

Background

- Ferulated arabinoxylans (AX) are dietary fiber from cereals that present prebiotic and antioxidant properties, which make them attractive biomolecules for cancer prevention, particularly colon cancer.
- Tissues have characteristic relaxation time constants that can be altered physiologically or by disease.
- Time-Domain Nuclear Magnetic Resonance (TD-NMR) could be used to identify the changes of spin-lattice relaxation time (T1) values in response to a maize fiber dietary intervention based on AX in rat colon tissues to reduce colon cancer risk.

Purpose: Investigate the effect of a maize AX dietary intervention on the colon cancer risk in rats treated with 1,2-dimethylhydrazine (DMH).

Methods

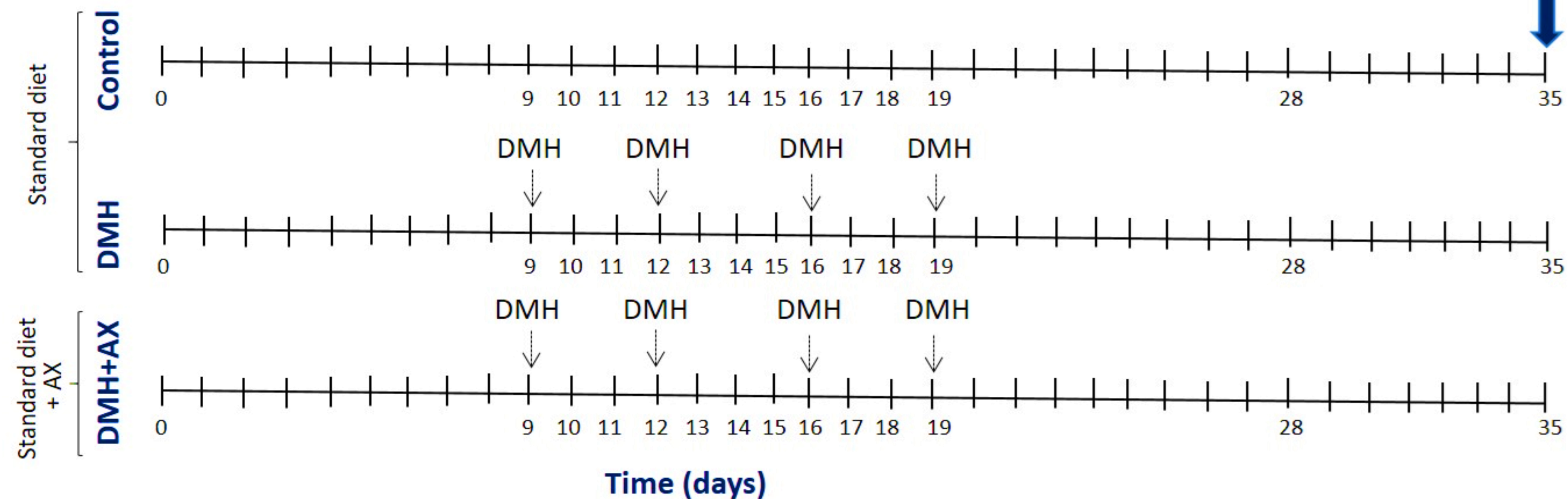
Model: **Male Wistar rats**
196 ± 10 g body weight
NOM-062-ZOO-1999



| Group | Treatment |
|----------------|---|
| Control (n=3) | Non treatment |
| DMH (n=6) | 40 mg DMH/kg bw., s.c. |
| DMH + AX (n=3) | 40 mg DMH/kg bw., s.c. + 4.8% AX/day |

bw.: body weight, s.c: subcutaneous

Sacrifice



Analysis

- Monitoring body weight
- Changes in T1 value of colon tissues by TD-NMR
- Morphological analysis of colon tissues

