RNA Amplification by NASBA: a New Molecular Technique for Detection of Infectious Diseases

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Abstract

Infectious diseases have always been considered an important cause of the deaths. Today, the prevalence of these diseases and high mortality rates of the epidemics have conducted many research projects to identify simple and accurate methods to diagnosis and treat these diseases. Among molecular methods, isothermal nucleic acid amplification methods have become of special interest since they do not require expensive equipment and facilities (thermocycler). The nucleic acid sequence-based amplification (NASBA), in addition to isothermal reaction, is able to identify RNA and differentiate between viable and dead microorganisms. Therefore, it can play a major role in the detection of infectious agents and examination of the treatment trend at the time of outbreaks in different populations. In this review study, the aim was to examine various reports on the application of this technique in the identification of infectious agents and investigate the importance and application of this new molecular technique in epidemics infectious. According to the results of this study, it can be claimed that NASBA is more effective than the polymerase chain reaction (PCR) in identifying infectious agents, in critical and epidemic conditions, and since NASBA is simple and not to require thermocycler, it can be set up in any laboratories. Hopefully, utilization of this technique in Iran's laboratory network can resolve the problems in the process of diagnosis and treatment of infectious diseases.

Key words: isothermal amplification, NASBA, infectious diseases

Ecological Characteristics, Medically Importance and Available Controlling Strategies about Whitefly as a Threatening Pest to Human and Plant Health

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Abstract

Background and objective: The reports of numerous outbreaks of Whitefly insects from various areas of the world, as well as expansion of their distribution in recent years, has emphasized the describing their morphological and ecological characteristics, medical importance and the provision an appropriate scientific control method to combat this pest. This review article was conducted to introduce this important pest.

Materials and methods: In this study, 34 English articles indexed in different databases such as PubMed, Web of Sciences, Scopus, Science direct and Google scholar were exploited. There were no articles about whiteflies in the Persian language.

Results: Whiteflies have been identified as one of the most important and polyphagia pests for a large number of strategic agricultural products around the world, especially in tropical regions. The insect by entering the respiratory pores, causes allergies and inflammation and infection in the upper respiratory tract, and ultimately these flies can trigger the activation of fungal and bacterial opportunistic microorganisms in humans. Also, damages to the leaf of plants and trees by these insects indirectly lead to the risk of air pollution and increased respiratory distress. The most effective control method of combating the whiteflies is integrated pest management.

Conclusions: According to the findings of this review article, Whiteflies are one of the major problems of metropolis such as Tehran. In addition to many damages to plants and trees, this insect is considered a threat to human health, especially the respiratory tract.

Therefore, it is recommended to use the Integrated Pest Management in cooperation and coordination of relevant organizations such as Ministry of Agriculture, Environment, Municipalities, Agricultural Sciences Universities and Ministry of Health to control this pest.

Keywords: Whitefly, Ecological Characteristics, Medically Importance, Controlling Strategies

Evaluation of two Nanoparticle PMMA and Alum adjuvant on DNA Vaccine Containing SAG3 Gene of *Toxoplasma gondii* (RH strain) for Immunity and Survival Assay in Animal Model

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Background and objective: *Toxoplasma Gondii*, as an intracellular and obligatory parasite, is a leading cause of toxoplasmosis in human which is widespread throughout the world. The surface big antigen SAG3 is expressed during the different cycles of the parasite life and plays critical role in cell adherence and attachment. In recent years, significant improvements have been provided for identifying of appropriate vaccines against this parasite. The aim of this study is to production of DNA vaccine from the *Toxoplasma Gondii* SAG3 gene and evaluation of immune responses resulted in BALB/c mice compared to controls.

Materials and methods: To consider the immunization properties of this vaccine, BALB/c mice in test group were immunized 3 times per week with pcSAG3, pcSAG3+Alum, and pcSAG3+PMMA, while BALB/c mice in control group had received PBS, pcDNA3, pcDNA3+Alum, and pcDNA3+PMMA. Immune responses were evaluated by measuring the antibodies and cytokines levels and mice survival rates.

Results: The humoral and cellular responses in groups received pcSAG3, pcSAG3+Alum, and pcSAG3+PMMA vaccines were increased significantly compared to the control group ($p<0.05$). The mean of survival rates in control groups was 9 days, while it was over 120 days in test group.

