely available in the cleaning industry yet. Reaching and maintaining the performance standards, regulatory and eco-certification compliances are the result of months (sometimes years) of research & development, performance analysis, stability assessments and, more importantly, significant commitment and unique expertise.

As the use of biotechnology in cleaning products is booming, biosurfactants as sustainable alternative to petrochemical surfactants is a growing trend. Surfactants (or surface-active agents) are wetting and emulsifying molecules used in all cleaning products to help removing greasy residues from dirty surfaces. Some microorganisms can produce surface-active agents that we call biosurfactants, that are endowed with remarkable environmental and performance properties.



Biosurfactants are recognized by their chemical composition and microbial origin. Among the most interesting are sophorolipids and rhamnolipids that are both glycolipids produced by yeasts and bacteria, respectively.

Manufacturing products that contain bioactive ingredients, like biosurfactants, natural bacterial cultures and/or enzymes is challenging and requires special processes and standards that are recognized by the scientific community⁶.

Biotechnology has also paved the way for new surfaces disinfecting solutions. A good example is lactic acid, an organic acid through fermentation of natural and renewable resources. Lactic acid is readily biodegradable and effective against both bacteria and viruses.

Bacteriophages based technology is another example of disinfecting solution produced through fermentation. Bacteriophages are viruses that specifically infect bacteria (not humans) in a targeted way. They are known by the scientific community and have found their way in some commercial applications.

For example, in the food industry, they are used for biopreservation or biosanitization to prevent biofilm formation on the surfaces. Bacteriophages may also be used as alternatives to antibiotics for treatment against antibiotic-resistance of bacteria.

Biotech Cleaning Products - An Upgrade in Cleaning

Biotechnological cleaning products are highly concentrated in bioactive ingredients and, thus, they achieve very high cleaning and detergent performance. They use safe and natural bacterial cultures, enzyme extracts and other bioactive ingredients that act by breaking down and removing dirt through hydrolysis and biodegradation.

Therefore, cleaning activity continues for hours after the regular cleaning actions operation like rubbing, wiping or mopping. This is what we call residual cleaning effect, which is responsible for deep cleaning.

The first Biotech Neutral Degreaser

Nu-Grip Plus™, the first pH neutral kitchen floors cleaner and degreaser, was patented and marketed in the year 2000. Nu-Grip Plus™ is highly concentrated in safe and natural bacterial cultures, enzymes and surfactants.

Once diluted according to the instructions of use, it contains less than 0.05% active ingredients, but degreases a kitchen floor more efficiently than any harsh chemical degreaser containing up to 25 times the amount of active ingredients (mainly surfactants, sodium hydroxide and chemical builders). Reducing - using less - is the first and most effective eco-responsible cleaning approach.

Because bacterial cultures and enzymatic extracts are highly effective at very low concentrations and provide prolonged cleansing, even diluted at very high rates, their cost per liter at use concentration becomes very low. Also, selling the product as highly concentrated allows reducing plastic container use and delivery transport, as well as their associated negative impact on the environment.

Nu-Grip Plus™ is certified as an eco-responsible cleaning solution by the European Ecolabel™ and the Canadian Ecologo certification programs. Contrary to typical chemical degreasers, which are alkaline and highly corrosive for skin and eyes, Nu-Grip Plus™ is classified non-corrosive, which lowers the health risk in case of accidental contact during usage.

Biotechnology to Solve Bad Odor Problems

Odor issues from garbage bins, public restrooms, improperly maintained carpets is still a global problem in the cleaning industry. Stakeholders resort to using methods that mask the odor without solving the problem. These methods are usually bad for health, the environment, and treated surfaces, which creates a never-ending loop.

The most common way to mask odors is to use perfumes. Automatic air fresheners dispensers in public restrooms are a common example. Air fresheners are particularly harmful because they generate volatile organic compounds (VOCs) that contribute to deterioration of indoor air quality.

Consequently, they may cause multiple inconveniences, discomfort and symptoms which collectively are known as the Sick Building Syndrome.



Other common methods to mask bad odors generated by filthy floors is using floor strippers attempting to reach hard-to access dirt embedded in floors, or sealers to seal in odor-causing dirt. These procedures do not effectively solve the problem since they do not eliminate the odor causing dirt.

Biotechnological cleaning products are the sustainable and effective odor problem solvers. They penetrate deep into surfaces, clean and dislodge all targeted dirt accumulated over the years, and thus eliminate the bad smells at the source.

Bio-active ingredients break down and assimilate molecules responsible for bad odor generation, such as ammonia, volatile fatty acids and others. With continued use and the residual cleaning action of the bacterial cultures, smells gradually disappear in a sustainable way.

Conclusion

To quote the famous scientist, Albert Einstein "We cannot solve a problem by using the same approach that we had used to create it". Now more than ever, we need technological innovation to provide effective and sustainable solutions and compensate for the harm that our actions caused to the planet. Biotechnology is our way to innovate to deliver efficient and sustainable cleaning solutions.

Article Credits

Roses in Saudi Arabia

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Contribution of Biotechnology

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