

Comparison of the Neutralizing Antibodies' Ability in Different COVID-19 Vaccine Platforms Recipients

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Abstract

The COVID-19 pandemic has led to great efforts to achieve effective vaccines with different approaches around the world, and different vaccine platforms have been developed against SARS-CoV-2. Meanwhile, these technologies are still being investigated to obtain more data on the efficacy of combined vaccine platforms. The purpose of this study is to investigate the power of neutralizing antibodies of vaccinated people against COVID-19 in different vaccination regimens in Iran.

We investigated Sinopharm/Sinopharm, Sinopharm/PastoCovac or Plus, AstraZeneca/AstraZeneca and AstraZeneca/ PastoCovac Plus recipients. The sera samples were collected from vaccinated individuals 3 weeks after the booster shots. cVNT test was done on the samples after sera dilution. The results showed that all the vaccine regimens induced neutralizing antibodies. Nevertheless, the combinational vaccine regimens in Sinopharm primed individuals showed greater neutralizing potency comparing to the homologous group. Moreover, PastoCovac Plus showed similar ability to AstraZeneca vaccine regarding neutralizing Wuhan and BA.5 variants.

An overview of the importance and role of probiotics in community health improvement

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Abstract

The consumption of healthy and natural food supplements in dietary plans positively impact food quality. Additionally, replacing chemical compounds with beneficial alternatives can enhance the functions of different body systems, including the digestive, immune, and nervous systems. Probiotics are foods and/or supplements that contain non-pathogenic microbes such as bacteria and yeast that colonize the gut and can potentially yield a variety of health benefits. The ability of probiotics to modify the immunological response of the host, antagonize pathogenic microbes, or compete for adhesion sites with pathogenic microorganisms is related to the action of probiotics against microorganisms. Different studies make it possible to identify the probiotics that are most suitable for a given application such as food items (cheese, milk, and yogurt) or supplements (chewing gum, lozenges). Because these bacteria have the benefit of being completely adapted to the human oral ecology, the presence of probiotics in the native human microflora should be studied. Previous studies regarding the benefits of probiotics on the human intestinal microbiome indicating the promising findings for the cure of gut-related disorders. Considering these health benefits of probiotics, now it has been applied to different food materials which are designated as functional food. This review explored a portrait of the beneficial effects of probiotics on human health.

Keywords: probiotics, health improvement, normal biota, gut-related disorders, functional food

Frequency of genes encoding prophage-associated virulence factors among methicillin-resistant *Staphylococcus aureus* strains isolated from patients with diabetic foot infections in Tehran during 2021-2022

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Abstract

Background: Foot ulcer is a common complication in diabetic subjects and infection of these wounds contributes to increased rates of morbidity and mortality. Diabetic foot infections (DFI) are caused by a multitude of microbes and methicillin resistant *Staphylococcus aureus* (*S. aureus*) (MRSA), a major nosocomial and community-associated pathogen, significantly contributes to wound infections as well. The aim of this study was to determine the frequency of genes encoding different virulence factors among MRSA strains isolated from patients with diabetic foot infection in Tehran.

Materials and Methods: In this study a total of 152 *S. aureus* isolated from patients with DFI in a laboratory of a hospital in Tehran were collected and confirmed by specific primers for *nucA* gene. The resistance of strains to oxacillin was determined using specific primers for *mecA* and *mecC* genes and separate multiplex-PCR assays were employed to type the MRSA strains. The presence of 6 enterotoxin (A, E, G, K, P and Q) genes and 5 virulence factors (*hly*, *sak*, *tsst-1*, *eta* and PVL) among the strains were tested by specific primers.

Results: A total of 58 (38%) *mecA* gene positive strains were selected as MRSA and 3 SCC*mec* types II (12%), III (69%) and V (19%) were detected among strains. Also, strains harbored 6 prophage types (SGA, SGB, SGF, SGFa, SGFb and SGL), in which SGF, SGFa and SGFb were the most prevalent types; and 4 prophage patterns were also determined, which pattern 3 (consisting of SGB, SGF, SGFa and SGFb) was the dominant one. All strains were positive for *sea*, *sek* and *seq* enterotoxin genes and *hly* and *sak* virulence genes. Moreover, the frequency of *see*, *seg*, *sep*, *eta*, *tsst-1* and *pvl* was limited to 24, 29, 36, 26, 14 and 11% of strains. On the other hand, community acquired MRSA (CA-MRSA) strains harbored SCC*mec* type V and were positive for SGA prophage type.

