Isolation of soil Bacillus spp. with inhibitory effects on methicillin-resistant Staphylococcus aureus (MRSA)

Introduction

The overuse of antibiotics in human medicine and agriculture has contributed greatly to the crisis we experience today. In the United States alone, at least 2 million people acquire resistant infections each year, with up to 95,000 of these cases resulting in death (CDC 2013). The production of biolignol and certain toxins from Staphylococcus aureus (MRSA) infection, in otherwise healthy individuals, affects the skin and soft tissues. More serious complications can arise from the superficial skin and soft tissues. More serious complications can result from the production of biolignol and certain toxins. These virulence factors, in combination with multifrug resistance, result in high mortality and morbidity rates (AAM 2013).

Approach

Currently, three isolates of approx. 30 soil samples have demonstrated significant activity against MRSA strains in the perpendicularly streaked tests (Figure 1). These isolates were sent to MIDI labs for D1 Table 1. A peptide media analysis has been performed on environmental isolates. Though no zones of inhibition have been observed to date, there has been an obvious impact on the density of the surrounding lawn of S. aureus.

Results

Isolation of soil Bacillus spp. (Figure 2)

0.25g soil, 4.5 mL TS&B, sodium acetate trihydrate incubate at 30°C for 48 hours. After a fruitless search for pathogens in soil, Selman Waksman (1924) suggested their discovery in the soil. One such organism, Bacillus subtilis, was found to inhibit the growth of S. aureus as a result of this approach. The most common cause of gut death was due to Gram-positive pathogens capable of surviving in the gut. The resistant strains were divided into four major genera, one of which is the soil-dwelling Bacillus (Waksman & Woodruff, 1924).

Perpendicularly streaked environmental isolates against MSSA strains

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Why Bacillus spp.?

In this study, 30 soil samples were tested for the presence of Bacillus spp. isolates. These samples were incubated for 48 hours. After incubation, an inhibition halo was observed around the isolates tested. These isolates were classified as Bacillus spp. using the VITEK 2 system and the VITEK 2 Gram-positive kit. The isolates were also tested for their ability to produce antimicrobial compounds using the well diffusion assay.

After the selection of Bacillus spp. isolates, the isolates were further tested for their ability to produce antimicrobial compounds. The isolates were incubated for 48 hours at 30°C. After incubation, the isolates were tested for their ability to produce antimicrobial compounds using the well diffusion assay. The results showed that Bacillus spp. isolates produced antimicrobial compounds.

Conclusion

In conclusion, this study demonstrated the potential of Bacillus spp. isolates to produce antimicrobial compounds.

Acknowledgments

This project was supported by NIH grant number R01GM113318 and by NIH grant number R01GM077122.

Literature Cited

Bacillus is a promising genus as a source of antimicrobials effective against Gram-positive organisms. In addition to conventional methods, high-pressure liquid chromatography (HPLC) will soon be used to determine the components of the promising environmental isolates.