ISLAMIC WORLD ACADEMY OF SCIENCES

# Newsletter

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## MESSAGE OF HIS ROYAL HIGHNESS PRINCE EL HASSAN BIN TALAL, *Founding Patron of the Islamic World Academy of Sciences,* ON THE IMPACT OF STI ON SOCIOECONOMIC DEVELOPMENT*

In October 2004, the Club of Rome met in Helsinki under the theme of 'Limits to Ignorance: The Challenge of Informed Humanity.' Dennis Meadows presented the *30-year update of Limits to Growth*[1]. The *Limits to Growth*[2], which was a report to the Club of Rome in 1972, a world model built specifically to investigate five major trends of global concern – **accelerating industrialisation, rapid population growth, widespread malnutrition, depletion of non-renewable resources and a deteriorating environment** – the conclusions were:

(i) If present growth trends in world population, industrialisation, pollution, food production and resource depletion continue unchanged, the limits to growth on this planet will be reached within the next hundred years with an uncontrollable decline in both population and industrial capacity.

(ii) It is possible to alter these growth trends and establish a sustainable condition of ecological and economic stability far into the future. Global equilibrium would see the basic material needs of each person on earth satisfied with an equal opportunity to realise human potential.

Thirty years later the update says, "…an enormous shift has occurred in our understanding of the global environment over the past three decades! Before the original Report, there was little recognition that society could destroy important global systems. Today there is little hope that we can avoid causing profound and permanent damage to natural processes, such as climate regulation and regeneration of marine fisheries.

In his paper, Sustainable development as the major challenge for the XXI century, Professor Kukliński of Austria, looked at three perceptions: the *global perspective* covering long-term development processes incorporating the totality of global space with differentiation in the scale and velocity of sustainable development; the *secular perspective* covering the decisions of the present generation so as not to destroy the development chances of the next generation; the *holistic perspective* covering a comprehensive approach to sustainable development.

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* *Delivered during the 14th IAS Conference on "Science, Technology & Innovation for Socioeconomic Development" held in Kuala Lumpur, Malaysia (2005).*

[1] *Limits to Growth: The 30 Year Update, published by Chelsea Green www.chelseagreen.com*

[2] *Limits to Growth, a report to the Club of Rome (1972), by Donella H. Meadows, Dennis I. Meadows, Jorgen Randers and William W. Behrens III.*

The advances in *biotechnology, nanotechnology* and *ICT* are 'electrifying' society – cutting across cultural, social and economic barriers. As in the statement of the Club of Rome to the World Summit on the Information Society, Geneva 2003, the emerging knowledge society poses new challenges: ensuring rights of access to and creation of knowledge; re-defining and protecting the 'commons,' especially related to knowledge and Intellectual Property Rights; assuring privacy; addressing the coherence and simultaneity of infrastructural developments and educational processes, and moving towards stability in the transition towards a sustainable world society. Advanced technologies, especially ICT, have contributed to the creation of the *digital divide*. Those that can afford access to technology, benefit, thereby increasing their wealth – unlike the communities with little or no access to electricity, water or the minimum essentials of life. First-rate education and health care are vital investments and the only assets the poor can control: their own labour, enterprise and ingenuity. Both developed and developing countries should work together to achieve what our faiths demand: peace, forgiveness, moderation, and above all *humanitarianism*, for all mankind.

On the topic of sustainable rationality: People talk about coping with climate change while the threat of global warming requires reductions in emissions and other "greenhouse gases" by 60%, promoting energy efficiency and relying on renewable energy sources. The 1997 Kyoto Protocol should be implemented. Furthermore, the Middle East is a water impoverished part of the world; a *Blue Revolution* would increase agricultural productivity per unit of water, while improving management of watersheds and flood plains. The three categories of pressing global challenges Jean Francois Rischard of the World Bank referred to cover a wide range of problems: in Category I, he enumerated problems involving the *global commons* such as global warming; biodiversity; deforestation and water deficits, etc. Category II included problems requiring a *global commitment* such as the fight against poverty; conflict prevention; combating terrorism; education for all; and global infectious diseases; would that he had added a *global commitment to regional commons*.

Global warming brings rising sea levels and other abnormal indications: note the disasters – the rain; the floods in India, Nepal, Pakistan and Bangladesh – the suffering and the droughts. The tsunami is the greatest humanitarian disaster in recent world history. It is even more tragic because a report produced 17 years ago could have reduced some of the casualties. The Report of the Independent Commission on International Humanitarian Issues set out, among other things, a blueprint for disaster management, pointing out that the international community had failed to construct a viable method for dealing effectively with the humanitarian dimensions of disasters. The Report (published as the book *Winning the Human Race?*) was presented to the United Nations General Assembly in 1987 with detailed recommendations for coping with natural disasters: it recommended that the UN should elaborate a code of conduct to regulate the management of disasters, under the principle that humanitarian criteria ought to prevail over any political or sovereignty constraints for the limited period of the emergency; "Mercy corridors" could be created to facilitate the entry of relief personnel and the import of goods to ensure unhindered access of assistance to victims (precisely the issue at Aceh); the United Nations should designate a central coordinating body to coordinate relief efforts with a prearranged formula for the collection of funds ( reducing the need for *ad hoc* funding); the UN body should maintain a central data bank on all phases of disaster management: prevention, preparedness, relief and rehabilitation; such a body should work with its national counterparts in addition to Governments having national disaster plans; governments, humanitarian organisations and the international community should promote the progressive development of international law whereby countries prepare for disaster relief within their own territory and take preventive measures to minimise the resultant suffering; accepting relief from the international community if their own resources are inadequate; trying to assist another country in the event of a disaster in good faith. Disaster management programmes of prevention, preparedness, relief and rehabilitation must, at least in part, be devised by insiders at the local level so as to obtain greatest efficiency as appropriate to the culture of the people in need. Developed countries reduce their risk by tougher planning and building regulations and they have state emergency services within national disaster

planning procedures whereas in developing countries the magnitude of the disaster seems to be amplified. The tsunami tragedy is an incentive for the UN to act on the Report and for all governments to create national disaster programmes.

We talk about 'drying the swamps of terror' by dropping bombs. The time has come to talk about drying the swamps of terror by empowering citizens; by building a multilayered civil society. In the Club of Rome, we believe that growth is not to be equated with equity. The Genuine Progress Indicator (GTI) takes into account traffic, pollution and crime and adds unaccounted benefits such as unpaid childcare and volunteer work. The wealth of several countries has declined, even where the GNP has increased once depletion of natural capital has been factored in. Ecological footprint expresses the carrying capacity per capita of available 'global hectare' for renewable use. Today it already exceeds the earth's availability by about 20% as mankind uses 1.2 'earths' to satisfy human 'wants and needs'. Human health is increasingly determined by environmental conditions, any deterioration (air pollution, poor water quality) is directly responsible for some 25% of all preventable ill-health, with diarrhoeal diseases and acute respiratory infections.

*The Global Marshall Plan Initiative* (GMPI)[3] launched in Vienna in October last year, seeks an international order based on partnership and cooperation that should lead to an optimal use of human and natural resources for universal benefit. It offers a mode for stimulating worldwide socio-economic development to overcome poverty. Finite natural resources on our planet also force us to follow sustainability by introducing resource-efficient technologies and lifestyles.

The *Jordan Badia Research and Development Programme* joins both environments (the physical and human) in sustainable development studies. It is no secret that our region has the highest per capita share of arid lands and deserts, in effect, water poverty. It is an equally known fact that the region is wealthy in energy sources and has the highest fossil fuel reserves. A regional community of water and energy may have similar benefits to that the community of steel and coal presented to post-war Europe. The Badia Project is an example of what was described in the preamble of the IAS Tunis Declaration on Information Technology for Development in the Islamic World (2000) which stated:

> *"The teachings of Islam emphasise the importance of the well being of man, and underline the fact that Man's relationship to the universe and to his fellow man must be one of stewardship and complementarity, respectively, and never one of mastery."*

I recently had the privilege of receiving an Honorary Degree of Doctorate of Laws in Pakistan, alongside Former Prime Minister Dr Mahathir Mohamad and Nelson Mandela from the International Islamic University of Islamabad, and was asked to deliver a lecture on 'Education in the Muslim *Ummah*: Present Realities and Future Aspirations.' The term *Ummah* is ultimately of a religious nature and includes all Muslims. When we speak of education in the Muslim *Ummah*, we do not refer to any one Islamic country, as none of these countries in itself constitutes the Muslim *Ummah*. It is Islam that makes the Muslims an *Ummah* and reform of education and future aspirations cannot ignore or cancel this; otherwise it would be negating its fundamental nature. This huge task requires a lasting campaign to change the ideology of governments, the rich, and NGOs, the educationists, the intellectuals and people in the media. Muslims should always remember that, from the beginning of Islam and their *Ummah*, all their progress, achievements, energy and creativity were based on '*Read, in the name of your Lord.*'

The Islamic World Academy of Sciences provides an institutional umbrella for the *utilisation* of Science and Technology in the development of Islamic countries and humanity at large. The IAS programme addresses many contemporary issues with a view of benefiting, not only the Islamic world, but all mankind through a knowledgeable, cooperative, pragmatic and humanitarian approach to scientific and technological development, changing ignorance and the lack of vision into global responsibility and awareness.

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[3] http://www.globalmarshallplan.org/

# WORLD CONSERVATION EFFORTS FOR BIOLOGICAL DIVERSITY

*Adnan Badran[*] FIAS, FAAS*
*President, Islamic World Academy of Sciences and President, Arab Academy of Sciences*

The strategy launched by IUCN, UNEP and WWF in 1980, promoted the conservation of natural resources, through the maintenance of ecosystems, the preservation of genetic diversity and sustainable use of species and ecosystem. Conservation and environmental strategies in 1991 reinforced those objectives. Fifty countries have established conservation or earth strategies.

To promote conservation of biological diversity at global level, another strategy was launched in 1992 by the World Resources Institute, IUCN, UNEP, WWF and WB. It aims at integrating conservation aims with development plans.
UNESCO has launched in (1992) with the International Union of Biological Sciences (IUBS) and the Scientific Committee on Problems of the Environment (SCOPE), both under The International Council of Scientific Union (ICSU), a joint program called "DIVERSITAS" which consists of a mixture of research, synthesis of knowledge, inventorying and monitoring, training of specialists. The program is set for 10 years. Results were synthesized and made available to decision-makers. DIVERSITAS has addressed the diversity of genes and the ecosystem, their loss and the consequences of the overall functioning of the ecosystem on which humankind is so dependent. And how to use biodiversity sustainably for ecologically sound development.

This intergovernmental agencies as UNESCO and non-governmental organizations as IUBSC and SCOPE partnership in tackling biological diversity for sustainable development was unique for mobilizing the scientific community, governments and decision-makers and the funding sources.

**Fresh water resources**

Although water covers more than 72% of the surface of our planet, 4% of it, is salty in open oceans and 7% of its fresh water, mostly locked away underground or in glaciers. The human population can count on an annual supply of only 9,000 cubic kilometers of fresh water.

Demand for water is highest in industrialized countries where the average North American for example uses 70 times more water at home than the average Ghanian. Yet personal use of fresh water is considered low. 69% of all water consumed is used in agriculture, 23% by industry, and domestic use accounts for only 8%. One major cause of water shortage is waste and pollution. Aquatic pollution is caused not only by the contamination of fresh water in rivers and lakes, but also by waste discharge to the oceans and coastal areas. Spread of algal blooms, coral bleaching and decline of marine food where 60% of developing countries obtain their protein.

UNESCO International Hydrological Program (IHP) is at the center of scientific efforts to improve basic knowledge of the global hydrological cycle and better management of water resources.

**Land and Trees**

Human activity has altered the planet's land. The ice-free land amounts to 13,000 million hectares. Of this, 11% is cultivated, 24% is permanent pasture land, 31% is forest and woodland. The progress of increasing soil fertility is very slow, where 1475 million hectares are currently cultivated out of a total cultivable area of 3200 million hectares. Over the last decade there was only a 4% increase of cultivated land, while permanent pasture remains unchanged and forest areas declined 3.5%. Dryland covering 47% of the world's land area was worst affected by degradation which caused desertification. Also, some 1,300 million people are consuming fuelwood faster than growing them locally.