Conclusion: The results of the present study indicated the presence of prophage associated different virulence factor genes among MRSA strains isolated from patients with DFI, which enable them to produce a variety of diseases.

Key words: Diabetic foot infections, MRSA, virulence factors, enterotoxins, prophage typing, SCC*mec* typing

Antifungal effects of thyme and clove extracts on *Candida* isolates obtained from patients with Recurrent Vulvovaginal Candidiasis

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Abstract

Background and purpose: Recurrent vulvovaginal candidiasis is an important gynaecological problem in medicine. *Candida* vulvovaginitis is the second cause of vaginitis in women after bacterial infections. This study aimed to investigate the effect of thyme and clove essential (TEO and CEO) oil in clinical isolates of recurrent vulvovaginal candidiasis.

Materials and methods: In this experimental study, 60 samples were taken from patients suspected of recurrent vulvovaginitis who were referred to Zahedan medical centers over a period of 6 months. Definitive diagnosis of candidates was done using germ tube tests, chlamydoconidia production and *Candida* pigment on CHROMagar candida medium. The minimum inhibitory concentration (MIC) was determined according to the CLSI M27 document of TEO, CEO and fluconazole drug in clinical isolates.

Results: The frequency of *Candida albicans* was 56.66% and *Candida krusei* was 43.34% in clinical isolates. The MIC₉₀ of thyme and clove essential oils for clinical isolates of *Candida albicans* recurrent vulvovaginitis were 3.9 and 0.97 µl/ml, respectively.

Conclusion: The results of this study showed that *Candida albicans* and *Candida krusei* are common causes of candidiasis and recurrent vulvovaginitis, respectively. Also, compared to thyme essential oil, clove essential oil had a better antifungal effect in inhibiting the causative agents of recurrent vulvovaginal candidiasis.

Keywords: *Candida*, thyme essential oil, recurrent vulvovaginal candidiasis, cloves

Association between biofilm production and antibiotic resistance in *Escherichia coli* strains isolated from patients with urinary infection in Isfahan during 2017

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Abstract

Background: Urinary tract infection (UTI) is one of the most common bacterial infections, and a significant cause of morbidity in humans. Uropathogenic *Escherichia coli* (UPEC) is known as the primary cause of UTI and due to its ability to form biofilm results in high level resistance to different classes of antibiotics. Biofilm formation is a major determinant for the persistence and recurrence of UTI. In this study we aimed to determine the prevalence of biofilm producing UPECs and the relationship between antibiotic resistance and the quantity and quality of biofilm formation in patients with UTI in Isfahan.

Materials and Methods: During 2017, a total of 213 suspected *E. coli* isolates were collected from patients with UTI in a referral hospital in Isfahan and were identified using common biochemical and PCR confirmatory diagnostic tests. Production of curli/cellulose, and, biofilm formation was assessed using qualitative Congo red agar (CRA) and quantitative microtiter plate (MTP) methods, respectively. Biofilm producing strains were tested for susceptibility to 17 antibiotics using disk diffusion method by the guidelines of Clinical & Laboratory Standards Institute (CLSI).

Results: A total of 166 strains (78%) were identified and confirmed as *E. coli* using common biochemical and PCR tests. According to the results of qualitative CRA and quantitative MTP assays, 39 strains (23%) were able to form curli and/or cellulose and were biofilm positive. The highest resistance rate of biofilm producing *E. coli* strains was against ampicillin followed by cefotaxime, cefpodoxime and ceftriaxone. On the other hand, carbapenems and aminoglycosides were also the most effective antibiotics against UPEC infections.

Conclusion: The results of the present study indicating the high prevalence of antibiotic resistant biofilm producing UPEC strains among patients with UTI in Isfahan. Moreover, a direct relationship between the strong biofilm production and high level antibiotic resistance was also found.

Key words: UTI, UPEC, biofilm, carbapenems, aminoglycosides