Conclusion: Our results demonstrated that the use of pcSAG3 as a DNA vaccine induces the humoral and cellular responses and increases survival rates of treated mice against *Toxoplasma Gondii*. Our data have also revealed that this gene can be a suitable candidate for vaccination against *Toxoplasma Gondii*.

Key Words: Toxoplasma Gondii, DNA vaccine, immunization, SAG3 gene,Nanoparticle PMMA&Alum

Anti-biofilm Activity of Melittin against *Acinetbacter baumannii* Strains Isolated from Patients Suffered from Burn Infection

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Abstract

Background and objective: *Acinetobacter baumannii* is a dangerous agent responsible for burn infection. Currently, antibiotic resistance is being increased and in these conditions, antimicrobial peptides have suggested to overcome this kind of infections. Accordingly, this study was aimed to evaluation of melittin peptide on degradation of biofilm produced by A. baumannii and killing effect of this peptide on bacteria in depth of biofilm.
Materials and methods: Melittin was purified from bee venom by Reverse-Phase HPLC. Biofilm producing ability of strains was evaluated by spectrophotometry. Then, degradation and killing effect of melittin on biofilm and bacteria were examined by spectrophotometry and culture method respectively.
Results: The results indicated that all strains have biofilm, production ability and the average of OD was estimated at 0.98. This average was dropped to 0.15 OD due to degradation of biofilm. The culture results showed that all bacteria were killed in different amounts of melittin.
Conclusion: The amount of biofilm production was varied among the bacteria. This issue pointed out to this fact that gene expression of biofilm related genes is different subsequently. Degradation of biofilm by melittin would be induced by pore formation in the surface of biofilm and this issue is boosted by increasing in peptide amount too. Killing ability of melittin on bacteria demonstrate that melittin can be able to penetrate across the biofilm and invade to bacteria.
Keywords: Acinetobacter baumannii, Melittin, Biofilm production, Biofilm degradation, Spectrophotometry, Culture

Antibacterial Effect of Tragopogon graminifolius DC Hydroalcoholic Extracts on Acinetobacter baumannii(In vitro study)

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Abstract

Background and objective: Acinetobacter baumannii opportunistic pathogen causing nosocomial infection, many problems in success of treatment failure and mortality in patients because of resistance to antibiotics has created. Tragopogon graminifolius DC plant in traditional medicine in Iran and around of the world by having multiple health effects always have been used. The aim of this study was to invitro investigating of antibacterial effect of Tragopogon graminifolius DC hydroalcoholic extracts on Acinetobacter baumannii.
Material and methods: In this study, plant Tragopogon graminifolius DC collected in the spring season and after confirming it was dried in the shade and away from direct sunlight.
Extraction was performed by Maceration method and alcoholic and aqueous extracts obtained with concentrations of 6.25, 12.5, 25, 50 and 100 mg per ml prepared to do the work were stored at 4°C. Standard strains of Acinetobacter baumannii at these concentrations with disc diffusion method was determined susceptibility. inhibition zone diameter was measure and recorded.
Results: The aqueous extract Tragopogon graminifolius DC in the highest concentration (10 mg per ml) caused an inhibition zone with a diameter of 2 mm, but alcoholic extract did not cause any inhibition.
Conclusion: Due to very weak growth inhibitory effect of aqueous extract and ineffective alcoholic extract it can be said, plant Tragopogon graminifolius DC has no antibacterial effect in Acinetobacter baumannii.
Keywords: Hydroalcoholic extract , Tragopogon graminifolius DC, Acinetobacter baumannii.

Antimicrobial Effect of Aqueous and Ethanolic Extracts of *Falcaria vulgaris* on some Pathogenic Bacteria and Comparison with a Variety of Common Therapeutic Antibiotics "*in vitro*"

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Abstract

Background and objective: *Falcaria vulgaris* (locally named Paghazeh and Ghaz-ayaghi) in the folk medicines of west of the country this herb is used for the healing of skin ulcers and stomach disorders. With regard to limitations and known side effects of common therapeutic antibiotics, the exploring of antimicrobial compounds seems necessary. The aim of this study was to investigate the antimicrobial effect of Ghaz-ayaghi on a number of bacteria including *Staphylococcus aureus*, Listeria innocua, *Escherichia coli* and *Pseudomonas aeruginosa*.

