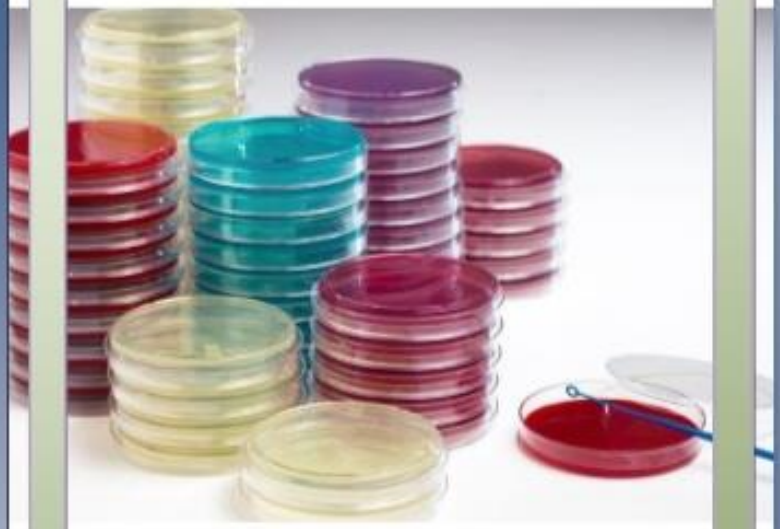
Syrian Arab Republic
Ministry of Higher Education and Scientific Research
National Commission for Biotechnology

# Abstract of Scientific Papers

# 2024



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# Abstracts of Scientific Papers 2024

# Contents


| Paper Title | Page |
|---|---|
| **Department of Medical and Animal Biotechnology** | 1 |
| Application of Three Types of Scaffolds in Pulp Regeneration for Permanent Mature Teeth with Periapical Lesions: A Randomized Controlled Trial | 2 |
| A Comparison Between Three Types of Scaffolds for Pulp Regeneration: A Histological Study on Dogs | 4 |
| Effects of *Salvia officinalis* on Production Characteristics of Laying Hens | 5 |
| Cytotoxic and Genotoxic Effects of Lambda-Cyhalothrin Insecticide on Human Dental Pulp Stem Cells | 6 |
| **Department of Molecular & Pharmaceutical Biotechnology** | 7 |
| Study of the effect of *Achillea fragrantissima* (Forssk.) Sch. Bip. (Asteraceae) oil on some types of pathogenic bacteria | 8 |
| **Department of Biodiversity & Biological Control** | 9 |
| Study of the effect of *Achillea fragrantissima* (Forssk.) Sch. Bip. (Asteraceae) oil on some types of pathogenic bacteria | 10 |
| Verticillium wilt of olive and its control caused by the hemibiotrophic soil-borne fungus *Verticillium dahlia* | 11 |
| *Phytophthora capsici* the Causal Agent of Phytophthora Blight of *Capsicum* spp.: From Its Taxonomy to Disease Management | 12 |
| **Department of Plant Biotechnology** | 13 |
| - | |
| **Department of Biotechnology for Medicinal Plants** | 14 |
| Role of some Abiotic stresses in the production of Vincristine and Vinblastine from *Catharanthus roseus* callus | 15 |
| **Department of Industrial & Food Biotechnology** | 16 |
| A Comparison of Laser Light-Scattering and Analytical Profile Index Systems for Foodborne Bacteria Identification | 17 |
| **Department of Fermentation Biotechnology** | 18 |
| - | |

# Department of Medical &

# Animal Biotechnology

# Application of Three Types of Scaffolds in Pulp Regeneration for Permanent Mature Teeth with Periapical Lesions: A Randomized Controlled Trial

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**European endodontic journal**

## Abstract

Objective: This study aimed to evaluate pulp regeneration by comparing the application of native chitosan-based scaffolds with enzymatically modified chitosan-based scaffolds in mature teeth with apical lesions, using clinical and radiographic assessments.

Methods: The eligibility criteria for this study were participants aged between 15–45 years, free from systemic diseases and with necrotic mature single-rooted teeth with periapical lesions. The teeth were equally and randomly allocated into three groups (1:1:1 allocation): Group A received treatment with a Blood Clot (BC) scaffold; Group B with a combination of Native Chitosan and Blood Clot (NCS+BC) scaffold; and Group C with Enzymatically-Modified Chitosan and Blood Clot (EMCS+BC) scaffold. Clinical procedures were performed over two appointments. During the first appointment, canals underwent standardized mechanical and chemical preparation, followed by a modified triple antibiotic paste application, then sealed with glass ionomer cement. After three weeks, the antibiotic paste was removed. Subsequently, the regenerative procedure was conducted based on the group assignment. Participants were monitored at one, three, six-, and twelve months post-treatment to evaluate the treated teeth clinically and radiographically, focusing on the status of periapical lesions and tooth sensibility through cold testing. Statistical analysis included the Kruskal-Wallis and Mann-Whitney U tests to determine significant differences in healing degrees among the three groups over time. Additionally, the Chi-square test was used to assess significant differences in tooth sensibility frequencies during the cold test across the groups.