Results

Fig 1. Mean body weight of Control, DMH, and DMH+AX rats groups

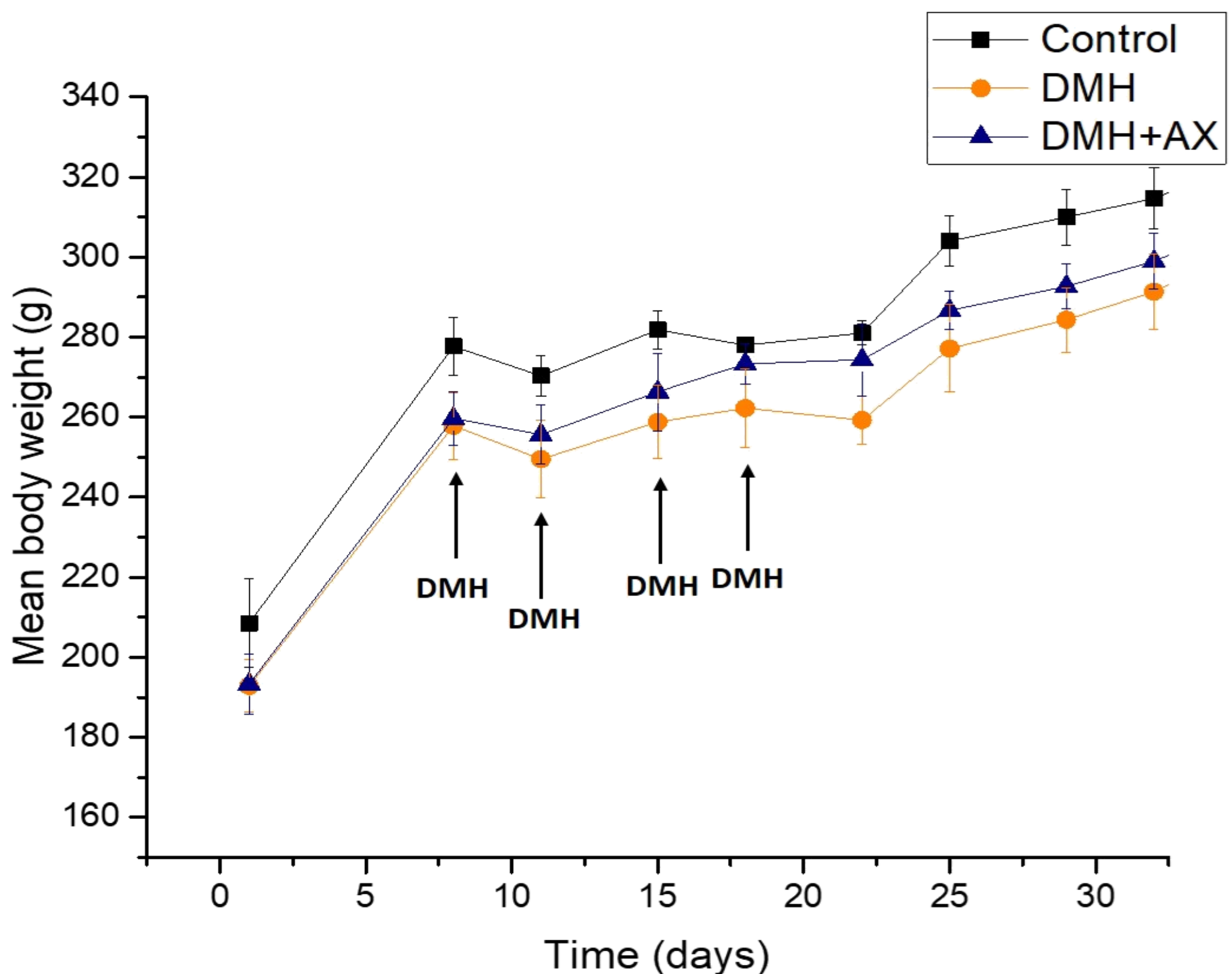


Table 2. T1 values of rats colon tissues.

| Group | T1 value (ms) |
|----------|---------------|
| Control | 500 |
| DMH | 600 |
| DMH + AX | 570 |

Measurements were made at 37 °C.

Conclusion

- Incorporation of maize AX to the diet of rats treated with DMH reduced the T1 value of the colon tissue and conserved the colon morphology normal.
- Evidence suggests that maize AX could have a chemopreventive effect and reduce colon cancer risk.
- Additional studies are being carried out to increase our understanding of maize AX anticancer properties as well as the opportunities and challenges of their use in the context of diet intervention and colon cancer prevention.