[*] *Biologist, Professor and Chancellor of University of Petra, Jordan.*

**Ozone, Greenhouse Gases and Climate Change**

The thin veil of ozone 25-40 km above the earth protects life below from the sun's ultra violet radiation. However, this layer is damaged by chemicals released on the earth's surface notably chlorofluorocarbons (CFCs) used widely in refrigeration, aerosols and cleaners. A large hole in the ozone layer above the Antarctic develops every spring but fills up later in the year. This damage is caused by highly reactive forms of chlorine and bromine from CFCs and from halons used in fire extinguishers. If CFCs continue to be released as freely as they were in the 1980s, then the ozone layer is expected to disappear. Each one percent reduction in the layer will cause an increase of about 2% in UV radiation reaching the earth's surface. Exposure of the human body to UV will reduce immunity and increase disease rates, eye cataracts and skin cancer. Also, plants and animals will be affected. As a result of the possible dangerous consequences, industrialized countries have agreed to reduce the production and consumption of CFCs by signing the Montreal Protocol on substances that deplete the ozone layer.

Greenhouse gases, mostly CO2 and water vapors trap the heat radiated back from the earth surface to the atmosphere, maintaining the planet at temperatures that allow life to flourish. Without this natural greenhouse warming, the earth's temperature would be 33°C lower than it is today. However, burning fossil fuels for power and deforestation are increasing the levels of CO2 and thereby enhancing the greenhouse effect. Concentrations of greenhouse gases are now 25% higher than in pre-industrial times and are rising at 0.5% per year. CO2 persists in the atmosphere for many years. Other greenhouse gases include methane (increasing at 1% per year) nitrous oxide (0.3% increase per year) and CFC's. Carbon Terrestrial regions-particularly dense tropical forests and the oceans function as carbon sinks where almost half the atmospheric CO2 will dissolve, but the increase in temperature will reduce the effectiveness of ocean sinks.

If no action is taken, then the increase in global temperature is expected to be 0.3°C a decade, producing warming of 2-5° over the century. This would affect agriculture and cause global climate change. As oceans expand and ice caps over the poles melt, sea level would rise by six centimeters over the century flooding low-lying islands and coastal areas, contaminating the fresh water supply and reducing the land area and displacing millions of people. The second World Climate Conference (1990) held by UNEP, UNESCO (and its IOC), FAO, UNDP, WMO and ICSU introduced legislation to reduce emissions of greenhouse gases. Several developed countries have committed themselves to stabilize CO2 emission.

**Climate Change and Biological Diversity Conventions**

Any study of CO2 emissions must begin with the fact that one fourth of the world's population accounts for three quarters of all carbon emissions from fossil- fuel. So at the United Nations Conference for Environment and Development in Rio, June 1992, heads of nations signed the Convention on Climate Change, so as to commit themselves to reducing CO2 emission and stabilize it at a level that will sustain the ecosystem.

As regards the convention on biological diversity, differences over access to rich genetic resources and relevant biotechnologies have surfaced. All nations agreed to sign the convention on biodiversity except the United States, on the grounds that this may interfere with intellectual property rights (June 1992). However, the fact remains that maintenance of biological diversity is crucial for the development and functioning of the life support system.

The UN also urged world leaders to launch negotiations concerning forests and desertification and adherence to the UN Law of the Sea Convention, the Basel Convention on Transboundary Movement of Hazardous Wastes and their disposals and the Montreal Protocol on the protection of the ozone layer.

# CRISPR-Cas9: Revolutionizing Disease Eradication and Advancing Food Security

*Zabta Shinwari*
*Vice President, Islamic World Academy of Sciences*

In the realm of modern biotechnology, CRISPR-Cas9 stands as a beacon of hope, offering unprecedented potential to eliminate diseases, enhance food security, and alleviate poverty worldwide. This revolutionary gene-editing technology has garnered immense attention for its versatility and precision in modifying genetic material. With its ability to target and alter specific DNA sequences, CRISPR-Cas9 holds promise in reshaping the landscape of medicine, agriculture, and beyond.

**Disease Eradication:**
CRISPR-Cas9 has emerged as a powerful tool in the fight against genetic diseases. By precisely editing faulty genes responsible for debilitating conditions such as sickle cell anaemia, cystic fibrosis, and muscular dystrophy, researchers envision a future where genetic disorders could be effectively cured. The ability to correct genetic mutations at the molecular level offers newfound hope to millions of individuals and families affected by hereditary illnesses, potentially transforming healthcare as we know it.

Furthermore, CRISPR-Cas9 enables scientists to develop targeted therapies for cancer, autoimmune disorders, and infectious diseases. By precisely editing immune cells to recognize and destroy cancerous tumours or disabling viral replication mechanisms, CRISPR-Cas9 therapies hold promise in revolutionizing the treatment landscape, offering more effective and personalized interventions for patients worldwide.

**Advancing Food Security:**
In addition to its medical applications, CRISPR-Cas9 has the potential to address pressing challenges in agriculture, thereby enhancing global food security and reducing poverty. Traditional breeding methods often require years of selective breeding to develop crops with desirable traits such as drought resistance, pest tolerance, and increased nutritional content. In contrast, CRISPR-Cas9 accelerates the breeding process by enabling targeted modifications to plant genomes, thereby expediting the development of resilient and high-yielding crop varieties.

By enhancing the nutritional content of staple crops, researchers aim to combat malnutrition and address deficiencies in key micronutrients such as vitamin A, iron, and zinc, particularly in vulnerable populations in developing countries. Furthermore, CRISPR-Cas9 can help mitigate the impact of climate change on agriculture by engineering crops capable of thriving in adverse environmental conditions, thus bolstering resilience in the face of shifting weather patterns and dwindling natural resources.

**Ethical Considerations and Regulatory Frameworks:**
Despite its immense potential, the widespread adoption of CRISPR-Cas9 raises ethical considerations and regulatory challenges. The ability to manipulate the human genome prompts ethical debates surrounding issues of consent, equity, and unintended consequences. Questions regarding the implications of germline editing, potential off-target effects, and equitable access to gene therapies underscore the need for robust ethical guidelines and inclusive dialogue among scientists, policymakers, and the public.

Moreover, the regulatory landscape governing the use of CRISPR-Cas9 varies across jurisdictions, reflecting differing societal attitudes, cultural norms, and risk assessments. Striking a balance between promoting innovation and safeguarding against potential harms remains paramount as society navigates the ethical and regulatory complexities of gene editing technologies.

**Conclusion:**
CRISPR-Cas9 represents a transformative force in the fields of healthcare and agriculture, offering unprecedented opportunities to eradicate diseases, enhance food security, and alleviate poverty on a global scale. While the technology holds immense promise, its responsible and equitable deployment hinges upon transparent governance, ethical stewardship, and inclusive engagement with stakeholders.
As researchers continue to unlock the full potential of CRISPR-Cas9, it is imperative to approach its application with caution, humility, and a commitment to harnessing its power for the greater good. By leveraging the transformative potential of CRISPR-Cas9 responsibly and ethically, humanity stands poised to usher in a new era of health, prosperity, and resilience for generations to come.

# AL MANN (WA SALWA) IN QURAN A SCIENTIFIC STUDY

*Mohammed Iqtedar Husain Farooqi*
*Deputy Director/Head (Retired)*
*Plant Chemistry Division*
*National Botanical Research Institute, India*

**Quranic Name**: *Al-Mann* المنّ

**Common Names:** *Turanjabin, Kazanjbin,* (Arab.), T*uranjibin, Gazangbin* (Pers.), *Kudset helvasi* (Turk.) *Manna* (Eng., Gr., It), *Manne* (Fr.), Manna (Russ.), *Man* (Heb.), *Mana* (Sp.), *Kshiri* (Hindi), *Mena* (Tam., Tel.) *Manna* (Mal.), *Gazanjbin, Turanbjbin* (Urdu). *Makanandr Sorga* (Indonesian., Malay).

**Botanical Names:** *1. Alhagi maurorum* Medic. (Family: Leguminosae) 2. *Tamarix mannifera* (Ehrenb.) Bunge (Family: Tamaricaceae).

**Quranic References:**

**1. SURAH II (*Al-Baqarah*-the Heifer). V: 57**
*And We gave you the shade of clouds and sent down to you manna and quails, saying: "Eat of the good things We have provided for you:" (But they rebelled); to Us they did no harm, but they harmed their own souls.*

**2. SURAH VII (*Al-A'raf*-The Heights). V: 160**
*We divided them into twelve Tribes or nations. We directed Moses by inspiration, when his (thirsty) people asked him for water: "Strike the rock with thy staff:" Out of it there gushed forth twelve springs: Each group knew its own place for water. We gave them the shade of clouds, and sent down to them manna and quails. (Saying): "Eat of the good things we have provided for you" (But they rebelled); to Us they did no harm, but they harmed their own souls.*

**3. SURAH XX (*Ta-Ha*-Mystic Letters T.H.). V: 80-81**
*O ye Children of Israel! We delivered you from your enemy, and We made a Covenant with you on the right side of Mount (Sinai) and We sent down to you manna and quails: (80) (Saying): "Eat of the good things We have provided for you sustenance, but commit no excess therein, lest My Wrath should justly descend on you: and those on whom descends My Wrath do perish indeed! (81)*

Although the meaning of *Al Mann* (المنّ) in Arabic is 'favor' or 'reward', yet in general usage it means a heavenly saccharine food that God provided to the Children of Israel when they were wandering in the Sinai desert after their exile from Egypt.

Ibn Khatir in his commentary (*Tafseer al-Quran al-'Azeem)* states that Ibn Abbas narrated that the "Sweet Manna (المنّ)" used to descend on trees and Children of Israel used to eat. The manna used to rain down on the trees, just as the snow falls, from dawn until sunrise.

Abdullah Yusuf Ali (The Meaning of Glorious Quran, Dar Al Kitab Al Misri Cairo)) has stated that '*Mann*' (English, Manna) was a sweet gum obtained from the *Tamarisk* trees of Sinai (Note No. 71). In *Lugat al-Qur'an* (Darul Musanafeen, Delhi) *'Mann'* is described as something like the Honey-Dew found deposited on leaves of certain trees and collected early in the morning. Several authors of the Commentaries of the Quran, like Qartabi (*Tafseer Al Qartabi*, 1987, Cairo), Tabari (*Tafseer Al Tabri*, 1969, Cairo), Kathir (*Tafseer Al Quran Al Azeem* 1980, Cairo), Abul Kalam Azad (*Tarjumanul Quran*), Thanvi (*Bayanul Quran*) Abdul Haque Haqqani (*Tafseer e Haqqani*) Maudoodi (*Tafhimul Quran*) Abdul Majid Daryabadi (*Tafseer e Quran*, Urdu , Lahore, English Lucknow) and Usmani ( *Tafseer e Quran*, Bijnore) have described *'Mann'* as a plant product but no one has ventured to identity the actual plant (Botanical) source. Of course, some of them have written that the present day *Turanjbin* (a sweet exudate) was the real *Mann.* The main reason for this lack of information about the correct identify of the plant from which *Mann* was obtained, is probably the fact that no authentic scientific work was available earlier on the systematic botanical identification of the flora of various regions including Sinai.

Abu Rehan Mohammad Ibn Albairuni (973 A.D.-1050 A.D.) was probably the first person to indicate that the sweet *Turanjabin* (ترينجبين) obtained from the plant known as *'Al-Haj'* (الحاج) in Arabic, was the real *Mann* of the Qur'an.

After Albairuni, for several centuries, not much progress was made to identify the plants and plant products of Middle East. It was only in 1822 A.D. that J.L. Burckhard, the author of the famous book 'Travels in Syria and Holy Land', stated that insects found on certain trees of Palestine and Syria were responsible for the production of a sweet gum. According to Burckhard, who was also known as Sheikh Barkat in Egypt, these insects punctured the bark of the host plant through which a liquid oozed

out during the intense heat of the sunny day and hardened into the form of a gum during the cool nights. Soon after the publication of the Burckhard's Book, two well-known botanists of that time, Ehrenberg and Hemprich, published a report of their survey in 1829 and identified the Manna producing insect as *Coccus manniparus*. They had observed the production of Manna by these insects on Sinai trees, which they identified as Tamarix. Thus, by the middle of the nineteenth century, it became amply clear that Sinai trees did yield saccharine exudates. It was also reported that people living around Sinai collected Manna from the trees and used them in sweet preparations, As a matter of fact, for certain tribes of the area, these plant exudates were the only source of sweetness.

On the basis of scientific investigations carried out till now, it may be stated that the *'Mann'* referred to in the Qur'an was in fact obtained from two different types of plants. One was the plant known as *Al-haj* or *Aqul* (عاقول) in Arabic and botanically identified as *Alhagi maurorum*. It is a thorny shrub and is a good fodder for camel, and, therefore, called *Shauk al-Jamal* (Camel's Thorn). In Persian it is known as *Khare-Shutr*. It does not normally grow beyond three feet in height but has very long roots, sometimes reaching fifteen to twenty feet deep in the ground. Camel's Thorn is a perennial shrub that grows 2 to 3 feet tall. It is a native of the Mediterranean region and Western Asia.

