Foods 2024 Conference
The 5th International Electronic Conference on Foods
28–30 October 2024 | Online
MDPI

Anti-inflammatory activity of taro resistant starch and its effect on intestinal flora

Xiaotong Chen, Juan Kan, Changhai Jin
College of Food Science and Engineering, Yangzhou University

INTRODUCTION & AIM

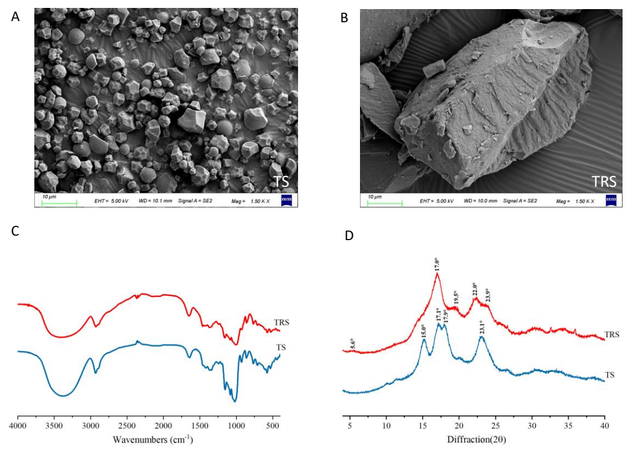
The number of patients with ulcerative colitis (UC) has increased rapidly, but the etiology and pathogenesis are unclear. Resistant starch (RS) is a type of dietary fiber characterized by its resistance to digestion by amylase in the small intestine, leading to its transit to the colon for fermentation by the microbiota. Taro (*Colocasia esculenta* (L.) Schott) is classified as an herbaceous root crop with a high starch content. Taro has been shown to possess a variety of anti-inflammatory, hypolipidemic, and anti-lipid peroxidation properties. However, there have been no reported studies on the modulatory effects of taro resistant starch (TRS) on intestinal inflammation and gut microbiota. In this study, we examined the process of preparing TRS from taro starch (TS) and assessed its physicochemical and structural properties. Our study focused on the mitigating effect of TRS on inflammation in DSS-induced colitis in mice and its modulating effect on intestinal flora.

METHOD

TS was dispersed in distilled water and pasteurized in an autoclave (121° C, 0.1 Mpa) for 30 min. The gelatinized starch was adjusted to pH 5.0, and 0.2 mL pullulanase (15 U/g) was added for debranching at 55 ° C for 12 h. After 24 h at 4 ° C, the treated starch was dried and ground into a powder. The substance obtained is crude TRS, which serves as a feedstock for the manufacturing of refined TRS. 100 g crude resistant starch was added to phosphate buffer (pH = 6.0). Subsequently, 0.4 g of heat-resistant α-amylase (100 U/g) was added, and the combination spent an hour being mixed at 85° C in a magnetic water bath. After processing, the starch was taken out and let cool to room temperature. After adding 0.2 mL of amyloglucosidase (500 U/g) and adjusting the pH to 4.5 with 1 mol/L of citric acid, the mixture was allowed to react for 1 h at 55 ° C. The starch was then cleaned several times with an 80% ethanol solution and then rinsed several times with distilled water. The mixture was centrifuged, ground through a 100 mesh filter, oven dried at 50° C for 24 h and then oven dried to yield TRS.

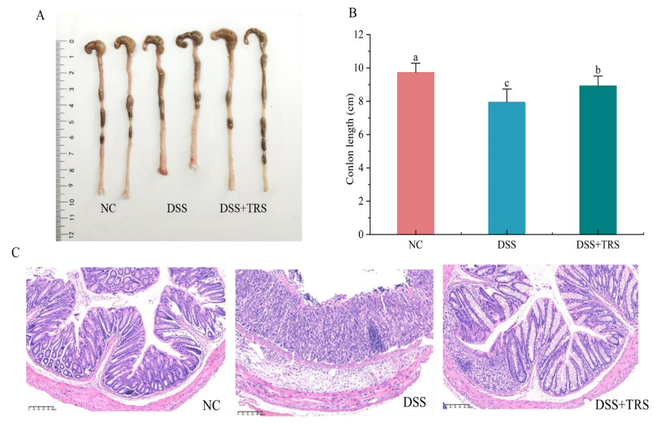
The physicochemical and structural properties of TRS were evaluated by using SEM, FTIR and XRD. High-Throughput16S rRNA Sequencing was used for analyze the structure of gut microbiota.Gas chromatography was used to study the SCFAs found in mice faeces.