Table 1. Rats gaining weight after 35 days experiment.

| Group | Initial Weight (g) | Final weight (g) | Gaining weight (g) |
|---------|--------------------|------------------|--------------------|
| Control | 208 ± 11 | 323 ± 3 | 115 ± 13 |
| DMH | 193 ± 7 | 302 ± 10 | 109 ± 12 |
| DMH+AX | 193 ± 7 | 308 ± 8 | 115 ± 1 |

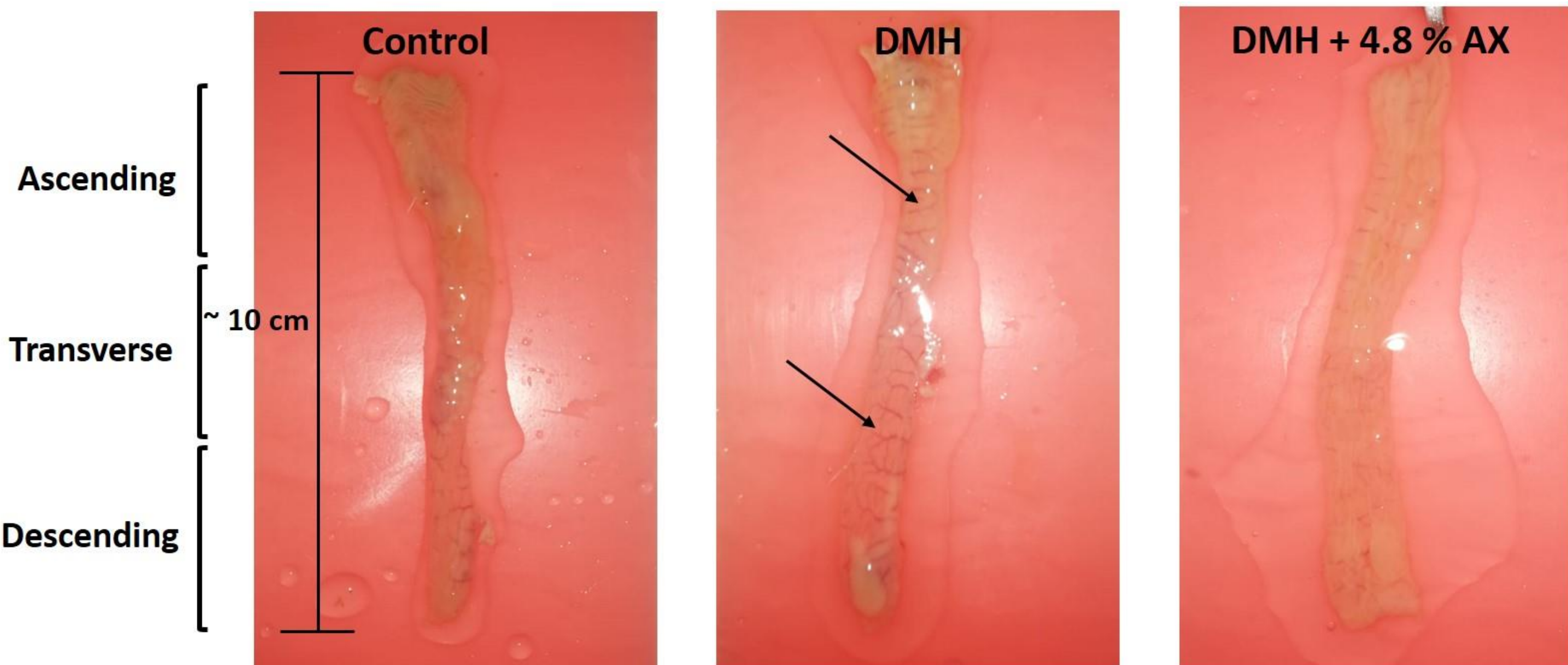


Fig 2. Morphology of rat colon tissues.

References

1. Femia et al. European Journal of Nutrition. 2010, 49:127–132.
2. Rodrigues et al. Brazilian Journal of Medical and Biological Research. 2002, 35: 351-355.

Acknowledgments

This research was supported by 'Fund to support research on the Sonora-Arizona region 2019', Mexico (Grant 20614to E. Carvajal-Millan).