Besides Sinai, Syria and other Arab countries, *A. maurorum* is also found in Iran, Pakistan and India, mainly on alkaline soils. At present Iran is the source of Manna called Turanjbin from this plant. In India, the plant is known as *Jawasa* , but the presence of *Mann* has never been reported from anywhere in the country, the reason being the absence of the insects responsible for the production of exudates.

Apart from *'Haj',* which must have been a very common plant in Sinai during the time of Prophet Moses, there was another *'Mann'* producing plant, botanically identified as *Tamarix mannifera* (Arabic, *Jaz*) in the same region. Several other plant species belonging to the genus Tamarix are known as *Athl* or *Tarfa* (طرفا) in Arabic and occur in Arabia quite frequently but these do not yield any gummy (sweet) substance. The only Manna producing Tamarix i.e. *T. mannifera* is generally found in Palestine, Syria, Iraq and Iran. Since in Iran this plant is known as *Gaz*, its *Mann* is called *Gazanjbin* (Arabic, *Kasanjbin* (کزنجبین). Few species of Tamarix also occur in India but none of them have been reported to yield *Mann.*

Manna from *Alhagi maurorum* and *Tamarix mannifera* named *Turanjbin* and *Gazanjbin* respectively, are still traded in many parts of the world. Since sugars from sugarcane and sugar beet have been introduced throughout the world as the main sweetening agent, the use of sweet *'Mann'* is now restricted to medicine only. *Turanjbin* is mostly supplied from the Khorasan area of Iran whereas the Tamarisk Manna (*Gazanjbin*) is still being collected in some northern parts of Africa. The sweetness of this Manna is due to sugars and sugar alcohols present in them. It has nutritional value as well as medicinal properties.

*Al Mann* has been mentioned thrice in the Qur'an, and in all these Verses, it has been referred to with *Salva* (سلوی) i.e. the bird Quail. These Verses clearly imply that a food consisting of a sweet carbohydrate (from *Mann*) as well as protein and fat (from *Salva*) was provided to Bani Israel (Children of Israel), and which by all standards was a balanced diet. Otherwise by eating only sweet Manna, so many of people (Bani Israel) could not sustain life for forty years (1491 B.C. to 1451 B.C.). The Quranic reference of 'shade of clouds' in SURAH *'Araf* and *Ta-Ha* is very significant and meaningful. This indicates that millions of trees, which provided *Mann* in sizeable amount for so many people, were not shady and the Almighty provided cloud shade to protect them from the scorching sun. It may be pointed out that *Alhagi maurorum* (*Al-Haj*) is a small shrub and hence cannot provide shade to human beings. Similarly, *Tamarix mannifera* is also a small tree with scaly leaves and hence not suitable for this purpose. Thus, these trees must have been occurring in large numbers in the areas of Sinai but were unfit to provide shade to Bani Israel during their wanderings. However, these plants in general, and *A. maurorum* in particular should have been very suitable shelter for the breeding and rearing of the birds i.e. *Salva* (quails) which were available to them in large numbers.
Manna has also been mentioned in the Bible eleven times but without reference to *Salva*. According to Moldenke (Plants of the Bible, Chronica Botanica Co., U.S.), it is very unlikely that the Children of Israel were provided with only sweet Manna for forty years. In his opinion, the Manna referred to in the 'Book of Baruch" was definitely a sweet substance of plant origin but the Manna mentioned in 'Book of Numbers', was most likely a starchy or proteinous material, as it is stated therein that Manna 'rained' from Heaven and people collected it and made bread from it. Obviously, bread cannot be made out of any sweet gum and, therefore, the Manna of 'Numbers' must have been some Lichen

which, when fully dried, is very light and can be flown to long distances and can settle down (rain) at a certain place. Moldenke has cited the example of the Great Famine of Iran in 1854, when tonnes of the lichen, named *Lecanora affinis* (Syn. *Lecanora esculenta*) 'rained' over the famine area and people collected, powdered, and ate its bread for several days. They thanked the Almighty for His favor (*Mann*) of 'raining' lichen. Some Scientists have surveyed the area adjoining the Sahara of Africa and found that this particular lichen grows on rocks and produces fructifications in the form of pea-sized globules which are light enough to be blown about by the wind. This occurs there in abundance and the local tribal people eat its bread whenever there is famine or failure of agricultural crops.

While concluding the description of Bible's Manna, Moldenke has very rightly inferred that two million people could not survive for years on sweet substances alone and it is also very unlikely that the Lichen and Algae were provided to them all through these years. He, therefore, states that most probably the Children of Israel were eating Quails along with Manna of any of the above-referred three descriptions. Had Moldenke studied the Sayings of the Qur'an about '*al Mann* and *Salva*', he would have reached this conclusion very easily. One must remember that although the provision of '*al Mann* and *Salva*' (Quail) has been very clearly described and explained in the Quranic Verses, yet none of them exclude the possibility of eating other types of food materials, like the lichen and algae, which the wandering men could find around. As a matter of fact, in one *Hadith Al Mann* has also been defined as *Al-Kam'a* (الكماتهِ) which is an Arabic equivalent of Truffle. Prophet Muhammad (SAW) is reported to have said "Truffles are a kind of ōAl Mann, which Allah sent down upon the people of Israel, and their juice is a remedy for the eyes."

What Prophet referred to as *Al Kama* was actually 'Desert truffle' a term used to refer to members of the genera *Terfezia* and *Tirmania* in the family Terfeziaceae, which grow in arid and semi-arid areas of the Mediterranean region, the Arabian Peninsula, and North-Africa. Species of *Terfezia* and *Tirmania* prefer high pH calcareous soils, typical of desert soils. The most common species of the genus *Tirmania* are *Tirmania nivea* and *T. pinoyi* (syn. *T. africana*). White truffle [*Tirmania nivea*] grows underground very fast until it bursts through and appears on the surface of the ground.

Desert truffles are nutritious, and particularly high in protein. In good seasons, truffles are dried and ground to powder to supplement the regular diet. Traditionally, desert truffles are cooked simply, so as not to mask their delicate aroma.

*Al-Kamah* or *Kame* is a classic Arabic word for the truffle although the common name is Al-*Fag'a* (الفاغع) which means bursting forth. This is because at late stages of truffle maturity, the soil surface above the fruiting body is cracked as a result of swelling of the Ascocarps. Desert truffles are known by several names in different countries. In Iran they are called Donbalan, in Turkey as Dobalan, in Algeria and Tunisia as Terfez, in Qatar and Kuwait as Fagga, in Saudi Arabia and Oman as *al faq'h and zubaydi* or *khalasi*, in Syria, and Libya as Terfase.

As reported by H.A. Bokhari & Sarwat Pervez, (J. Food Composition and Alalysis, 285-293, 1993: J. King Saud Univ., 137-148, 1994) most of the truffles (micorhizal fungi) collected from the Arabian Desert and neighboring areas of the Arab Gulf belong to Terfezia. (Al-*Kame-al-soda - Al-kame Al-Bunya).* Main desert areas for truffle production, closely resembling potatoes, are Iran, Saudi Arabia, Libya, Morocco, and Tunisia.

It may be important to mention here that in sematic language (from which Hebrew and Arabic originated), *Mann* means 'what' or 'who'. Thus, in all probability when the Children of Israel saw the white substance around trees they simply wondered about it and asked each other 'what (*Mann*) it was'? It is, therefore, most likely that all the new and strange edible substances which they encountered and obtained during their exile, were referred to as *Mann* (Bible, Manna) by them.

In addition to *Turanjbin* (Alhagi Manna) and *Gazanjbin* (Tamarisk Manna) yielding plants, there are still other plant species that yield sweet gum, and all of them are termed in English as Manna. For instance, the famous' plant of South Europe, *Fraxinus ornus* Linn. (Family: Oleaceae), is a source of commercial Manna. Its main producing area in Sicily is called Gibelman which is a corruption of the Arabic name *Jabal Mann* (جبل المن) meaning the Hills of Manna. Some scientists have considered this Manna as another possible Manna of Bible.

*Cotoneaster nummularia* Fisch & Mey (Family: Rosaceae) is a plant occurring frequently in Iran, and is the source of a very sweet Manna called *Shirkhisht(شیر خشت)* which in Persian means the milk of stone; reflecting the fact that *C. nummularia* is a crawling plant in the rocky habitat and Manna exuded from the plant falls immediately on the ground giving a feeling that the rock on which it falls, has exuded it. It is also sometimes called

*Shirkhushk* which means dried milk. *Astragalus adscendens* Boiss & Haussk. (Family: Leguminosae/Fabaceae) is another source of Iranian Manna (114). *Quercus incana* Roxb. (Family: Fagaceae), occurring in Iran and Iraq, also yield good quality Manna. In India, *Calotropis gigantea* (Linn) R.Br. ex Ait. (Family: Asclepidiaceae), locally called '*Aak*' has been reported to produce Manna, called *Sukuri Tighal* (Wealth of India, Raw Materials, CSIR, New Delhi, 1976). Some people are of the opinion that the siliceous sweet substance, *Tabashir* (Hindi: Bans Lochan), obtained from Bamboo is also Manna. The tree of Olive (*Olea europaea*) has also been reported to yield a type of Manna.

In Sinai, it is the honey-dew manna obtained from desert shrubs that receives most attention. Most Tamarisks, some Acacias, and even Camel Thorn produce exudates. The focus, however, is on the *Tamarix mannifera* (Arabic, *Tarfa*), also rendered *T. gallica* (French tamarisk). The exudates production of all other shrub species is probably less than that of the *Tarfa*.

Walter reports (Reinhold Warttig Mattfeld-Manna of Sinai -1910) that most famous Manna (Tamarix and other plants) product of the Middle East is the Kurdish manna which is collected by the thousands of kilograms every year in June and July. It is used for the preparation of special confections which are sold in the streets of Baghdad and elsewhere under the name of *manna*. This manna is also produced all over the Kurd region in the extensive oak forest by an aphid. This plant louse sucks on oak leaves and copiously excretes honey dew which solidifies with fragments of the leaves. This type of manna is composed principally of a rare polysaccharide trehlose.

There has been some confusion about the chemical nature of common gums and Manna. It may be stated that all the gums, like Gum-Arabic (*Acacia senegal* Willd. Family: Leguminosae) or Tragacanth (*Astragalus gummifera* Labill., Family: Leguminosae) are polymers of sugars and, therefore, bland in taste. These are chemically termed as complex polysaccharides. But the Manna contains different types of free sugars and sugar alcohols and, therefore, is always sweet. The sugars and their alcohols generally present in Manna are Glucose, Fructose, Melezitose, Dulcitol, Mannitol etc. Manna has a peculiar odor and a sweetish taste. It can be used in medicine as a gentle laxative. It is nutritive and a gentle tonic. It is still largely consumed in South America and was official in the United States Pharmacopoeia. Manna is usually prescribed with other purgatives, particularly senna, rhubarb, magnesia and the neutral salts, the taste of which it conceals while it adds to the purgative effect.

Under the name of Dulcinol, a mixture of Manna and common salt has been recommended by Steinberg in 1906 as a sweetening agent in diabetes.

The Codex of the British Pharmacopeia describes a Syrup of Manna to be prescribed as a mild laxative for children, in the proportion of 1 part of Manna to 10 of water.

Manna of the best quality dissolves in about 6 parts of water, forming a clear liquid. It has no bitterness or acridity.

Mannite, the crystalline constituent of sugary constituent of Manna was frequently prescribed in medicine instead of Manna itself.

**Prophetic Sayings on Manna**

1. Narrated Sa'id bin Zaid (R), Allah's Apostle (PBUH) said "The *Kama* (Truffle)) is like the *mann* (in that it is obtained without effort) and its water is a (medicine) cure for eye troubles-*Sahih Al-Bukhari*.
2. Narrated Sa'id bin Zaid (R) - 'I heard Prophet (PBUH) saying "Truffles are like (a type of) manna (i.e. they grow naturally without man's care) as their water heals eye disorders'-Book of Medicine-*Sahih Al-Bukhari*.
3. Narrated Sa'id bin Zaid (R) - The Prophet (PBUH) said "*Kam'a* (desert truffle) is a sort of *Mann* which God provided to Children of Israel. Its water is useful for eyes (Al Sunnan Ibn Majah).
4. Narrated Abu Huraira (R). Once someone described *Kam'a* (mushroom/desert truffle) as a pox on earth but the Prophet (PUBH) said "it is a kind of *Mann*. (Tirmizi).
5. Sa'id bin Zaid (May Allah be pleased with him) reported: I heard the Messenger of Allah saying, "Truffle (edible fungus) is a species of Al-Manna and their water cures eye diseases." (*Al-Bukhari* and *Muslim*).

