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**Behaviors of probiotic formulations in aromatic fixed and essential oils and established therapeutic models: *In-vivo* studies of repair of dysbiosis with coconut oil and trace peppermint-lemon-patchouli essential oils and/or multi-probiotic replacement**

In this research study; therapeutic effects of aromatic fixed and essential oil formulations containing probiotic bacteria on SIBO were investigated using the "Dysbiosis Based Rat SIBO Model". In dysbiosis based SIBO model rats, villous distortion and loss of crypts, epithelial shedding and necrotic changes in the apical regions of the villi, and inflammatory cell infiltrations extending to the lamina propria and submucosa were observed. No inflammatory reaction was observed in dysbiosis based SIBO model rats given 1E+10 CFU/1000 mg/ coconut oil + trace amounts of peppermint-lemon-tefarik essential oil and a multi-probiotic mixture as a treatment regimen, moreover, numerous mitotic figures, hyperplasia, increase in goblet cells, and regeneration of epithelium were observed in the villi and crypt epithelium, which are indicative of the repair stage. The ratio of Bacteroides / Firmicutes, Prevotella / Bacteroides, Faecalibacterium, Akkermansia, which were found in sufficient amounts in healthy animals, remained low during disease development. It has been

observed that these ratios were significantly improved with the application of the probiotic formulation in oil compared to the treatment applied with only oil or a mixture of probiotics only. On the other hand, *E.coli* and Clostridium ratios, which were present in small amounts in healthy animals, remained high during disease development, whereas these ratios were significantly decreased with the application of probiotics in oil, compared to the treatment applied with only oil or a mixture of probiotics only.

**Speaker Biography**

Hulya Kayhan is completed her graduation from the Faculty of Pharmacy in 1995; she went to London to pursue a master's degree in Pharmaceutical Technology. During her graduate studies at the University of London King's College, she took alternative therapy courses including aromatherapy and phytotherapy. Aromatherapy attracted a lot of attention and he started to concentrate his studies in this field.

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