

# How Alcohol and Tobacco Affect Oat Seed Germination

## **Introduction**

Everyone knows that alcohol and tobacco have negative effects on people, but what about plants? How does alcohol and tobacco affect the germination of oat seeds? I think that alcohol and tobacco will cause the seeds to not germinate at all, and even if they do germinate they will be unhealthy and deformed.

## **Information**

Germination is the process where growth emerges from a period of dormancy. The seed absorbs water and swells up. The food stored in the seed then breaks down giving off energy to grow. The seed then produces a tiny root. Oat seeds generally germinate within three to five days. Ideal germinating conditions for oat seeds are light to medium textured soil with minerals, a cooler climate, and about 25 inches of rain annually.

I believe that alcohol and tobacco will have many effects on plants. I believe this because I know that tobacco has many effects on humans such as: increase in blood pressure, increase in heart rate, narrowing of arteries, and reducing the amount of oxygen the blood can carry. It also may cause lung disease, heart disease, stroke, cancer of the lungs or mouth, and if you have tobacco while pregnant the child is at risk for many birth defects.

Alcohol also has many long term effects, such as liver disease, heart disease, cancer, pancreatitis, and damage to the vital organs. If alcohol is consumed while pregnant the child is at risk of many birth defects. Abuse of alcohol also causes addiction, blackouts,

and short-term memory loss. Most importantly, people have to realize that alcohol is a poison.

**Materials for My Experiment:**

Oat seeds  
Unfiltered water  
Chewing tobacco  
Alcohol  
Coffee filters  
Nine Petri dishes  
Measuring glass  
Four Styrofoam cups  
Permanent marker  
Tweezers

**Experiment**

To begin my experiment, I separated 900 oat seeds into groups of 300. I then put each group of 300 seeds into a Styrofoam cup. In each cup I poured 75 mL of distilled water. I also placed one small can of Grizzly chewing tobacco in a Styrofoam cup with about 8oz. of distilled water. I let the three cups with seeds in and the cup with tobacco and water sit overnight. After letting them sit overnight I drained and separated the seeds into 9 groups of 100 seeds. I placed each group of 100 seeds into a Petri dish. The Petri dish was lined with a coffee filter. I labeled all the Petri dishes as 1,2, or 3 water, 1,2, or 3 tobacco, and 1,2, or 3 alcohol. Next, I poured 25 mL of distilled water into the three Petri dishes labeled as water. After that, I poured 25 mL of tobacco water into the three Petri dishes labeled as tobacco. Finally, I poured 25 mL of Southern Comfort (100 proof) into the alcohol Petri dishes. I set the covers on the Petri dishes and set them on a table in my sunroom. I will remove and record the seeds as they germinate.

## **Results**

I ran the experiment twice. The first time I ran it with the covers on the Petri dishes, and the second time without the covers on. During trial one, germination didn't begin until day four. On day four, two seeds had germinated from Water #1, six seeds from Water #2, and two seeds from Water #3. I waited a week, but still no more seeds from the water Petri dishes had germinated. In all of trial one, none of the seeds in the alcohol or tobacco Petri dishes germinated. I decided the covers might have stopped the oxygen from getting to the seeds to germinate. I then ran the experiment again without the covers on. During the second trial seed germination started on day three. On day three, one oat seed from Water #1 germinated, one oat seed from Water #2 germinated, and four oat seeds from Water #3 germinated. Over the days of the experiment the liquid evaporated so I added liquid as needed. I watched them until day nine, but still no more seeds from any of the Petri dishes germinated.

## **Conclusion**

From the results I can reasonably conclude that alcohol and tobacco have an adverse affect on oat seed germination. My hypothesis was correct because none of the seeds in the alcohol and tobacco germinated. Now that you see what alcohol and tobacco do to little seeds, imagine what harm they could do inside of you!