**Note:** Article is one of the Chapters of PLANTS OF QURAN, by D. M.I.H. Farooqi, 10th Edition, 2019, Sidrah Publishers, Lucknow. Preface by Maulana Syed Abul Hasan Ali Nadvi, Founder-Member, Rabita Al Alam Al Islami.

# BIOLOGICAL AND PREVENTIVE STUDIES ON WHEAT SMUT DISEASE IN IRAQ

*Mahdi Hanoon Nwaedh Alkinani*
*Republic of Iraq – Governorate Maysan - Ministry of Agriculture – Directorate Agriculture of Maysan*

**Abstract:**
Results of wheat bunt survey explored presence of the disease in the northern and middle zones of Iraq. The disease was recorded for the first time in the southern zone in Al-Kadissia and Thekkar.

During the growing season 2002/2003 the highest percentage of wheat grains contamination with bunted balls was (0.66%) weight / weight followed by the middle and southern zone with (0.33 and 0.07%), respectively. These precents caused 50-100% of wheat grains contamination with fungal teliospore.

The highest inoculum load of spore in healthy wheat grains was 2.7 x 106 spore / gm grains in the sample taken from Baldroze area, Diala Governate, while the lowest load was 0.02 x 106 spore / gm grains from Alkut / Wasit governate.

Tilletia tritici was most frequent on wheat sample in northern zone compared with middle and southern zones. While the fungus T. laevis was significantly freguaent in the middle and southern zone followed by T .intermedia in the southern zone and Tilletia . sp in the middle zone of Iraq.

C.M.A. and W.A. media gave the highest germination for the spore compared with other media in the laboratory. The spore germination started after 3 days from incubation at 15°C and the promycelium expanded up to 266.6 µ without branching.
The length of primary sporedia was ranged from 44.4 - 71.1 µ and the length of conjugation tube was 4.4 - 6.8 µ which is formed from the short distance of the primary sporedia base, while the secondary sporidia dimension was 20 – 28 x 4.4 - 6.6 µ.

The maximum growth rate of *T. tritici* ( isolate D) was 3.97 cm on P.S.A media representing northern zone compared with the other isolates . Furththermore, differences in mycelia colour from snow white to pale yellow was detected . All the fungal colonies were rosset to irregular.

Most of the chemical fungicides and organic substances were highly effective against this disease especially Carboxin and Vitavax – plus which prevent spore germenation on W.A. at 100% in the laboratory.There was no effect of chemical treatment on grain vaibility except Dividend which showed significant effect on germination rate .Field experiment results showed significant effect of Dividend , Raxil and Vitavax – plus in bunt disease control by 100% in Sali and 100% , 98.3% and 96.6% in Saber Beg respectively. Carboxin significantly reduced infection percentage by 97.3% in Sali and 98.2% in SaberBeg.

Wheat floure treatment reduced disease incidence rate in both Sali and SaberBeg by 90.8 and 88.3%, respectively, while skim milk treatment were 84.3% and 74.0% reducation in Sali and SaberBeg respectively, Chemofoam treatment showed significant reduction in disease by 80.3% in SaberBeg.

Bread wheat cultivars Tamuz 2, Iratum and Durum wheat cultivars, Umrabi, Sham 3, Aksad, showed high resistance against the disease under artifical inoculation condetions, while Lattifia, SaberBeg and Milad showed high susceptibility toward this disease. The rest cultivars showed different reaction type.

Host prefernce of *Tilletia spp.* was different toward wheat species *T. tritici , T. laevis* and *T. intermedia* prefered bread wheat cultivars, while *T. tritici* prefered all durum wheat cultivars.

Results of alternate contamination of wheat species with inoculum showed differences in disease incidence by using different inoculum sources.

The depth of planting showed a significant effect on disease infection at 5 or 7 cm depth compared with 3 cm.

**Keywords:** wheat, biological study, smut disease, smut disease prevention, genotypes used in the study, artificial pollution, spread of covered smut disease.

**Introduction**

The wheat crop Triticum spp is one of the main cereal crops that is of great importance in the world, both in terms of cultivated areas and economic importance, as it represents the main type of human food throughout the ages and because it constitutes food measured in calories, and provides an adult with more than 25% of his need for protein. (Gooding, Davies, 1997) and 50% of its need for carbohydrates.

The crop occupies the forefront in the Arab world and Iraq by virtue of its importance as a main source of food and its role in the field of economic and social development, especially in light of the increasing food gap between demand for the crop and its supply, which is attributed to the global deficit in production and increased consumption, which recently reached 49% (Abu Rumaila, 1995) The latest forecasts indicate an increase in the rate of global demand for wheat by 40% at the beginning of 2020, which leads to its incompatibility with the steady increase in population. This is evident in third world countries in particular, which calls for serious thought in searching for different Methods for developing crop cultivation and optimal investment of available capabilities and means.

As for Iraq, there is an urgent need to pay attention to cultivating the crop and preparing ways to increase the productivity of one dunum, as well as protecting it from various pests by adopting modern technologies, which are the most effective force in the long term for the growth of vertical agricultural productivity, as the productivity of one hectare of the crop in the country does not exceed only 30 % of global production levels (F.A.O, 1998). In 2000, the production level reached approximately 1,040,000 tons for the cultivated areas designated for wheat production, which were estimated at more than 4,308,000 dunums (Central Bureau of Statistics, 2000). In addition to the instability of production rates from one season to another as a result of multiple factors, the most important of which is the amount of rain falling in the northern regions of the country in particular, which depend on organic agriculture, and salinity problems in the central and southern regions, as well as the crop's exposure to many plant diseases, including common bunt disease. Which is called by other synonymous names, including covered smut, stinking smut, hill bunt, and complete bunt.

**The disease is caused by fungi:**

Tilletia tritici (Bjerk.) Wint ( T.caries (Dac.) Tul T. laevis Kuhn (T. foetia (Wall.) LiroThe disease caused by the fungus T.foetida is also called high bunt, and low bunt is given to the disease caused by the fungus T.caries, depending on the degree of dwarfism caused by the pathogen to the host.

The spread of the disease prevails mainly in the northern regions of the country, where it represents a major problem for the wheat crop. The levels of damage to the crop vary from one season to another depending on the prevailing environmental conditions through the interplay of factors of humidity, temperature, and soil type, as well as factors related to levels of fertilization, the cultivated variety, the pathogenic strain, the pollination capacity, and the depth. Seed rate and length of photoperiod.

The disease has recently appeared in a striking manner in the irrigated areas represented by the central and southern regions of the country. Some high epidemic cases of infection with the disease have been recorded in some wheat fields spread in these areas, causing significant losses in yield. The reason for this may be due to reliance on the cultivation of local varieties. Regardless of the cultivation of certified seeds and chemical treatment, the disease is transmitted superficially by seed, with environmental factors being suitable for the spread of the disease (Al-Marouf et al., 2004).

Previous studies related to the disease are few, as they included aspects of testing the efficiency of different pesticides and their local alternatives in resisting the disease (Shali, 1973; Al-Baldawi et al. 1981; Al-Hassan et al., 1977; Daoud and Al-Hassan, 1981; Hassan and Mustafa, 1981; Hassan et al., 2001, and Al-Ma'rouf et al., 2004b). In addition to conducting field surveys in some years to investigate the spread of the disease (Al-Hassan and Alwan, 1973; Shali et al., 1974; Al-Baldawi et al., 1983; Al-Maarouf et al., 2004b) and the use of genetic resistance to the disease using different breeding methods.

**The Theoretical Framework Of The Study:**

**Objectives Of The Study:**

**This study seeks to achieve the following objectives:**

Due to the importance of the disease and the losses resulting from it, it has become necessary to study it and examine many aspects addressed

in this study, which are represented in the following:
- Conduct a field survey in the northern, central and southern regions to identify the reality of the disease and the extent of its spread in these regions.
- Testing the susceptibility of different varieties of soft wheat, Triticum aestivum, and durum wheat, T. durum, to the disease.
- Study of host preference for pathogen species.
- Conducting phenotypic studies of some pathogenic fungal isolates directly and in food media.
- Testing the efficiency of some chemical pesticides and their organic alternatives, in addition to other agricultural methods in combating the disease.

**Materials and working methods:**

1. The spread of covered smut disease:

For the purpose of determining the spread of covered smut disease in the country, samples of infected wheat grains were collected from the governorates of Nineveh (6 samples), Salah al-Din (2), Baghdad (2), Diyala (4), Wasit (2), Nasiriyah (1), and Diwaniyah (1), from the harvest of the 2002-2003 agricultural season, directly from farmers and from grain marketers, as well as from the silos affiliated with the General Company for Grain Trade in the Ministry of Commerce. The size of the form was 1 kg, placed in polyethylene (nylon) bags, and a tag was placed inside the bag including the name the governorate, region, and wheat variety as much as possible, then transferred to the laboratory until examination.

2. Laboratory studies:

A- Determining grain contamination rates:

250 grams were taken from each sample, and the contamination rates of the grains infected with the disease were determined by calculating the number and weight of charred balls in the healthy grains for each model according to the specifications of the International Organization for Standardization and Quality Control (ISO), (1989) and the Codex International Standard, (1995). The same was done. Calculating the number of tail spores of the pathogenic fungus in each charred grain using a microscopic counting slide (Heamocytometer). After crushing the charred grain in a hull and purifying it using a 500 micrometer sieve, 100 ml of distilled water was added to it in a 100 ml glass beaker. Then I took a drop and placed it on the microscopic counting slide. The number of tail spores in 1 ml was extracted, in addition to calculating the spore load of the pathogenic fungus in the seeds. The sedimentation method (Neergaard, 1977) was followed by taking 1 gram of wheat grains superficially contaminated with tail spores for each sample and adding 10 ml of distilled water to it in a 100 ml glass beaker. Then it was shaken manually for 10 minutes, and the suspension was transferred to centrifuge tubes and centrifuged for 15 minutes at a speed of 2000 r/min. The supernatant was removed and 1 ml of distilled water was added to the sediment and mixed well using a glass rod. I took a drop of the suspension and placed it on the divided slide. The number of teleospores per milliliter was estimated, which is equivalent to the spore load of one gram of wheat seeds.

3. Diagnosis of pathogenic causes:

The pathogens of the hooded smut disease accompanying the infected wheat samples were identified to the genus and species level, initially, after identifying the manifestations of the infection in the diseased grains and the shape and color of the masses of coccyx spores in the charred balls with the naked eye, and then the shape, size and color of the coccyx spores and their accompanying structures with an optical microscope using a lens micrometer. (Micrometer) under magnification (X400) and the causes were diagnosed based on taxonomic characteristics and using keys specific to the pathogenic fungus (Fisher and Holton, 1957; Wilcoxson and Sarri, 1996).

Cultivation of teleospores using different nutrient mediaI used the media

A. W (Water Agar) 2%

Soil Extract Agar

Nutrient Agar Wilcoxson and Sarri, 1996

Corn meal agar

Sterilized water

I took an unopened charred ball from one of the models in the northern region, and using a flame-sterilized needle, a small amount of teleospores were taken from the middle of the charred ball after piercing it to reduce the chances of contamination, and spread them over each of the above-mentioned media in glass dishes with a diameter of 9 cm, in three replicates for each treatment. After (3-4) days of incubation at 15°C, the dishes were examined to study the levels of germination and the phenotypic characteristics of the pathogenic fungus from the beginning of

germination until the formation of secondary sporidia, while measuring the dimensions of the structures formed by the fungus during this stage, and the following indicators were given according to the levels of germination.