Results: Thirty teeth from twenty-four participants were included. There were no significant differences in the frequencies of healing degrees among the three studied groups (BC, NCS+BC, EMCS+BC) after one, three, and twelve months. The degree of healing after six months in the EMCS+BC group was higher than in other groups, and there were no statistically significant differences in the frequencies of healing degrees after six months between the NCS+BC group and BC group. The frequencies of tooth sensibility in the cold test among the three studied groups (BC, NCS+BC, EMCS+BC) were significantly different after six and twelve months. The tooth sensibility in the BC group was smaller than that of both the NCS+BC group and EMCS+BC group, and there were no statistically significant differences in the frequencies of tooth sensibility between the NCS+BC group and EMCS+BC group.

Conclusion: The application of the EMCS+BC scaffold demonstrates superior outcomes in pulp regeneration after six months, with a higher degree of healing observed compared to the NCS+BC and BC groups. There were no statistically significant differences at one month, three months, and twelve months. Additionally, tooth sensitivity was more pronounced in the EMCS+BC and NCS+BC groups.

**Keywords**: Blood clot, chitosan, mature teeth, scaffolds, tissue regeneration

# A Comparison Between Three Types of Scaffolds for Pulp Regeneration: A Histological Study on Dogs

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**Clinical and Experimental Dental Research**

## Abstract

Objectives: This study aims to compare the application of three types of normal scaffolds—native chitosan, enzymatically modified chitosan, and blood clot (BC)—on pulp regeneration in the teeth of experimental dogs through histological examination, to determine the quantity and type of new tissues formed within the root canal.

Materials and Methods: The research sample consisted of 32 root canals from 20 premolars of two male local experimental dogs. The sample was randomly divided into a control group, in which no intervention was performed on the teeth, and three experimental groups based on the type of scaffold used: the BC group, the native chitosan combined with BC (NCS + BC) group, and the enzymatically modified chitosan combined with BC (EMCS + BC) group. Mechanical and chemical cleaning of the canals was performed, followed by the application of the studied scaffolds within the root canals. After 3 months, the teeth were extracted and prepared for histological study, where two variables were studied: the percentage of total vital tissue (soft and hard; VT%) and the percentage of soft vital tissue only (ST%). A one-way ANOVA and Bonferroni tests were used to determine significant differences between the groups at a 95% confidence level.

Results: The VT% values were significantly higher in the EMCS + BC group compared to both the NCS + BC and BC groups. The ST% values were also significantly higher in the EMCS + BC group compared to the BC group. However, no significant differences in ST% values were observed between the NCS + BC group and either the BC or EMCS + BC groups.

Conclusions: Within the limitations of this study, we conclude that the application of enzymatically modified chitosan scaffolds combined with BC yields superior results in pulp regeneration, which contributes to the formation of pulp-like tissue and cells resembling odontoblasts, as well as apex closure with tissue resembling bone tissue.

# Effects of Salvia officinalis on Production Characteristics of Laying Hens

Rafan Abd Al Hadi  Frdoos Al Fadel

**Journal of world poultry research**

## Abstract

Due to the extreme importance of the poultry industry in securing animal proteins for humans, it is necessary to expand the research related to increasing egg production without resorting to antibiotics, which pose significant drawbacks. This study explored the impact of sage plant extracts, known for their bioactive compounds, on the production indicators of laying hens. Thirty chickens were randomly assigned to three groups, including a control group and two experimental groups (T1 and T2) receiving sage plant aqueous extract at 0.1% and 0.2% in their diets, respectively. The egg production percentage, egg weight percentage, percentage of daily feed consumption, feed conversion coefficient, and blood calcium concentrations were measured. The results indicated that supplementation of sage extract in the diet of the laying hens under study increased daily egg production percentage and daily egg yield significantly in group T2 (87.63%, 59.7 eggs/day) and improved average egg weight (68.23 grams) in group T1. Moreover, there was no significant difference in daily feed consumption among the tested hens. A notable reduction was also observed in the feed conversion ratio to 2.09 in group T2 .

