

Abstract/ Introduction: Rosemary and Asafoetida scientifically known as *Rosmarinus officinalis* and *Ferula asafoetida* are commonly used in cooking and for their abundant medicinal purposes. *Rosmarinus officinalis* (Rosemary) can be used as a natural antioxidant, which counteracts deterioration in a food substance and has been approved as a healthy and effective natural antioxidant to use against perishable foods. Muscle pain, memory, immune and circulatory systems can be improved from the consumption of *Rosmarinus officinalis* (rosemary).² *Ferula Asafoetida* (Asafoetida) can be classified as a digestive acid and used to show a significant treatment for hysteria, some nervous conditions, bronchitis, asthma, and whooping cough. The volatile gum which is present in the plant can be broken down in the lungs allowing it to be a treatment for asthma. *Ferula Asafoetida* alongside many others is considered antispasmodic, meaning it is used to relax and prevent spasms in the muscles.¹

Methodology:

1. Extract DNA from *Rosmarinus Officinalis* and *Ferula Asafoetida* samples.
2. Perform PCR replication and amplification
3. Upload results on the DNA subway database.
4. Use MUSCLE BLAST Alignment to analyze differences between consensus sequence and *Rosmarinus Officinalis* and *Ferula Asafoetida*.
5. Use phylogenetic trees ML and NJ to analyze evolutionary relations and common ancestors.

Results
Figure 1: NJ (Neighbor Joining) Phylogenetic Tree



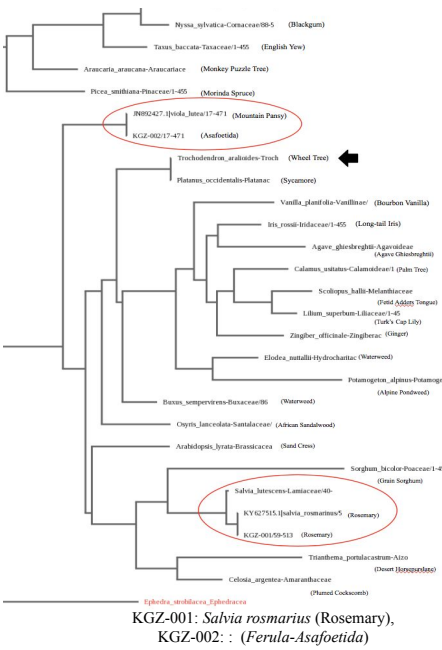
Figure 3: MUSCLE



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Figure 2: ML (Maximum Likelihood) Phylogenetic Tree



Discussion: The phylogenetic trees in Figure 1 and 2 demonstrate a high potential in the positioning of the two species, *Salvia lutescens* (Koidz.) and *Salvia rosmarius* (Rosemary). The predicted evolutionary relationship shows that there may be genes present in both species which may determine shared properties. The properties of *Salvia lutescens* (Koidz.) have not been researched to the extent of *Salvia rosmarius* (Rosemary) but we can predict their relation *Salvia rosmarius* (Rosemary) and determine if it contains the same beneficial properties.

The ML tree represents connections between KGZ-002 (*Ferula-Asafoetida*) and *Viola Lutea*, therefore we develop a better understanding of the characteristics of *Ferula-Asafoetida*. *Viola Lutea* is a part of the *Violaceae* family which is rich in mucilage, vitamin C, salicylic acid, flavonoids, and many more. The presence of mucilage can be used as a soothing ingredient, anti-inflammatory, and an antitussive, treating symptoms of bronchitis and asthma. Salicylic acid combined with flavonoids allows substances to work as an antirheumatic (treating conditions of arthritis) and treat fevers, headaches, weakness, muscle aches, and a general cold. By examining the numerous medicinal benefits of substances found in the *Violaceae* family, we can predict that our substance, *Ferula Asafoetida*, may share many of the same properties.

Figure 3 shows that *Platanus occidentalis* (American Sycamore) & *Trochodendron aralioides-trochode* (Wheel Tree) are 100% compatible allowing us to infer that they will have similar medicinal properties. Medicinal applications of the American Sycamore include healing lung ailments, sore throats, inflammation and even diarrhea.

Figure 3, shows that *Ferula-Assafoetida* and *Arabidopsis lyrata* have a 96.3% sequence similarity. Looking at the *Brassicaceae* family, which *Arabidopsis lyrata* is a member of, many plants from this family offer health benefits such as triggering the liver to produce enzymes which detoxify cancer toxins.