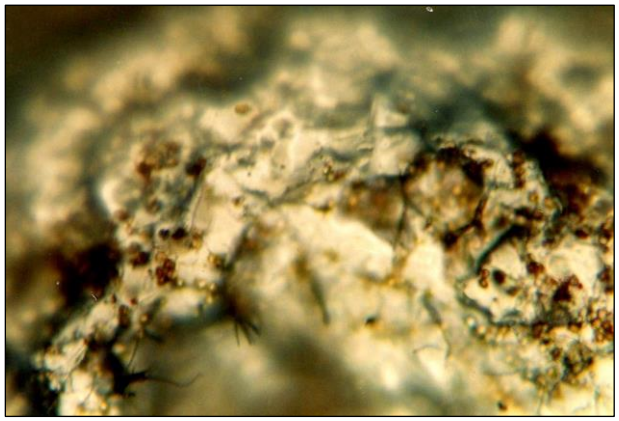

*Fig. 1. Gassnar's modified method for cultivating fungal coccygeal spores*
*Tilletia spp. Using W.A (X 400) nutrient medium.*

**The Effect Of Planting Depth On Disease Infection Rates**

The experiment was conducted in the fields of the College of Agriculture - University of Baghdad / Abu Ghraib, and as mentioned in paragraph 3-3-4-1-2, three depths were used in planting (3, 5 and 7) cm. Also, the artificial contamination of soft wheat seeds was classified by Saber Bey according to It appears in paragraph 3-2-6. Planting depths were prepared using a wooden board, 1 m long and 50 cm wide, with the depths marked in centimetres. The specific depth for each treatment was chosen by planting the board in the soil of the pond by pressing on both ends of the board based on the marks affixed to it, after creating the necessary moisture for the germination of the teleospores that It was mentioned in Paragraph 3-3-2. The first irrigation was given to the experimental plants as mentioned in Paragraph 3-3-3-1. The number of infected and healthy ears per meter of each treatment was calculated after they reached full maturity. In light of this, the percentage of infection with the disease was extracted for each planting depth under test. The results were recorded and the data analyzed statistically.

**Results And Recommendations:**

Determining the spread of hooded smut disease

The spread of covered smut disease in most wheat samples taken from the northern, central, and southern regions of Iraq, where the highest percentage of contamination of intact grains with charred balls, amounting to 1.3 w/w, was recorded in grain samples taken from the village of Al-Bajliyah and Baladruz district in Diyala Governorate, while the lowest was recorded. Grain contamination rate of 0.04 in Al-Hay District, Wasit Governorate. In general, the covered smut disease was more widespread during the 2002/2003 agricultural season in wheat samples taken from the northern region, with an average contamination rate of 0.66 w/w, meaning the presence of 6.6 grams of charred balls per kg of wheat grain, which equates to a contamination percentage of 1.26%. Number/number, followed by the central region with a contamination rate of 0.84%, then the southern region with a contamination rate of 0.09%. This explains, beyond a doubt, the spread of the covered smut disease from areas where it is found in the northern region to the wheat fields located in the central regions and then to the southern region. This result is consistent with what was indicated by Al-Ma'rouf et al. (2004) regarding the spread of the disease for the first time in wheat fields spread in the central regions of the country during the agricultural season 2001/2002, compared to the results of previous studies that indicated the spread of the disease exclusively in the northern regions of the country (Al-Baldawi (b1983 and Al-Ma'rouf et al., 1993), so the results obtained from this study are the first record of the disease's migration to the southern regions of the country as a result of the spread of the disease in both Dhi Qar and Al-Qadisiyah governorates during the 2002/2003 agricultural season. The reason for the spread of the covered smut disease from its areas of occurrence in the northern regions to the central and southern regions of the country may be due to the cultivation of wheat seeds contaminated with fungal spores imported from the northern regions, especially the use of the crop succession system, which has recently increased in work in the central and southern regions of the country specialized in the cultivation of watermelon, where Provides a suitable environment for the germination of teleospores and the development of the infection.

Determining the rates of contamination of wheat grains with charred balls:

The results of Table (4) show that the contamination rates of wheat grains with charred balls in most of the wheat samples taken from the

northern and central regions of the country exceeded the internationally permissible limits according to the standard specifications that allow the receipt of shipments of wheat grains when the contamination rates range between 0.1-0.5% as a maximum ( Standards of the International Organization for Standardization and Quality Control, (1989) and Standards of the Codex Alimentarius Organization, (1995). The highest percentage of contamination of intact grains with charred balls was recorded during the agricultural season 2002/2003 in Diyala Governorate/Baladruz district - Al-Bajliyah village, amounting to 1.3% w/w. This means that there are 13 grams of charred balls per kilogram of grain, which is equivalent to a percentage of 2.5% on a number/number basis, while the lowest percentage of contamination with charred balls was recorded in wheat samples taken from Al-Hay District, Wasit Governorate, amounting to 0.04%.The test results showed that Also, the rates of contamination of wheat grains with charring balls recorded in the studied wheat samples led to surface contamination of healthy grains with tail spores of the pathogenic fungus at rates ranging between 50-100%. This may be due to the huge numbers of tailing spores of the pathogenic fungus present in the charring balls, whose numbers ranged between 11-100%. 70 million telespores per charred grain, with a general average of 37.6 million telespores per charred grain, depending on the size of the charred grains and the dimensions of the telespores, while Al-Ma'arouf et al., (2004) indicated that the number of telespores in charred balls taken from the northern and central regions ranged between -70 80 million teleospores per charred grain.

The results of the spore load of intact wheat grains showed clearly in this study (Table 4) that the highest percentage of spore load was 2.7 x 106 spores/g of intact grains in the samples taken from the village of Al-Bajliyah - Baladruz district, Diyala Governorate, and the lowest was 0.02 x 106 spores/ A cloud of intact grains in the city of Kut, Wasit Governorate. The results of the same table also show the variation in the spore load rates of the grains with the weight and number of charred balls in the wheat samples. The reason for this may be due to the moisture content of the charred grains, as high moisture content causes the spores to agglomerate and prevents them from spreading and contaminating them. In addition, it also depends on the cultivated wheat varieties, as the highest spore load of grains occurs in the varieties that have the largest amount of hairs and fuzz at the top of the grain. Therefore, plant breeders usually resort to selecting varieties that lack these. The bristles are made smooth in disease resistance programs in order to reduce the spore load of grains to the maximum possible extent. In addition, the phenotypic appearance of healthy grains may help reduce or increase the amount of spore load in healthy grains.

*Fig. 2. Shape, size and color of charred balls.*

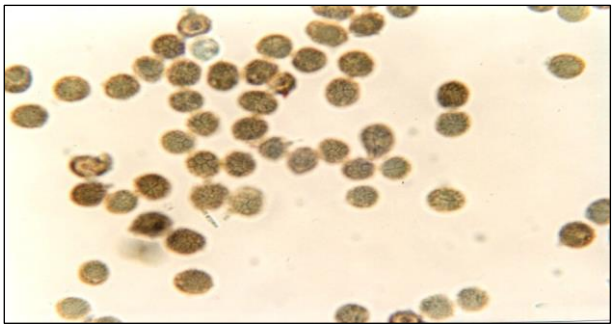

*Fig. 3. Tilletia tritici fungus 400.*

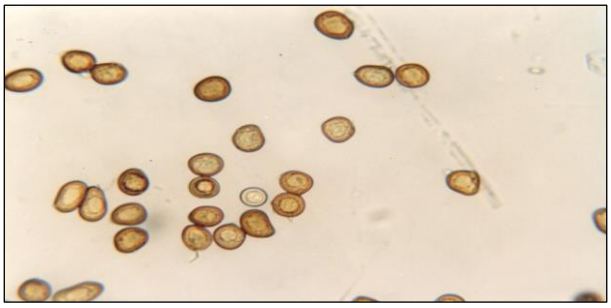

*Fig. 4. Telospores of the fungus T. laevis 400 X.*

**Second / Recommendations:**

Conduct periodic field surveys to investigate the spread of mulch smut disease in fields designated for wheat cultivation throughout the country.

It is necessary to adhere to international standard specifications when receiving grain consignments, which allow receipt when the percentage of grain contamination is between 0.1 - 0.5% maximum, with training competent

personnel to work in qualitative examination laboratories for grains.
Emphasis on planting the promising varieties Tammuz 2 and Aratom from soft wheat varieties, Umm Rabie and Sham 3 and Aksad from durum wheat varieties.

Use the fungicides Dividend, Raxil, and Vitafax-Plus at concentrations of 1, 1.5, and 1 gm/kg seeds, respectively, because they are highly efficient in controlling the disease as well as the accuracy of treating wheat grains. If pesticides are not available, fine wheat flour or skimmed milk can be used. At a concentration of 45 gm/kg seeds because they are efficient in resisting disease as well as being environmentally friendly study the resistance mechanism in resistant varieties.

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## MESSAGE FROM TAGHREED SAQER, EXECUTIVE SECRETARY, IAS ON HER 25TH WORK ANNIVERSARY

On my 25th work anniversary I am fulfilled with gratitude for the incredible journey I have had with the Islamic World Academy of Sciences (IAS). It's difficult to believe that all began back in March 1999 when I joined this amazing organization. The past 25 years have been filled with challenges, success, and unforgettable memories and friendship. I am proud to be part of this challenging team, and I am excited about what the future holds.

As I celebrate my 25th work anniversary, I want to express my heartfelt appreciation to IAS Fellows, IAS Director General, and my colleagues who have supported and guided me throughout this incredible journey I have had with IAS. Your trust, encouragement, and belief in my abilities have been instrumental in my growth and success, and I avail myself on this occasion to convey my hopes for the continued advancement of the IAS in the domain of science and technology for the advancement of OIC countries.

*During the 9th IAS Conference in Tehran, Iran (1999).*

# EVALUATING THE EFFICIENCY OF SOME PLANT EXTRACTS AND CHEMICALS IN COMBATING BLUE-GREEN ROT DISEASE ON ORANGES CAUSED BY THE FUNGUS PENICILLIUM SPP

*Mahdi Hanoon Nwaedh Alkinani*

*Republic of Iraq – Governorate Maysan – Ministry of Agriculture – Directorate Agriculture of Maysan*

**Abstract:**

This study was carried out to evaluation the activity of some natural products , salts and bioagents to control the causal agents of blue and green mould disease on orange fruits *Penicillium digitatum* and *P. italicum*.

The result showed that the powder of floral bud of *Eugenia caryophyllata* and seeds of white and red *Raphanus sativus* L. gave significant increasing in the inhibition of the percentage of fungi growth on artificial media according with the increasing of powder concentration. The Minimum Inhibition Concentration (MIC) for E.caryophyllata and R. sativus L. , red radish seeds and white radish seeds was 3 % ,15 % and 15 % respectively and ensured their ability to keep the fruits for 30 days at 25 ±2 c° in all concentration .

The results indicated efficiency of aqueous extracts for the powder flora buds of clove , red radish and white radish to decreasing the growth of the fungi *P. digitatum* and *P. italicum* there was significant inhibition at 10 % concentration with no growth for both fungi and percentage of inhibition was 100 % on able to preserve the fruits for 30 days at 25±2 c°.

Results indicated that there was significant inhibition effect of *Candida oleophila* on growth of both fungi , the radial growth means were 2 and 2.4 cm. for *P. digitatum* and *P. italicum* respectively comparing to control which it was 7 and 8 cm. to both fungi and able to preserve fruit for 30 days at 25±2 c° , also the results revealed that the yeast able to protect the wounds which were done on the surface of the fruits artificially.

Results of 3 % concentration of sodium bicarbonate showed highly inhibition of growth for *P. digitatum* and *P. italicum* on culture media P.S.A and preserve fruit for 30 days with all concentration degree. Meanwhile, $CaCl_2$ appeared less activity for inhibition growth, it was 53.8 % for *P. italicum* and 62.9% for *P. digitatum* at 60 % concentration which resemble $ED_{50}$ on culture media, also $CaCl_2$ ableed to preserve fruits for 30 days at 25±2 c° on 60 % concentration while other concentration don't achieved any ability to keep the fruits.

**Keywords**: Penicillium spp, chemical substances, plant extracts, blue-green rot disease, control of blue-green rot disease, oranges, mushroom isolation.

**Introduction:**

Orange (L.) Osbeck Citrus sinensis is one of the varieties of citrus that is classified among the important fruit trees and whose fruits occupy the forefront after grapes in international trade in terms of global consumption because they are one of the rich sources of vitamin C in addition to simple sugars, organic acids and some important mineral elements such as potassium (Adel). et al., 1985). Citrus fruits are susceptible to diseases caused by field and storage fungi. Mechanical damage, wounds, or scratches during harvesting, packing, transportation, and storage operations may help in this. The most important of these diseases are green orange fruit rot disease (Green mold disease) and fruit rot disease. Blue orange (Blue mold disease) caused by the fungi Penicillium digitatum and P. italicum, respectively. They are among the economic problems that lead to damage to fruits at the Arab and international levels, and they are considered storage diseases that cause major economic losses. Oranges are not only affected by rot, but the disease also affects other types of citrus (Bancroft et al., 1984) (Eckert and Eaks, 1989) (Wilson and Wisniewski, 1989).

