

POPULAR SCIENTIFIC SUMMARY

Since their discovery in the 20th century, antibiotics have played a major role in treating life-threatening, untreatable infections. For a long time, these life-saving drugs have been used and abused to their maximum extent and as a result, what was once thought as a powerful weapon of choice for the elimination of pathogens has now become nearly impotent because of the emergence of antibiotic resistance. As a consequence, the number of drug-resistant microorganisms have grown in size and have been spreading uncontrollably despite all efforts. Thus, antibiotic resistance is viewed as an ever-increasing threat to humanity and it challenges the very survival of all living creatures. This means that it is beyond question to discover alternate ways to combat the pathogenicity of virulent microorganisms. One of the possible ways is to use probiotics.

Probiotics like *Lactobacillus reuteri* are well-known for their beneficial effects on the host. Although probiotics are commercially marketed and available as functional foods and livestock feeds, their antimicrobial properties have been often overlooked. *L.reuteri* has been previously found to secrete an antimicrobial compound known as reuterin during the metabolic conversion of glycerol, which is proven to act against pathogenic microorganisms. In this work, the antibacterial activity on *Escherichia coli* effected by *L.reuteri* by the production of reuterin was studied.

The two organisms were co-cultured in a common medium at optimal conditions and reuterin production under varying glycerol concentrations was observed. The study revealed that at a certain concentration of glycerol, a lethal dose of reuterin on *E.coli* was produced by *L.reuteri* in the medium. This confirmed that the *E.coli* is susceptible to antagonistic effects of the antimicrobial reuterin. And as a probiotic, *L.reuteri* could be potentially used as a substitute for antibiotics in treating infections.

In addition, co-culturing opportunities of *L.reuteri* and *Prevotella copri* for exocellular electron transfer between the two species were explored by designing a modified bioreactor setup. The experiments showed that a medium that nourishes both bacteria and help them grow should be formulated and the culture conditions should be optimized. Therefore, it was evident that is possible to co-culture and at the same time, more basic studies need to be carried out before co-culturing of the aforementioned microorganisms.