Materials and methods: maceration method and solvent of water and ethanol at a ratio of 1 to 5 used for extraction. Various qualitative and quantitative methods were used to examine the antimicrobial activity of the Ghaz-ayaghi extract. The antimicrobial effect of the extracts was evaluated by two methods qualitative, "Pour plate method" and "kirby-bauer method". The broth microdilution and broth macrodilution methods were employed to measure the minimum inhibitory concentration. The minimum bactericidal was measured.

Results: The results showed that the highest inhibition zone diameter in 60 mg/ml was related to *Staphylococcus aureus* and the minimum diameter in this concentration was related to *Pseudomonas aeruginosa*. Minimum inhibitory concentration (MIC) of the ethanolic extract of Ghaz-ayaghi for *Staphylococcus aureus*, Listeria innocua, *Escherichia coli* and *Pseudomonas aeruginosa* were 12.5, 25,25 and 50 mg/ml, respectively and the minimum bactericidal concentration (MBC) of the ethanolic extract were 25, 25, 100, and 100 mg/ml, respectively.

Discussion: The results showed good antimicrobial effects on pathogenic strains, hence the complementary study for clarifying of the biological activity of extract is suggested.

Keywords: Ghaz-ayaghi, Antibiotic, Pathogenic bacteria, Extract.

Prevalence and Risk Factors of Culture Positive Infections in ICU of Vali-e-asr Hospital. Birjand in 95-94

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Abstract

Background and objective: culture-positive infections included the nosocomial infections in the ICU . The aim of this study was to investigate the culture- positive infections and the risk factors in patients admitted to the ICU of Valiasr (AS) university hospital, Birjand, Iran.
Materials and methods: In this cross-sectional descriptive analytical study, 353 patients in the ICU at Valiasr (AS) university hospital in Birjand were studied. In the case of hospital infection they were cultured and in positive samples risk factors were analyzed. After data collection, (SPSS-18) were used and descriptive statistics (percent - frequency) and chi-square tests were analyzied.
Results: 96 (27. 2%) of the patients who were admitted to the ICU affected with positive culture-positive. The mean age of individusls in present study, was 53/85±23/16 years. 71/2% of patiants with more than 10 days hospitalization affected with culture-positive infection. The increase in the duration of hospitalization, increase the culture-positive infection statiscally significant ($p<0.001$) There was significant relation between culture-positive infection and many risk factors.
Conclusions: According to current study, it is necessary to pay more attention to the patients who are at risk of positive culture infection and reduction of risk factors. It is also recommended to avoid any unnecessary interventions in the ICU. In addition, if it is a need for catheterization, care and hygiene to prevent infection is necessary.
Key words: culture-positive infection, risk factors, ICU

An Epidemiological Study of Hydatid Cyst in Isfahan Province during 2011-2014

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Abstract

Background and objective: Hydatid cyst disease is one of the most common parasitic diseases of humans and animals caused by the larval stage of E. granulosis.This disease is prevalent in many parts of Iran and has a great importance. This study was conducted by the aim of assessing epidemiological of hydatid cyst in Isfahan province during 2011-2014.

Materials and methods: In This routine data base study all records from patients with hydatid cyst during 2011-2014 at health centers under coverage of Isfahan University of Medical Sciences were studied. Personal characteristics including gender, age, nationality, location, number of cysts and affected organ were obtained. Data were analyzed by descriptive statistics including: frequency tables and graphs, and analytical statistics included T- student test in less than 5% error level using Stata software version 12.

Results: Morbidity Ratio was higher in women compared with men (51.3% compared to 48.7%) and nearly 78% of them were living in urban areas. The average age of women were 42.1±18.6 and in men were 42.2 ± 19.8 (P.Value= 0.97). About 13.4% of patients were younger than 20 years and 37.5% of patients older than 50 years. Most of the patients (117 subjects) were housewives. In 66.8% of patient's liver and in 27.9% of them lungs were involved. In 68.77% of patients abdominal pain was a chief complain.

Conclusions: In this study According to the majority of patients with hydatid cyst were female and housekeeper wives, the main cause of contamination can have more contact with the vegetables contaminated with parasite eggs.

Keywords: Hydatid cyst, epidemiology, Isfahan, Iran