Many control methods have been used against the two fungi that cause the disease, including chemical control (Obagwu and Korsten, 2003), various biological methods, and the adoption of natural products to control the disease (Pal and Gardener, 2006). Chemical control included the

use of a number of fungicides. Despite the ability of these pesticides, such as thiabendazoie (TBZ), imazalil (IMZ), and ortho-phenil phenate, which are sprayed on the fruits for the purpose of reducing the effectiveness of the two pathogenic fungi and increasing the storage period, there are health and environmental problems. The use of these pesticides is accompanied by direct risks to human health, in addition to the emergence of strains resistant to pesticides. It has been proven that Benomyl, which is one of the effective fungicides in reducing the growth of fungi, but it has health problems because it may lead to immune weakness and show symptoms similar to those symptoms caused by a virus. AIDS, as these pesticides are slow to decompose in the environment. The use of fungicides has led to increased resistance among fungal pathogens in addition to their negative effects on human health and disruption of the microbial balance in the environment (Eckert et al., 1994) (El-Goorani et al., 1984). Because of these negative effects, there has been a need to develop alternatives to fungicides to control post-harvest diseases, including biological resistance by adopting antibiotic microorganisms as a good and safe alternative in the environment to fungicides. Research has tended to use natural products, including pomegranate peels, seed powders, and aqueous and alcoholic extracts of a number of plants, instead of using fungicides. Another reason is that natural products do not pollute the environment, are characterized by rapid decomposition in the environment, and are non-toxic to humans because they contain effective compounds that inhibit the growth of many diseases. Plant pathogens and their bacterium, and the use of fungi and bacteria in bio-resistance pesticides has provided promising results in controlling fungal diseases.

**Objectives of The Study**

This study seeks to achieve the following objectives evaluation of the antagonistic activity of Candida oleophila yeast, some chemicals, powders, and aqueous extracts of clove flower buds, red radish seeds, and white radish seeds on the growth of the fungus Penicillium spp in agricultural media and on orange fruits under natural storage conditions in the laboratory.
the importance of studying:

The importance of this study lies in evaluating the efficiency of some plant extracts and chemicals in combating blue-green rot disease on oranges caused by the fungus Penicillium spp.

**Materials and Working Methods:**

Culture media used to diagnose and isolate fungi Potato Sucrose Agar (P.S.A).

Prepare the P.S.A culture medium by weighing 200 grams of peeled potato tubers, cutting them into small pieces, and boiling them with 500 ml of distilled water for 20 minutes in a glass baker. Then I filtered the boiled potatoes into a glass beaker using a piece of gauze cloth and kept the filtrate for the other ingredients. 20 One gm agar and 20 gm sucrose were added to half a liter of warm water with constant stirring to ensure complete dissolution and homogeneity. The potato filtrate was mixed with the water to which the agar and sucrose were added, and the volume was brought to 1 liter, and the antibiotic chloramphenicol was added at an amount of 250 mg/l. Then it was distributed in glass jars as needed, then its mouths were closed with cotton plugs and aluminum foil, and it was sterilized using an autoclave at a temperature of 121°C and a pressure of 1 atmosphere. Thus, it was ready for use or stored in the refrigerator until use. This medium was used to grow fungi and yeast Candida oleophila.

**Potato Sucrose Broth P.S.B**

It was prepared in the same way as in the previous paragraph, but without adding agar, and this medium was used to grow the fungi.

Isolation of the two fungi P. digitatum and P. italicum from infected orange fruits and their diagnosis:

The fungi P. digitatum and P. italicum were isolated from local orange fruits that showed symptoms of green and blue rot, which were brought from the local markets of the Babylon Governorate Center. Pieces of the peels of the affected orange fruits were taken (3-5 mm long and 3-5 mm wide) and placed in a baker containing 200 ml of sterile water, stirring for two minutes. Then take 0.5 ml of the solution containing the spores of the two fungi individually with a sterile pipette and transfer it to a petri dish, then pour 18 ml into the P.S.A. medium. (Potato Sucrose Agar) I gently moved the plates in different directions to ensure a uniform distribution of spores within the mushroom culture. The cultures were incubated at a temperature of 25±2°C for 2-3 days. Small colonies spaced apart from each other were selected for the purpose of obtaining a pure fungal culture for the two previously mentioned

mushrooms by scraping the culture The growing mushrooms were 2-3 days old, and each colony was placed in a new Petri dish containing P.S.A. medium, and was marked to represent a pure culture of the two fungi, P. digitatum and P. italicum, after later confirming by microscopic examination using a compound microscope equipped with a DB2-180M digital camera that it was For the two fungi under study separately, the process was repeated several times to obtain pure cultures of both fungi. The cultures of the two fungi were identified based on the taxonomic characteristics mentioned by Pitt, 1988 and Moubasher, 1993. The two fungi were grown in Petri dishes containing P.S.A. medium. By taking discs with a diameter of 0.5 cm using a cork auger with a diameter of 0.5 cm from the edge of the growing colonies of the two previously mentioned fungi at the age of a week, as they were grown on the surface of the inclined medium in test tubes containing the P.S.A. culture medium. The slant scro tube was sealed at an angle and incubated at a temperature of 25±2°C for a week, after which it was stored in the refrigerator for use in subsequent experiments. The isolation was continued periodically once a month.

**Evaluation Of The Effectiveness Of Powder And Aqueous Extract Of Clove Flower Buds And Red And White Radish Seeds In Inhibiting The Growth Of P.Italicum And P.Digitatum Colonies On Orange Fruits:**

Orange fruits were brought from the local market. Infected, small, and mechanically damaged fruits were excluded. The orange fruits were sterilized with chlorine (commercial minor) at a concentration of 6% for 2-3 minutes, after which they were washed with distilled and sterile water. Then the fruits were left until they were completely dry, after which a (+) or sign was made. Cross in the body of the fruit, at a depth of 2-4 mm, using a special, sterilized scalpel (blade), and then dip the fruits in the powder of the pink buds of cloves at a concentration of 1, 2, and 3% after preparing them by adding a specific weight of the powder, 1, 2, and 3 grams, to 99, 98, and 97 ml of distilled and sterile water. The fruits were immersed in it for half an hour, while the red radish seeds and white radish seeds were at a concentration of 5, 10, and 15%, each separately, by adding 5, 10, and 15 grams of each powder separately to 95, 90, and 85 ml of sterile distilled water, in the same manner and time. Dipping the powder of the pink buds of cloves. As for the extract, the same concentrations tested in Petri dishes, 5, 7.5, and 10% were used, while replacing the culture medium with sterile distilled water as in the powders. After that, the fruits were dried in a sterile room on sterile filter papers. The wounds were contaminated with a disk of fungal pollen. Each separately, with orange fruits immersed in water only and used as a comparison treatment. The fruits were stored in cork containers prepared for this purpose, as shown in Figure No. (1), and left in laboratory conditions at a temperature of 25 ± 2°C for a period of 30 days. The results were taken, including measurements. Colony diameter in each treatment and in the control treatment.

*Picture 1. Containers used to preserve orange fruits after treating them with C. oleophila extracts, yeast, and chemicals.*

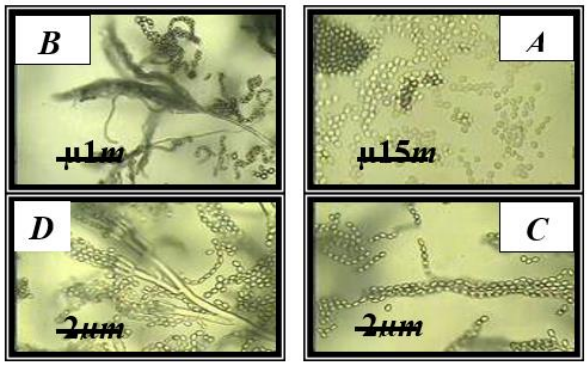
**Results and Recommendations:**

**First/Results:**

**Isolation of The Two Fungi P. Digitatum And P. Italicum From Infected Orange Fruits and Their Diagnosis:**

After obtaining pure isolates of the two fungi P. italicum and P. digitatum separately by the dilution method, the characteristics of the pure isolates were studied (colony shape, reverse pigments, conidia, and conidia). The colonies of all isolates belonging to the fungus P. italicum were characterized as being bluish-green in color. The fungus is white and divided, from which the conidia arise. These conidia grow vertically and branch from the apex into several branches that carry large numbers of conidial spores at their tips, arranged in broom-like chains. The spores were elongated and smooth, while the reverse pigments were dark brown, as shown in Picture No. (2) A and B. As for the characteristics of the fungus P.digitatum, the colonies were greyish-green in color, the mycelium was white and divided, the conidia that arise from the mycelium branched at their apex into several branches, and these branches carried a large number of elongated, smooth conidial spores arranged in

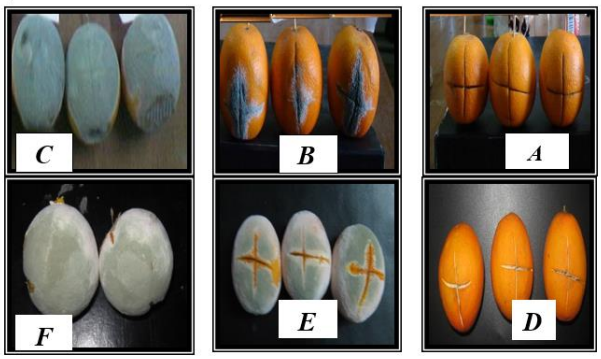
broom-like chains, pigments. The reverse is pale to light brown in color, as shown in Picture (2), C and D.



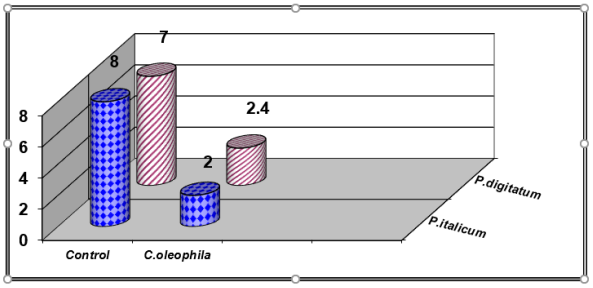

*Picture 2. Some diagnostic characteristics of the fungi P. digitatum and P. italicum.*

**Testing the Pathogenicity of The Fungi P. Digitatum And P. Italicum:**

The results of the pathogenicity test showed that the isolates of P. digitatum and P. italicum, which was isolated from infected orange fruits, had a high pathogenicity on healthy orange fruits. The process of inoculation with the two fungi separately led to infection of the healthy fruits and the appearance of disease symptoms on them 3-4 days after inoculation with each of the two pathogenic fungi, with the appearance of the water layer and then Fruits inoculated with the fungus P. italicum are colored blue, and those inoculated with the fungus P. digitatum are colored olive green, as shown in the picture.




*picture 3. The effect of P. digitatum and P. italicum fungi on orange fruits.*




*Format 1. Demonstrates the efficiency of oleophila yeast. C in inhibiting the fungi P.italicum and P.digitatum.*

**Second/ Recommendations:**

Work to separate the active substances from extracts of clove flower buds, their powders, and red and white radish seeds, and use them in applied research studies to achieve the best results because of its effectiveness through research in inhibiting the two pathogenic fungi tested.

Expanding the work in testing the efficiency of yeasts in biological resistance to what the yeast C. oleophila has shown in inhibiting the growth of pathogenic fungi tested in Petri dishes and in preserving fruits.

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# FRACTIONATION AND PHYTOCHEMICAL COMPOSITION OF AN ETHANOLIC EXTRACT OF ZIZIPHUS NUMMULARIA LEAVES: ANTIOXIDANT AND ANTICANCEROUS PROPERTIES IN HUMAN TRIPLE NEGATIVE BREAST CANCER CELLS[1]

*Rola Abdallah[1], Abdullah A. Shaito[2*], **Adnan Badran[3]**, Serine Baydoun[4], Mansour Sobeh[5], Wafae Ouchari[5], Nihad Sahri[5], Ali H. Eid[6], Joelle Edward Mesmar[1*] and Elias Baydoun[1*]*

[1] Department of Biology, American University of Beirut, Beirut, Lebanon,
[2] Biomedical Research Center, Department of Biomedical Sciences at College of Health Sciences, and College of Medicine, Qatar, University, Doha, Qatar,
[3] **Department of Nutrition, University of Petra, Amman, Jordan**,
[4] Breast Imaging Section, Imaging Institute, Cleveland Clinic Foundation, Cleveland, OH, United States,
[5] Agrobiosciences Program, College for Agriculture and Environmental Science, Mohammed VI Polytechnic University, Ben Guerir, Morocco,
[6] Department of Basic Medical Sciences, College of Medicine, QU Health, Qatar University, Doha, Qatar.