**Keywords:** Feed additive, Laying hen, Plant extract, Productivity, Sage

# Cytotoxic and Genotoxic Effects of Lambda-Cyhalothrin Insecticide on Human Dental Pulp Stem Cells

Manal Saleh , Aroub Al-Masri, Daas Ezzedin

**Iranian Journal of Toxicology**

**Abstract**

Background: Lambda-cyhalothrin (LCT) belongs to pyrethroid insecticides, the use of which has increased for pest control. It is essential to study the effects of LCT on the DNA of living organisms to prevent its mutagenic and carcinogenic properties. Currently, there is a lack of information on the effects of LCT on humans. This study examined the cytotoxicity and genotoxicity of LCT insecticides on human dental pulp stem cells (DPSCs).

Methods: We examined the cytotoxicity of LCT at serial concentrations of 0.5, 1, 2.5, 5, 10, 25, and 50 µM using an MTT assay. Four concentrations of LCT at 0.5, 1, 25, and 50 µM were selected from the cytotoxicity curve and subjected to a comet assay to assess genotoxicity.

Results: The results of the MTT assay showed that LCT inhibited cell proliferation at 1 µM concentration of the 5% formulation, while the other concentrations of LCT at 0.5, 2.5, 5, 10, 25, and 50 µM increased cell proliferation rates by 10, 1, 4, 20, 59, and 76%, respectively. The results of the comet assay provided evidence that the LCT insecticide induced a statistically significant increase in DNA damage in DPSCs at all tested concentrations compared to those of the negative controls ($P>0.05$).

Conclusion: The LCT insecticide was genotoxic to DPSCs but was not cytotoxic at the tested concentrations, except at 1 µM. Instead, it increased cell proliferation. This suggests that LCT may function through an additional mechanism that mimics that of estrogen and may potentially become a candidate as a xenoestrogen.

**Keywords**: Comet assay, Cytotoxicity, Dental pulp stem cells, Genotoxicity, Lambda-cyhalothrin, LCT.

# Department of Molecular & Pharmaceutical Biotechnology

# Study of the effect of Achillea fragrantissima (Forssk.) Sch. Bip. (Asteraceae) oil on some types of pathogenic bacteria

Nawras Al-Abras  Lina Al-Amir  Vivian Daifallah

**Revista Brasileira de Gestão Ambiental e Sustentabilidade**

**Abstract**

The effect of the essential oil of the *Achillea fragrantissima* plant on some bacterial species pathogenic to humans, such as *Escherichia coli, Pseudomonas aeruginosa , Staphylococcus aureus* , was studied. The results showed resistance of *P. aeruginosa* to the highest studied concentration of oil(10 µl/ml), while the MIC for E.coli bacteria ranged between 3 µl/ml and 4.5 µl/ml while MIC for *Staphylococcus S.taphylococcus aureus* 5µl/ml.

**Keywords:** Oil- *Achillea fragrantissima* - Minimum inhibition concentration- pathogenic bacteria- resistance- The macro dilution method.

# Department of Biodiversity &

# Biological Control

# Study of the effect of *Achillea fragrantissima* (Forssk.) Sch. Bip. (Asteraceae) oil on some types of pathogenic bacteria

Nawras Al-Abras  Lina Al-Amir  Vivian Daifallah

**Revista Brasileira de Gestão Ambiental e Sustentabilidade**

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# Verticillium wilt of olive and its control caused by the hemibiotrophic soil- borne fungus *Verticillium dahlia*

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Okon Okon Mohammad Imad Khrieba

**Microbial biosystems**

## Abstract

Verticillium wilt, caused by the soil-borne fungus *Verticillium dahliae* Kleb., poses a significant threat to olive (*Olea europaea* L.) cultivation worldwide. This review provides an in-depth comprehension of the disease and its management strategies. The genetic diversity of *V. dahliae*, comprising various pathotypes and races, has implications for virulence and host interactions. The fungus can affect a wide host range, including crops and trees. *V. dahliae* is responsible for many symptoms such as wilting, yellowing, stunted growth, necrosis, and vascular discoloration. Economic consequences caused by this pathogen include yield losses, low-quality olive oil, market restrictions, and increased production costs. Verticillium wilt thrives in warm temperatures and excessive soil moisture. Chemical and biological controls and cultural practices are evaluated as potential measures. However, the search for resistant cultivars stands out as a significant solution. Insights from this review underscore the need for an interdisciplinary approach to managing the Verticillium wilt of olives. Integrated disease management strategies, resistant cultivars, and sustainable practices emerge as pivotal approaches for disease control.

