

OVERVIEW

Ethyl Alcohol (EtOH), Absolute alcohol (C₂H₆O) is a colorless, pungent, highly flammable liquid and vapor. It is a common laboratory reagent and is used in the production of pharmaceuticals and disinfectants. It is the second most important solvent after water in laboratory use and is commonly used for cleaning surfaces and making tinctures.

WHAT HAPPENED?

FIRE FROM ETHANOL AND BUNSEN BURNER

A student was working at a table with a Bunsen burner and ~ 50mls of EtOH in a 100 ml beaker. He was using a glass rod to spread LB media on agar plates. First, he dispensed the media onto the plate. Then he would take the glass rod that was sitting in the beaker and heat it in the flame for approximately 5-7 seconds. He let the rod cool for 45 sec-1 minute and then spread the media over the surface of the agar plate while rotating the plate in a circular motion. In between plates, as he was using the glass rod either a burning drop of EtOH fell off the rod into the beaker or the vapors from the beaker ignited because the beaker was too close to the flame.

The lab had passed this procedure from one student's lab notebook to the next student's lab notebook with no warnings or precautions listed.

POTENTIAL HAZARDS








WHAT WENT RIGHT?

- ✚ The correct PPE was worn; therefore, there was no injury to the person.
- ✚ The work area had been cleared of all other materials which kept the fire from spreading.
- ✚ A fire extinguisher was used to put out the fire.

WHAT CORRECTIVE ACTIONS WERE TAKEN?

- ✚ The PI and student involved created a more formal and comprehensive laboratory SOP for the colony streaking procedure and reviewed the information with lab personnel.
- ✚ Safety steps were clearly added to the protocol with appropriate warnings for working with a highly flammable substance. This included using a larger beaker to place over the smaller beaker to deprive the fire of oxygen should the ethanol beaker catch fire.
- ✚ A replacement fire extinguisher was ordered for the laboratory.

HOW CAN INCIDENTS LIKE THIS BE PREVENTED?

-  **Chemical Inventory:** Maintain accurate chemical inventories of all chemicals and make note of commonly used, highly flammable materials. In case of fire: a large beaker may be placed over the smaller beaker containing EtOH to smother the fire due to lack of oxygen. Alternatively, dry sand, dry chemical or alcohol-resistant foam may also be used to extinguish the fire, if available.
-  **Training:** Lab-specific personnel training is a key to preventing injuries and for emergency procedures. Highly flammable materials need to be monitored for distance from heat/sparks/open flames/hot surfaces. Keep flammable material containers tightly closed when not in use. Vapors are heavier than air and spread along lower surfaces. Pay attention to possible flashback when working with alcohols.
-  **Specific SOP's-** Develop a hazard specific SOP. Instead of using lab notebooks.
-  **Enforcing PPE Use:** Personal protective equipment does not eliminate a hazard, but it is the only thing that protects a person from injury in this type of situation.
-  **Working Alone Policy:** Create and review your work alone procedures with your staff, especially when hazardous chemicals are involved. Recommendation: use the Gator safe app to sign in as working alone.