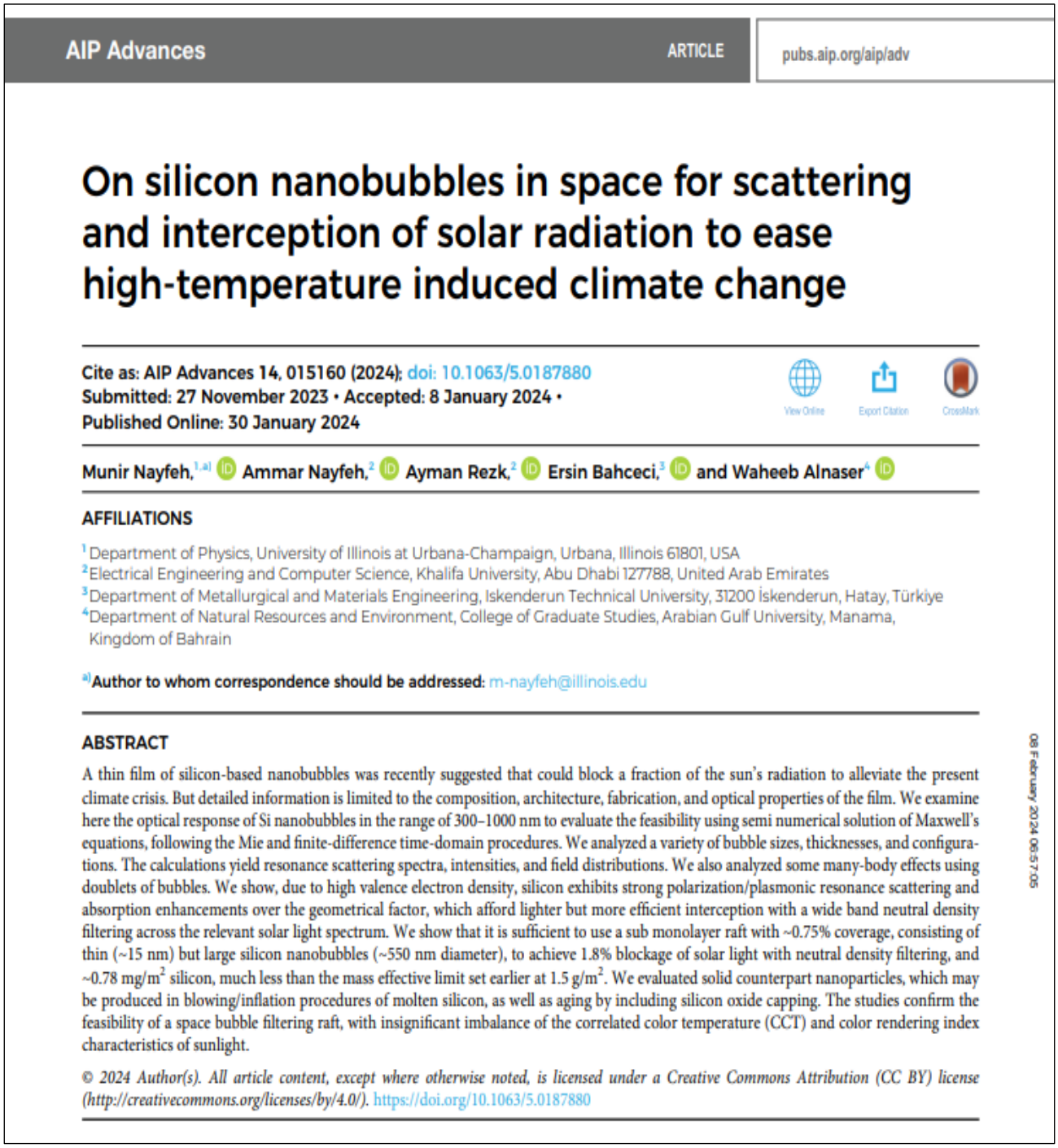
**Abstract**

Natural products have long been utilized in traditional medicine as remedies to improve health and treat illnesses, and have had a key role in modern drug discovery. Recently, there has been a revived interest in the search for bioactives from natural sources as alternative or complementary modalities to synthetic medicines; especially for cancer treatment, which incidence and mortality rates are on the rise worldwide. Ziziphus nummularia has been widely used in traditional medicine for the treatment of various diseases. Its traditional uses and numerous ethnopharmacological properties may be attributed to its richness in bioactive metabolites. However, its phytochemical composition or chemopreventive effects against the aggressive triple-negative breast cancer (TNBC) are still poorly explored. Here, phytochemical composition of an ethanolic extract of Z. nummularia leaves (ZNE) and its chromatographically isolated fractions was identified both qualitatively by spectrophotometric assays and analytically by HPLC-PDA-MS/MS. The anti-proliferative effects of ZNE were tested in several cancer cell lines, but we focused on its anti-TNBC effects since they were not explored yet. The anti-cancerous potential of ZNE and its fractions was tested in vitro in MDA-MB-231, a TNBC cell line. Results showed that ZNE and its Fraction 6 (F6) reduced the viability of MDA-MB-231 cells. F6 decreased MDAMB-231 viability more than crude ZNE or its other fractions. ZNE and F6 are rich in phytochemicals and HPLC-PDA-MS/MS analysis identified several metabolites that were previously reported to have anti-cancerous effects. Both ZNE and F6 showed potent antioxidant capacity in the DPPH assay, but promoted reactive oxygen species (ROS) production in MDA-MB-231 cells; an effect which was blunted by the antioxidant N-acetyl cysteine (NAC). NAC also blunted ZNE- and F6-induced reduction in TNBC cell viability. We also demonstrated that ZNE and F6 induced an arrest of the cell cycle, and triggered apoptosis- and autophagymediated cell death. ZNE and F6 inhibited metastasis-related cellular processes by modifying cell migration, invasion, and adhesion. Taken together, our findings reveal that Z. nummularia is rich in phytochemicals that can attenuate the malignant phenotype of TNBC and may offer innovative avenues for the discovery of new drug leads for treatment of TNBC and other cancers.

[1] *Link to the whole publication:* https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2024.1331843/full?utm_source=Email_to_authors_&utm_medium=Email&utm_content=T1_11.5e1_author&utm_campaign=Email_publication&field&journalName=Frontiers_in_Pharmacology&id=1331843

[*]*Correspondence: Abdullah A. Shaito: abdshaito@qu.edu.qa, abdshaito@gmail.com; Joelle Edward Mesmar: jm104@aub.edu.lb; Elias Baydoun: eliasbay@aub.edu.lb*

# A RECENT RESEARCH ARTICLE BY PROF. MUNIR NAYFEH FIAS PUBLISHED IN AIP ADVANCES



AIP Advances ARTICLE pubs.aip.org/aip/adv

## On silicon nanobubbles in space for scattering and interception of solar radiation to ease high-temperature induced climate change

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Munir Nayfeh,[1,a] Ammar Nayfeh,[2] Ayman Rezk,[2] Ersin Bahceci,[3] and Waheeb Alnaser[4]

AFFILIATIONS

[1]Department of Physics, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801, USA
[2]Electrical Engineering and Computer Science, Khalifa University, Abu Dhabi 127788, United Arab Emirates
[3]Department of Metallurgical and Materials Engineering, Iskenderun Technical University, 31200 İskenderun, Hatay, Türkiye
[4]Department of Natural Resources and Environment, College of Graduate Studies, Arabian Gulf University, Manama, Kingdom of Bahrain

[a]Author to whom correspondence should be addressed: m-nayfeh@illinois.edu

ABSTRACT

A thin film of silicon-based nanobubbles was recently suggested that could block a fraction of the sun's radiation to alleviate the present climate crisis. But detailed information is limited to the composition, architecture, fabrication, and optical properties of the film. We examine here the optical response of Si nanobubbles in the range of 300–1000 nm to evaluate the feasibility using semi numerical solution of Maxwell's equations, following the Mie and finite-difference time-domain procedures. We analyzed a variety of bubble sizes, thicknesses, and configurations. The calculations yield resonance scattering spectra, intensities, and field distributions. We also analyzed some many-body effects using doublets of bubbles. We show, due to high valence electron density, silicon exhibits strong polarization/plasmonic resonance scattering and absorption enhancements over the geometrical factor, which afford lighter but more efficient interception with a wide band neutral density filtering across the relevant solar light spectrum. We show that it is sufficient to use a sub monolayer raft with ~0.75% coverage, consisting of thin (~15 nm) but large silicon nanobubbles (~550 nm diameter), to achieve 1.8% blockage of solar light with neutral density filtering, and ~0.78 mg/m$^2$ silicon, much less than the mass effective limit set earlier at 1.5 g/m$^2$. We evaluated solid counterpart nanoparticles, which may be produced in blowing/inflation procedures of molten silicon, as well as aging by including silicon oxide capping. The studies confirm the feasibility of a space bubble filtering raft, with insignificant imbalance of the correlated color temperature (CCT) and color rendering index characteristics of sunlight.





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*For full paper: https://pubs.aip.org/aip/adv/article/14/1/015160/3230625/On-silicon-nanobubbles-in-space-for-scattering-and*

# PROF. YAHYA TAYALATI, HONORARY FIAS, VISITS IAS HEADQUARTERS IN AMMAN, JORDAN

Honorary Fellow, Prof. Yahya Tayalati, a distinguished scientist from Morocco, visited the headquarters of the Islamic World Academy of Sciences (IAS) in Amman, Jordan.

Prof. Tayalati was cordially received by Prof. Adnan Badran, IAS President and IAS staff and was given a comprehensive tour of the Academy's Headquarters allowing him to observe the facilities of the Academy and daily operations.

Prof. Badran discussed the academy's history, its significant accomplishments, and outlined the future plans and activities. Tayalati was presented with an IAS shield and a collection of the academy's publications.

The visit also emphasized the importance of international collaboration in science and provided a platform for discussing current scientific trends and future plans. It also highlighted the role of IAS in promoting scientific advancement in the Islamic world.

Prof. Tayalati was in Amman to represent Morocco in the Foundational Infrastructure for the Responsible Use of Small Modular Reactors (SMR) organized by the US Department of State. This important event highlighted the global commitment to responsible and sustainable energy solutions.

*Prof. Adnan Badran with Prof. Yahya Tayalati.*

*Prof. Badran presenting IAS Shield to Prof. Tayalati.*

*Prof. Tayalati signing the Visitor's Book.*

*Prof. Badran and Prof. Tayalti (center) with IAS Staff Ms. Daghestani (far left) and Ms. Saqer (Far right).*

# THE PASSING AWAY OF PROF. ASKAR MUSSINOV DIRECTOR GENERAL OF IOFS

It is with profound sorrow that the Islamic Organization for Food Security (IOFS) announced the passing of Ambassador Askar Mussinov, on 10 February 2023. The esteemed Director General of IOFS. Ambassador Mussinov departed at the age of 63, leaving behind a legacy of exemplary service and unwavering commitment to the cause of global food security and diplomacy.

Ambassador Mussinov was a distinguished diplomat and a visionary leader who devoted his life to advancing international cooperation. His tenure at IOFS exemplified his dedication to fostering peace and stability through diplomatic channels. Prior to his esteemed role at IOFS, Ambassador Mussinov held various high-level diplomatic positions, where his profound understanding of international relations earned him respect within the diplomatic community.

The Ministry of Foreign Affairs of the Republic of Kazakhstan acknowledges Ambassador Mussinov's significant contributions to strengthening bilateral relations with countries in the Middle East and Africa, as well as his pivotal role in the development of consular services and state protocol.

As Ambassador to key nations including Egypt, Saudi Arabia, the United Arab Emirates, and South Africa, Ambassador Mussinov adeptly promoted and safeguarded the interests of the Republic of Kazakhstan. His service as Deputy Secretary-General for Science and Technology at the Organization of Islamic Cooperation and as Director-General of IOFS epitomized his unwavering dedication to international peace and stability.

Born in Alma-Ata on 11 April 1961, Prof. Mussinov studied Eastern studies and philology at Leningrad State University. He began his career as a military translator in Libya from 1984 to 1987. From 1987 to 1991, he was Deputy Minister of Foreign Affairs for the USSR and subsequently Kazakhstan. From 1991 to 1992, he was Ambassador of Russia to Saudi Arabia. He then held various senior positions within the Ministry of Foreign Affairs and was chief of protocol for the President from 1997 to 1999. He was then Kazakhstan's ambassador to Egypt from 1999 to 2002 and to Saudi Arabia from 2002 to 2006. He was ambassador to the United Arab Emirates, Bahrain, Kuwait, Oman, Qatar, and South Africa from 2006 to 2013.

