ABSTRACT

The aim of the present study was to determine the inhibitory effects and the potential underlying mechanisms of a novel Pleurotus eryngii β-type glycosidic polysaccharide (WPEP) on colitis. To achieve this, sixty CD-1 (ICR) mice were divided into six groups including healthy and colitic mice treated with or without WPEP at two different doses (n = 10). The results showed that WPEP displayed a significant inhibitory effect on colitis as indicated by the lowered disease activity index in the treated colitic mice compared to the untreated colitic mice (2.78 ± 0.50 to 1.80 ± 0.17). A decrease in pro-inflammatory cytokine concentrations and pro-inflammatory protein expressions and an increase in the colon length (9.31 ± 0.59 cm to 10.89 ± 1.20 cm) along with histological improvements were also observed in the treated colitic mice compared to the untreated colitic mice in the present study. Flow cytometry and western blotting analysis revealed that these anti-colitis effects were associated with decreased accumulation of CD45+ immune cells, CD45 + F4/80+ macrophages and CD45 + Gr1+ neutrophils. Moreover, the 16s rRNA sequencing analysis of the gut microbiota revealed that WPEP partially reversed gut microbiota dysbiosis in the colitic mice including the decreased abundance of Akkermansia muciniphila (35.80 ± 9.10% to 18.24 ± 6.23%) and Clostridium cocleatum (2.34 ± 1.78% to 0.011 ± 0.003%) and the increased abundance of Bifidobacterium pseudolongum (3.48 ± 2.72% to 9.65 ± 3.74%), Lactobacillus reuteri (0.007 ± 0.002% to 0.21 ± 0.12%), Lactobacillus salivarius (1.23 ± 0.87% to 2.22 ± 1.53%) and Ruminococcus bromii (0.009 ± 0.001% to 3.83 ± 1.98%). In summary, our results demonstrated that WPEP could be utilized as a functional food component in colitis management as well as a potential prebiotic agent to improve inflammation-related disorders.