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Increased Antioxidant Activities is Attributed with Probiotic

Richa Sebastian*

Department of Surgery, College of Medicine, Medical University of South Carolina, USA

Introduction

Probiotics have undergone extensive research as potential therapeutic agents for use in the treatment and prevention of gastrointestinal disorders caused by altered gut microbiota profiles. It is well established that probiotic supplementation reduces intestinal cytotoxic damage in a number of animal disease models by downregulating inflammatory pathways. Probiotics have also been linked to the stabilisation of gut microbiota through a variety of mechanisms, including iron chelation and the production of anti-microbial metabolites that have antioxidant properties. In this regard, it has been shown through the use of bacterial growth cultures that a number of probiotic strains have strong in vitro antioxidant activity. In clinical trials using probiotic supplementation, increased plasma antioxidant capacity and decreased oxidative stress biomarkers. Probiotic bacteria have been shown to have strain-specific antioxidant potential. Because of this, the antioxidant potential cannot be extrapolated to the level of a species. Numerous lactic acid bacteria strains have been shown to have antioxidant capacity, demonstrating the strain-specific antioxidant properties of lactic acid bacteria. The extent of their abilities and the ways in which they act, however, can vary greatly.

Probiotics are thought to act as antioxidants through a number of different mechanisms, including the production of metabolites like lactate and antioxidant enzymes like catalase, glutathione S transferase, and superoxide dismutase. Probiotics also inhibit the bioavailability of metals like iron, which can inhibit the growth of pathogens by regulating the composition of the gut's microbial population. Given that enterotoxin-mediated intestinal toxicity, which is linked to increased free radical production and upregulation of inflammatory pathways, is a feature of *Clostridium difficile*-mediated infection, the probiotic LAB's antioxidant potential may be of particular relevance to this type of infection. Which might include covert defensive lines that lower the production of free radicals. Literature on the direct antioxidant properties is scarce. Producing anti - oxidant metabolites makes it a powerful oxygen radicals scavenger.

Discussion

Numerous studies have been done using spectroscopic assays, such as ferric reducing antioxidant power, to evaluate the antioxidant activity of probiotics. Each of these analyses, which gauge the reduction potential of antioxidants in a sample, is based on the concept of transfer of electrons between oxidant and antioxidant moieties. It was formed that the FRAP and TEAC assays have comparable redox potentials and are therefore interchangeable [1]. Using a stable synthetic nitrogen-radical, the DPPH assay is used to assess the sample's capacity to scavenge free radicals. Along with the conventional antioxidant assays, metal chelation measurements have also been carried out as a potential indicator of their mode of action. In this study, the antioxidative potential of commercially available strains of LAB and *S. boulardii* was evaluated [2]. These strains were cultured in a simulated gut digestion model using either *C. difficile*-infected faecal matter or healthy donor fecal material. Thru the FRAP and DPPH assays, this same antioxidant capacity of faecal matter water digests as well as the iron and copper steel chelation capacity were evaluated. So they could be marketed, probiotic bacteria had to be shown to be safe and effective for use in humans through extensive experimental research. The current study evaluated a non-mammalian model that can be used to assess EcN's probiotic effects [3].

We concentrated on evaluating the mucoactive properties of probiotic bacteria using the *C. elegans* gut model, one of the many beneficial effects of probiotic bacteria. In order to send danger signs to the other parts of the body and cause the production of boost, which in turn can attract circulating immune cells, epithelial recognition is essential.

A lot of time has been spent using murine-based models to identify valuable barrier-active ingredients in food or other sources. However, the current study used EcN as a representative facultative anaerobic bacterium in the market to perform a *C. elegans*-based assessment of mucoactive probiotic bacteria due to growing ethical issues and complexity in human extrapolation. The gut of C [4].The gut epithelial lining serves as the animals' primary defence barrier against external infections and xenobiotic stressors in place of specialised immune cells. Along with suppressing pathogens, EcN also strengthened worms' gut barriers, which was supported by evidence from the murine model. In our current models, EcN treatment increased the expression of ZO-1, a crucial junctional molecule of the epithelial barrier, even though the precise bacterial mediator was not found. The production of mucin from goblet cells was also significantly increased by EcN treatment [5].

In addition to junctional integrity, EcN in the mammalian model enhanced goblet cell differentiation or mucin production. Future research should therefore examine more complex mechanistic evidence of these combined beneficial effects of EcN. The in vitro epithelial monolayer model using enterocytes has gained the most popularity for determining the barrier permeability by measuring the transepithelial resistance throughout place of the mammalian exposure model. The simple epithelial monolayer, however, does not provide important details regarding the spatial impact of the food components on the three-dimensional monolayer in the gut. We can quickly determine the in vivo dynamic impact of the microbes on the gut barrier integrity in the various mucosal surfaces of the gut lining using worm gut model. A gut organoid could be used in a different three-dimensional assessment of bacterial actions in the organoid's light output instead of the epithelial monolayer's this double model.

Conclusion

In conclusion, the current findings point to dysregulation in the redox status of the FW infected with C. difficile. The absence of radical inhibition in the DPPH assay and the reduced ability of those specimens to chelate iron were indicators of this phenomenon. Probiotics with antioxidant properties have been linked to a reduction in the negative effects caused by ROS generation, which is linked to protection against some GI diseases. The current data support the idea that probiotic strains with higher reducing and copper chelation abilities could provide a factor that needs to be investigated with regard to C. difficile.

Conflict of Interest

None.

***Address for Correspondence:** SRicha Sebastian, Department of Surgery, College of Medicine, Medical University of South Carolina, USA; E-mail: Richasebastian56@gmail.com*

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