

## PASTURE-FINISHING OF BISON IMPROVES ANIMAL METABOLIC HEALTH AND MEAT NUTRITIONAL QUALITIES

### *Researchers.*

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### *Rationale.*

Adaptive grazing of bison on rangelands has the potential to be regenerative and produce positive ecosystem effects. This outcome, coupled with growing consumer demand for sustainably raised, healthier meat products has led to an increase in livestock producers implementing agro-ecological management, including rotational grazing and pasture-finishing of

animals, to improve ecological, animal, and human health. Consumer interest in pasture-finished meat (i.e., grass-fed) has raised several questions about its nutritional quality. The goal of this Institute study was to determine the impact of two common finishing systems in bison (pasture-finished or pen-finished in confinement on corn) on metabolomic, lipidomic, and fatty acid profiles in bison.

*Outcomes.* Main metabolite classes that discriminated between pasture- and pen-finished bison bulls were amino acids (94/162 metabolites differed); lipids (83/138 metabolites), carbohydrate metabolites (29/44 metabolites), xenobiotics/phytochemicals (16/27 metabolites), and vitamins & co-factors (13/28 metabolites). Pen-finished individuals had higher glucose, triglycerides, oxidative stress, and amino acid proteolysis, indicating impaired metabolic health compared to pasture-finished individuals. Pasture-finished animals also had lower levels of a common advanced glycation end product (N6-carboxymethyllysine) while having higher levels of long-chain saturated and mono-unsaturated carnitines, which associate with improvements in metabolic health. Pasture-finishing also concentrated higher levels of phenolics, alpha-tocopherol, carotene, and very long-chain saturated fatty acids (saturated and unsaturated) in meat; compounds considered favorable for human health. Our study represents one of the deepest meat profiling studies to date, having identified >1500 compounds. We conclude that pasture-finishing (i.e., grass-fed) improves bison metabolic health and nutrient density of their meat compared to finishing bison on grain-based concentrates in pens. For a more complete summary please see the following:

van Vliet, S., A. Blair, L. Hite, J. Cloward, R. Ward, C. Kruse, H. van Wietmarschen, N. van Eekeren, S. Kronberg, and F. Provenza. 2023. Pasture-finishing of bison improves animal metabolic health and potential health-promoting compounds in meat. *Journal of Animal Science and Biotechnology* 14:49.  
<https://turnerecoagriculture.org/wp-content/uploads/2023/02/Pasture-finishing-van-Vliet-et-al-2023.pdf>