In July 2014, Mussinov was appointed Deputy Minister of Foreign Affairs. He then worked in the General Secretariat of the Organisation of Islamic Cooperation. On 5 May 2018, he was elected Deputy Secretary General of the Organization of Islamic Cooperation for Science and Technology. He then became Director General of the Islamic Organisation for Food Security, taking office on 1 January 2024.

The IAS President, Fellows and Staff pray to Allah (Subhanahu Wa Taala) to grant his soul eternal peace and give his family the courage and strength to bear this huge loss.

إِنَّا لِلَّهِ وَإِنَّا إِلَيْهِ رَاجِعُونَ

INNA LILLAHI WA INNA ILAYHI RAJIUN

*Source: https://www.iofs.org.kz/news/announcement-of-ambassador-askar-mussinovs-passing*
*https://en.wikipedia.org/wiki/Askar_Mussinov*

## 2024 TÜBA ACADEMY PRIZES ARE NOW OPEN


TÜBA Academy Prizes are annually awarded to the nominated scientists in one of the following categories of sciences namely,
1) Basic and Engineering Sciences,
2) Health and Life Sciences and
3) Social Sciences and Humanities.

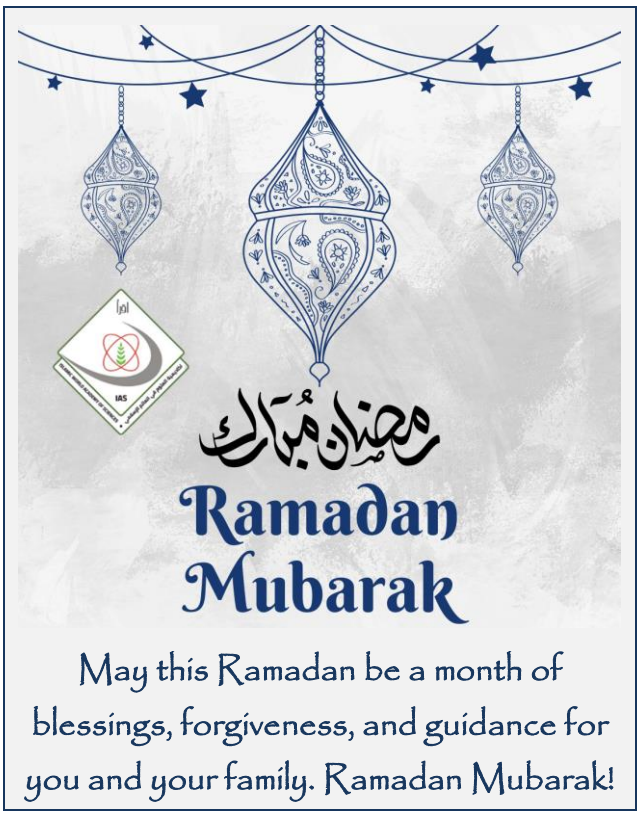
One prize is awarded in each category and every year one of the prizes is awarded to scientists related with Türkiye or Turkish issues, meaning those who work in Türkiye and/or study Turkish. Academy Prize in Social Sciences and Humanities is designated as the Türkiye related (research and studies) prize for this year. TÜBA Academy Prizes are given to those scientists with original, leading and path-breaking works in their fields. Nominations are made by TÜBA members, science academies and inter-academy organizations and other science institutions which are related with TÜBA.

Members of TÜBA and those who take part in the evaluation process of the prizes cannot be nominated. The nominees shouldn't have received any another science award from public institutions and organizations in Türkiye for last three years. The nominees are evaluated by a Prize Committee in each category. The Committees, composed of TÜBA members and renowned scientists, examine the works of the candidates via a rigorous process involving peer review and identify the possible prize laureates. The laureates are announced by the Academy Council of TÜBA. Following the Academy Prizes Rules and Procedures, the Academy Prizes, consisting of the Academy Prize Medal and Certificate, and a monetary prize determined by the Academy Council each year, will be presented to the laureates at a ceremony held at the Presidential Complex under the auspices of the Presidency of the Republic of Türkiye.

*For further information, please see the following link: https://bit.ly/3SVv6cy*

*The Project Officer: Nihal Tamgüç*

*E-mail: academy.prizes@tuba.gov.tr*



# THE ENDURING LEGACY OF AVICENNA: A PIONEER OF ISLAMIC SCIENCE AND PHILOSOPHY

*Prepared by:*
*The Academy of Sciences of IR Iran*

The Academy of Sciences of IR Iran proudly presents an exploration of the multifaceted contributions of Hakim Abu Ali Sina, also known as Avicenna, to the fields of medicine, philosophy, and astronomy. Avicenna, a prominent Persian polymath who lived from 980 to 1037, made substantial and lasting impacts on the development of Islamic and Western thought through his groundbreaking works and innovative ideas.

Avicenna's early life was marked by a rigorous education in various disciplines, including Islamic theology, logic, and natural sciences. His intellectual prowess became evident at an early age, and he quickly gained a reputation as a prodigious scholar. Influenced by the works of Greek philosophers, such as Aristotle and Plato, Avicenna's intellectual development laid the foundation for his later philosophical and scientific endeavors.

His most enduring contribution to the field of medicine is his magnum opus, "The Canon of Medicine" (Al-Qanun fi al-Tibb), a comprehensive medical encyclopedia that synthesized knowledge from various traditions and became a standard textbook in both the Islamic and European worlds for centuries. Avicenna's systematic approach to medicine, emphasis on empirical observation and experimentation, and classification of diseases significantly advanced the field of medicine and had a profound impact on subsequent medical scholarship.

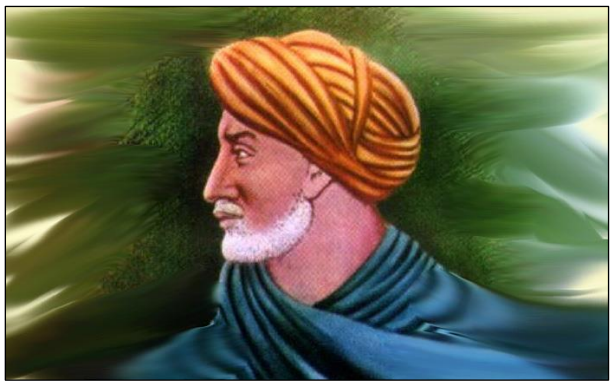
In addition to his medical achievements, Avicenna made significant contributions to the field of philosophy through works such as "The Book of Healing" (Al-Shifa) and "The Book of Salvation" (Al-Najat). His innovative ideas on the nature of existence, the soul, and the relationship between faith and reason have had a lasting influence on Islamic and Western philosophical thought.

Avicenna's influence extended beyond medicine and philosophy to the field of astronomy, where his astronomical theories based on observation and mathematical reasoning contributed to the development of later astronomical thought and had a lasting impact on Islamic and Western astronomy.

In conclusion, Avicenna's multifaceted contributions to medicine, philosophy, and astronomy have had a profound and enduring impact on the development of Islamic and Western thought. His legacy continues to inspire and inform scholarly inquiry and remains a testament to the enduring legacy of Islamic intellectual tradition.

*Avicenna's Tomb in Hamadan, Iran.*

# IBN KHALDUN* (1332 - 1395 AD)



Abd al-Rahman Ibn Mohammad is generally known as Ibn Khaldun after a remote ancestor. His parents, originally Yemenite Arabs, had settled in Spain, but after the fall of Seville, had migrated to Tunisia. He was born in Tunisia in 1332 AD, where he received his early education and where, still in his teens, he entered the service of the Egyptian ruler Sultan barquq. His thirst for advanced knowledge and a better academic setting soon made him leave this service and migrate to Fez. This was followed by a long period of unrest marked by contemporary political rivalries affecting his career. This turbulent period also included a three year refuge in a small village Qala'at Ibn Salama in Algeria. It was that period that provided him with the opportunity to write the *Muqaddimah,* the first volume of his world history that won him an immortal place among historians, sociologists and philosophers. The uncertainty of his career still continued, with Egypt becoming his final abode where he spent his last 24 years. There, he lived a life of fame and respect, marked by his appointment as the Chief Malekite Judge and lecturing at the Al-Azhar University. Envy caused his removal from his high judicial office as many as five times.

Ibn Khaldun's chief contribution lies in philosophy of history and sociology. He sought to write a world history preambled by a first volume aimed at an analysis of historical events. This volume, commonly known as the *Muqaddimah* or 'Prolegomena', was based on Ibn Khaldun's unique approach and original contribution. It became a masterpiece on literature, on philosophy of history and sociology. The chief concern of this monumental work was to identify psychological, economic, environmental and social facts that contribute to the advancement of human civilisation and the trends of history. In that context, he analysed the dynamics of group relationships and showed how group-feelings *al-'Asabiyya,* give rise to the ascent of a new civilisation and political power and how, later on, its diffusion into a more general civilization invites the advent of a still new *'Asabiyya* in its pristine from. He identified an almost rhythmic repetition of rise and fall in human civilisations, and analysed factors contributing to it. His contribution to history is marked by the fact that, unlike most earlier writers, interpreting history largely in a political context, he emphasised environmental, sociological, psychological and economic factors governing the apparent events. This revolutionised the science of history and also laid the foundation of *Umraniyat* (Sociology).

Apart from the *Muqaddimah* that became an important independent book even during the lifetime of the author, the other volumes of his world history *Kitab al-I'bar* deal with the history of Arabs, contemporary Muslim rulers, contemporary European rulers, ancient history of Arabs, Jews, Greeks, Romans, Persians, etc., Islamic History, Egyptian history and North-African history, especially that of Berbers and tribes living in the adjoining areas. The last volume deals largely with the events of his own life and is known as *Al-Tasrif*. This was also written in a scientific manner and initiated a new analytical tradition in the art of writing autobiographies. A book on mathematics written by him is not extant.

Ibn Khaldun's influence on the subject of history, philosophy of history, sociology, political science and education has remained paramount ever since his life. His books have been translated into many languages, both in the East and the West, and have inspired subsequent development of these sciences. For instance, Prof. Gum Ploughs and Kolosio consider *Muqaddimah* as superior in scholarship to Machiavelli's *The Prince* written a century later, as the former bases the diagnosis more on cultural, sociological, economic and psychological factors.

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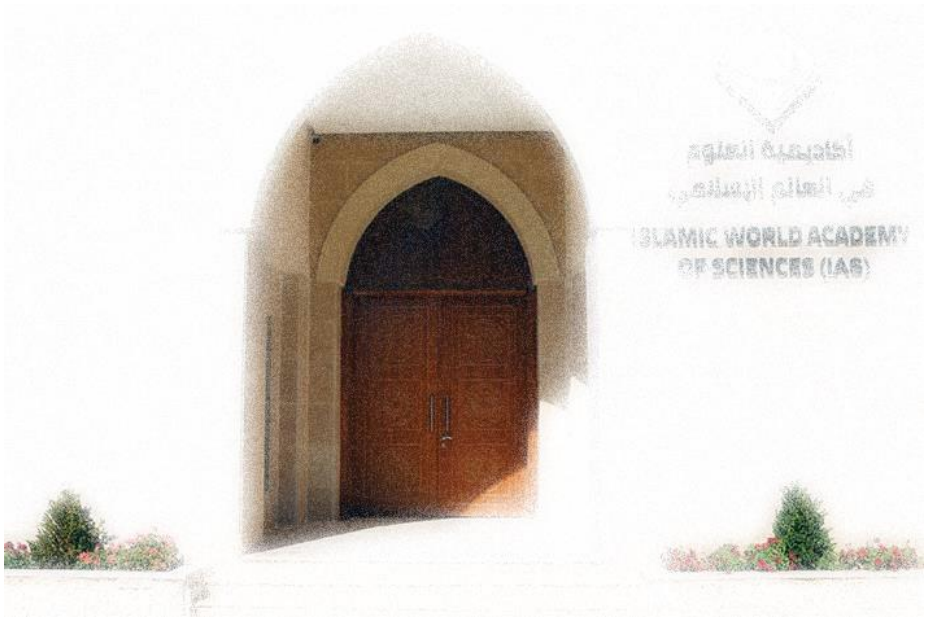
## EDITORIAL BOARD



PO Box 830036 Zahran
Amman 11183 Jordan

**Tel**: +962-6-552 2104
**Fax**: +962-6-551 1803

**E-mail:** ias@iasworld.org , ias@go.com.jo
http://www.iasworld.org

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