An experiment on the different evaporation rates of various liquids

Food & Diet, Alcohol

Alcohol, which is a volatile liquid that evaporates quickly, can be used for cooling your skin after a sunburn or controlling a high fever. It is known to work so efficiently due to its quick evaporation rates and its ability to lower temperature. Evaporation rate is known as the time it takes for a certain solution to vaporize. To find the rate of evaporation, the change in temperature must be found, and then divided by the time it takes to reach the lowest temperature.

The main goal of the study is to determine why seven different liquids evaporate at different rates. In order to do so, the strength of intermolecular forces and the rate of evaporation for the volatile liquids must be determined first. Intermolecular forces (IMFs) are defined as the forces holding molecules together.

There are three main types of IMFs; London Dispersion Forces, Dipole-Dipole, and Hydrogen Bonds. Hydrogen Bonds require the most energy consumption of the three. Dipole-Dipole, which occurs between partially negative and partially positive molecules, can occur with the presence of polar covalent bonds. Dispersion forces, which are the weakest of the three IMFs, exist between every type of molecule. All of these aspects correspond to one guiding question: “ Why do liquids evaporate at different rates?”

To begin, it is important to follow safety precautions. For this experiment, safety goggles, a lab coat, closed-toe shoes, long pants, no jewelry, and gloves are needed. In regards to materials, distilled water, acetone, methanol, pentane, propanol, ethanol, butanol, rubber bands, chromatography paper, and the Logger Pro system with temperature probe

are necessary as well. To begin, Logger Pro needs to be open and ready on the laboratory station computer. After clicking “ Expt Data collection”, it is crucial to set the time to 300 seconds to ensure stabilization of the liquid and accurate data collection.

After locating the probe and wrapping it with chromatography paper, secure it by wrapping a rubber band around it. This is done as a method to prevent losing the chromatography paper in the solution. It can also provide greater values than a bare probe alone. To begin, the probe should be stood in the liquid. Wait until the reading on the monitor appears to be level, which should take roughly 15 seconds. Following the stabilization of the solution, click “ Start”. This establishes the initial temperature, also known as T.

After confirming the data, remove the probe from the liquid. Change out the chromatography paper between every liquid tested to avoid cross contamination and error in the results. After repeating this process for all seven liquids, check on the information collected. Based on the data, and comparing the different types of bonding occurring within the molecules of each solution, liquids evaporate at different rates because some of them have different strengths and intermolecular forces. Rate of evaporation is inversely proportional to strengths of IMFs.