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Saccharum officinarium (Sugarcane) Molasses Enhances TGF-β Secretion and FoxP3 Expression by Probiotic Yogurt Culture *Bifidobacterium animalis subsp. lactis BB-12* Stimulated PBMCs from Patients with Ulcerative Colitis

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Running title: Sugarcane molasses enhances TGF-β secretion and FoxP3 expression by *B. lactis* stimulated PBMCs of UC Patients.

Background: Ulcerative colitis (UC) is one of the inflammatory diseases of the gut with frequent bloody diarrhea leads to increased rates of anemia. Evidences indicate the immunomodulation disorders in the response to intestinal microbiota in UC. Although sugarcane molasses, rich in necessary minerals and vitamins could be a good support nutrient but its effect on immune system of UC patients is unknown. To determine how the immune system of UC patients responds to molasses this study planned.

Methods: Bifidobacteriumlactis (*B. lactis*) were cultivated on MRS broth. Peripheral blood mononuclear cells (PBMCs) of 12 UC patients separated by Ficoll-Hypaque centrifugation and co-cultured with UV killed bacteria and/or molasses in RPMI-1640 plus 10% FCS. The FoxP3 gene expression measured by real-time PCR. TGF-β and TNF-α were measured in supernatant of PBMCs by ELISA.

Results: Sugarcane molasses and *B. lactis* significantly augmented TGF-β compared to control ($p<0.01$ and $p<0.001$ respectively). The secretion levels of TGF-β by *B. lactis* plus molasses compared to *B. lactis* stimulated PBMCs was significantly higher ($p<0.05$) but the level of TNF-α after 2/4/12 h incubation of PBMCs with *B. lactis* plus molasses compared to *B. lactis* alone wasn't changed ($p>0.2$). The level of FoxP3 expression after treatment with molasses was increased significantly ($p<0.05$). Although FoxP3 expression after treatment with the molasses plus *B. lactis* was increased but it wasn't significant compared to control.

Conclusion: These data show that if sugarcane molasses added to *B. lactis*, not only would not increase the pro-inflammatory cytokine, TNF-α, but also augments the anti-inflammatory cytokine, TGF-β by PBMCs. Increasing the expression of the FoxP3 could be due to stimulating the activity of the Treglymphocytes. Therefore, sugarcane molasses could be a safe support to compensate the lost nutrients in UC patients.

Keywords: Sugarcane molasses, Ulcerative colitis, *B. lactis*, Immunomodulation, TGF-β, FoxP3, TNF-α

Biography:

Dr. Sheikhi started his B.Sc. in ShahidChamran University in Biological Sciences and then his master in Medical Immunology in Tarbiat Modarres University. He did his Ph.D. at Immunology Institute, Kiel, Germany and Department of Immunology, Faculty of Medicine, Shiraz University of Medical Sciences (UMSc). Currently he is the professor of Immunology, head of department of Immunology and Microbiology, Dezful University of Medical Sciences. He currently studying the effect of yogurt derived probiotics and some support nutrients on the immune response of ulcerative colitis (UC) patients.