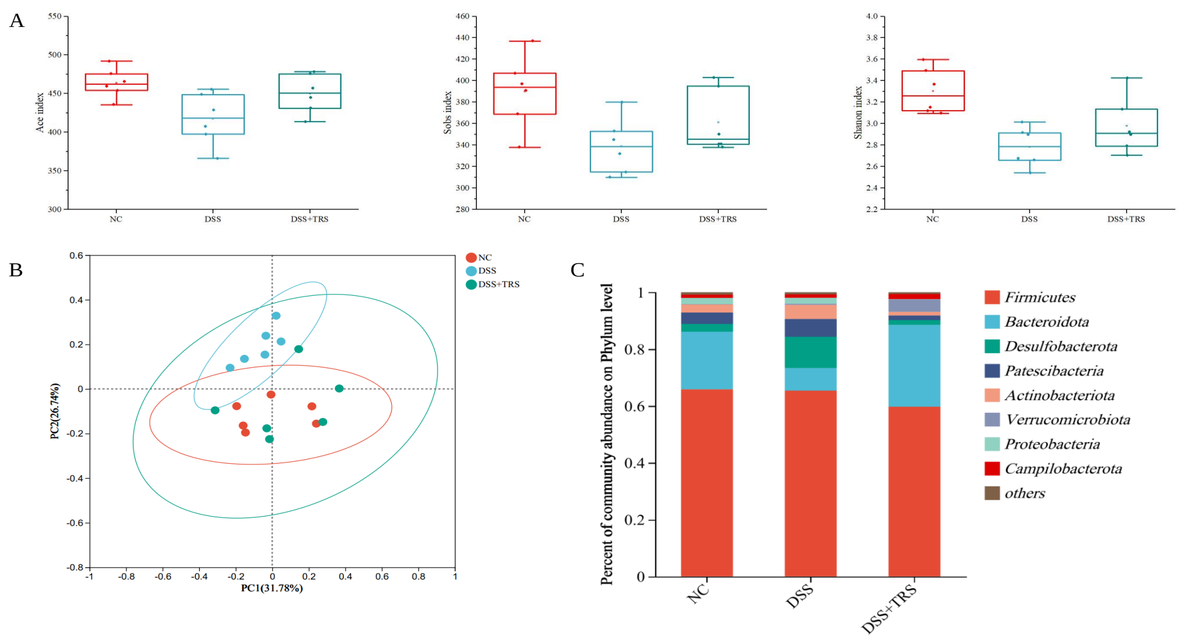
RESULTS & DISCUSSION



TRS formed an ordered crystalline structure and a high degree of double helix. TRS exhibited the most prominent diffraction peak observed at 17.0°, which is characteristic of type B crystallization.

The administration of 300 mg/kg TRS reduced colon shortening and alleviated the colonic mucosal injury in colitis mice, thus reducing the infiltration of inflammatory cells.





It is noteworthy that TRS restored the reduction in gut microbiota diversity and abundance caused by DSS-induced colitis in mice, while also reducing the abundance of potentially harmful bacteria,

CONCLUSION

The findings in this research indicated that TRS can improve inflammatory symptoms in colitis mice and exert anti-inflammatory activity by regulating inflammatory factors and oxidative stress levels.

FUTURE WORK / REFERENCES

Future research could focus on exploring the relationship between the structural characteristics of TRS and the physiological functions and providing a theoretical foundation for TRS used as an effective ingredient in dietary for prevention or treatment of UC.