Metabolic reprogramming in the drug-resistant *P. aeruginosa* by polyphenols: Examining the possibilities in adjuvant therapy with antibiotics.

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ABSTRACT

Acquisition of antibiotic resistance by the pathogenic bacteria is the major concern to the scientific community. *P. aeruginosa* is the causative organism for hospital-borne diseases and respiratory tract ailments. Moreover, this organism is responsible for rapidly developing resistance to antibiotics by mechanisms which include overexpression of drug metabolizing enzymes, enhancing drug efflux rates or developing drug resistant biofilms. Polyphenols like Gallic acid and tannic acid hold good potential in combating microbial diseases. Our previous data indicated that Gallic acid improves the antibiotic sensitivity of the ampicillin resistant *P. aeruginosa* strains where inhibition of the drug efflux plays an immense role. Here we have studied two polyphenols – Gallic acid and tannic acid - in modulating the metabolic profile and the membrane potential of *P. aeruginosa* in order to understand the mechanisms behind the drug efflux alterations. Results have shown that Gallic acid increases the oxygen consumption rate as well as modulates the membrane potential of the cells. A major challenge remains as to link the observed changes with the antibiotic resistance phenotype and the drug effluxes. Further studies needed to establish whether dietary polyphenols can be used in supplementing the patients with antibiotic therapy for the purpose of increasing the latter's efficacy.

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