

2023 Report to Oregon Sheep Commission

Name of the organization/individual awarded funds:

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Amount awarded:

\$2,500

Summary of findings:

Industrial hemp is a rapidly proliferating commodity since hemp was removed from the Controlled Substances Act. The compound cannabidiol (CBD) is extracted from the hemp to use in a variety of supplements. This extraction process leaves behind fibrous plant material, called spent hemp biomass (SHB).

Although spent hemp biomass SHB has nutritional similarities to other livestock feeds, it has not been approved to feed to livestock due to concerns over potential CBD residues. Past research has indicated that CBD negatively affected reproductive health in lab animals, so the purpose of this research was to determine if SHB negatively affected reproductive health in male sheep. Reproductive health was assessed by evaluating sperm quality and examining the testicular microanatomy. If SHB is not detrimental to reproductive health, then it could be explored further as an inexpensive and sustainable livestock feed.

Thirty-five Polypay rams were randomly assigned to five feeding trial groups (7/group) and fed either alfalfa (control) or SHB at low (10%) or high (20%) concentrations for 4 or 8 weeks. The five groups were: control (CON), 10% SHB for 4 weeks (LH1), 10% SHB for 8 weeks (LH2), 20% SHB for 4 weeks (HH1), and 20% SHB for 8 weeks (HH2).

At the conclusion of the feeding trial, rams were euthanized and the testes were removed. Sperm were collected directly from the vas deferens and evaluated for motility (total, progressive, speed), morphology, and concentration using routine methods. The testes were weighed, and a section from each testis was paraffin-embedded to perform routine immunohistochemistry for the fertility-associated proteins deleted in azoospermia-like (DAZL) and Boule. Both DAZL and Boule immunoexpression were affected by SHB ingestion, but no sperm characteristics were negatively affected. In fact, rams fed either 10% or 20% SHB for 8 weeks had significantly higher progressive sperm motility compared to controls. There were no differences between control and treatment groups for total sperm motility, percentage of morphologically normal sperm, total testicular weight, or seminiferous tubule diameter.

Based upon these results, we conclude that up to 20% of the diet can be fed as SHB to rams for eight weeks without adversely affecting their fertility.

The Oregon Sheep Commission's support is being acknowledged on the publications stemming from this research.