



“Production of oil in vegetative tissues to increase the nutritive value of forage legumes”

## IMPROVING THE ENERGY CONTENT OF LEGUMES

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**Background:** Many producers recognize the value of a high proportion of legumes in pasture stands. In addition to fixing nitrogen and reducing reliance on fertilizer, legumes tend to have high yields and quality. Some legume species, such as sainfoin, can be mixed with alfalfa to also reduce bloat.

Oil is twice as energy-dense as carbohydrates, which make up most of the leaves and stems of plants. Traditionally, seeds have been the main source of plant oils and primarily used for food (i.e. canola oil) or biofuel production, with few plants having a significant amount of oil in the leaves. However, research groups in other parts of the world have been successful in improving the oil content in the leaves of certain plants. Increasing the oil content in vegetative tissues of legumes like alfalfa and sainfoin means those plants would contain more energy, and therefore be a more efficient and productive feedstuff for cattle.

**Objectives:** The objectives of this study are to:

1. Gain insight into the variability in oil content of vegetation from existing lines of alfalfa and sainfoin.
2. Establish proof of concept for increasing total oil content in alfalfa and sainfoin vegetation using chemical mutagenesis.
3. Characterize promising lines for oil content and sequence those lines to reveal the genes altered by the mutagenesis that are responsible for improved oil production, and to ensure that no other agronomic characteristics are impaired.

**Implications of the Research:** This project will create new germplasm with improved lipid content in the vegetation of alfalfa and sainfoin that will be incorporated into further legume breeding efforts.

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