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**POLYPHENOLS: THE ROLE OF FOOD BIOACTIVE AGENTS IN  
COMBATING MICROBIAL VIRULENCE**

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Polyphenols are well-known group of bioactive molecules distributed in various foods such as citruses and honey. They have been recognized mainly due to their antioxidant properties but recent insight into their antimicrobial spectrum implies potential novel application for this group. Polyphenols are able not only to block growth of pathogenic microorganisms, but they can also interfere with microbial ability to induce disease, microbial virulence. With the abundant studies conducted worldwide we now know about range of virulence factors that are necessary for disease induction and though we have new antimicrobial targets. One of the most studied virulence factors is microbial ability to form biofilms. We have recently studied rutin, flavonoid glycoside found in citruses. This molecule has the ability to block biofilm formation of *Pseudomonas aeruginosa* IBRS P001 and *Staphylococcus aureus* IBRS MRSA 011, strains that are resistant to antimicrobial therapeutics. In addition to reduction of biofilm biomass, rutin antibiofilm mechanisms also included reduction in cell viability, exopolysaccharide, and extracellular DNA levels. Moreover, moderate inhibition of bacterial adhesion to keratinocytes upon rutin treatment was observed. Rutin antivirulence mechanisms involved inhibition of *P. aeruginosa* protease, pyocyanin, rhamnolipid, and elastase production and the downregulation of the *lasI*, *lasR*, *rhlI*, *rhlR*, *pqsA* and *mvfR* genes. This research has proven wide antivirulence potential of rutin. Moreover, we have tested range of flavonoids as inhibitors of fungal virulence and resistance. Rutin, but also apigenin and apigenin, have shown promising antibiofilm and anti-hyphal properties in several clinical *Candida albicans* strains examined, which was also confirmed on molecular level.

Polyphenols have wide antivirulence capacity employing a range of mechanisms and might be used for the development of novel antimicrobial strategies. Intake of food polyphenols might have some health benefits in the terms of limiting microbial pathogenicity, which is the possibility that should be explored in more detail.

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