**Keywords**: Chemical control, Management practice, *Olea europaea*, sustainability.

# Phytophthora capsici the Causal Agent of Phytophthora Blight of *Capsicum* spp.: From Its Taxonomy to Disease Management

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**Egyptian Journal of Phytopathology**

**Abstract**

Capsicum, a genus native to tropical and subtropical America, holds immense nutritional, economic and cultural significance due to its diverse species. However, these valuable crops face a constant threat from various diseases caused by viruses, bacteria, fungi and especially the notorious *Phytophthora capsici*. *P. capsici*, first identified as a pepper pathogen in New Mexico by L.H. Leonian in 1922, is a devastating Oomycete wreaking havoc on vegetable, ornamental and tropical crops worldwide. This pathogen thrives in both temperate and tropical environments and possesses an arsenal of abilities that make it a formidable adversary. *P. capsici*'s high genetic diversity allows it to readily overcome fungicides and host resistance, while the formation of long-lasting oospores ensures its persistence in soil. Its ability to rapidly differentiate into infectious zoospores in the presence of water fuels epidemics and its broad host range amplifies economic losses and renders crop rotation less effective. The severity of *P. capsici*-induced diseases and the complex management challenges have spurred extensive research efforts. Here, we delve into recent discoveries regarding the biology, genetic diversity, disease management strategies and effector biology of this formidable Oomycete.

**Keywords**: *Phytophthora capsici*, Phytophthora blight, *Capsicum* spp., sustainability, management practice.

# Department of Plant

# Biotechnology

# Department of Biotechnology of

# Medicinal Plants

# Role of some Abiotic stresses in the production of Vincristine and Vinblastine from *Catharanthus roseus* callus

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**Research Journal of Biotechnology**

**Abstract**

The experiment was carried out at the National Commission for Biotechnology during 2019–2021 with the aim of studying the influence of some abiotic stresses on the fresh and dry weight and the content of vincristine and vinblastine in *Catharanthus roseus* callus. After sterilization, seeds were cultured in MS medium. Plants were transferred to propagation media. Callus was developed from the leaves using 5C01 medium. After 60 days, the callus was moved to the 5C01 medium with NaCl (0, 30, 60, 90, 120 mM) and PEG-6000 (0, -0.2, -0.4, -0.6 MPa) with a higher level every 30 days. The findings revealed that fresh and dry callus weight considerably decreased in the 120 mM NaCl treatment (3.03, 0.24 g respectively) and at the osmotic stress level of -0.6 Mpa (2.34, 0.19 g respectively). The vincristine and vinblastine content were significantly higher at the NaCl induction level of 90 mM NaCl (94.29, 103.6 µg.g-1 DW respectively), while they were considerably lower at the osmotic stress level of -0.6 Mpa (2.61, 3.12 µg.g-1 DW respectively). This research suggests a new medium (5C01) for callus induction which is distinguished by superior levels of vincristine and vinblastine in the callus compared to other studies.

**Keywords**: NaCl-salinity stress, PEG-6000 osmotic stress, Callus, Vincristine, Vinblastine

# Department of Industrial & Food Biotechnology

# A Comparison of Laser Light-Scattering and Analytical Profile Index Systems for Foodborne Bacteria Identification

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**Archives of Razi Institute**

## Abstract

Foodborne bacteria pose substantial risks to human health and food safety. Scientists worldwide have shown great interest in the development of rapid, reliable, and cost-effective methods for identifying foodborne bacteria. Among these methods, Optical scattering technology (BARDOT) has emerged as the fastest and most efficient technique, offering a unique pattern of scattered light passing through the center of the bacterial colony for identification purposes. In this study, we examined 118 isolates of foodborne pathogenic bacteria, including *Escherichia coli*, *Enterobacter cloacae*, *Salmonella Enterica*, *Hafnia alvei*, and *Proteus mirabilis*, derived from various food sources. To identify these isolates, we employed Analytical Profile Index (API) Systems, specifically API 20E and ID 32E, which rely on biochemical tests, in addition to laser light scattering technology. In this method ideal colonies, which exhibited specific characteristics such as a suitable diameter, isolation from neighboring colonies, and a completely circular shape without any irregular edges, were selected to create scatter images. These scatter images revealed a distinct "fingerprint" that can be utilized to differentiate between the species. This "fingerprint" allowed for the successful identification of all isolates belonging to the five species in our current study, achieving a 100% identification accuracy. Our findings demonstrated that laser light scattering technology provided accurate identification cost-effectively and safely. This method eliminated the need to open the plates containing the bacterial colonies, ensuring the colonies remained intact after identification. Furthermore, the laser light scattering technique proved to be much more rapid compared to the API 20E and ID 32E Systems, which were not only significantly more expensive but also time-consuming and labor-intensive.

**Keywords:** Foodborne bacteria, Foodborne bacteria, Food safety, API system, Laser light scattering, Biochemical tests.

# Department of Fermentation