

In this green chemistry project we attempted to make frontalin which is an aggression pheromone for the Southern Pine Beetle. Pheromones are chemical substances produced by a living organism and can affect the behavior of others of the same species. This three-step synthesis utilized several common organic reactions, including hydrolysis, decarboxylation, epoxidation and isomerization. Nuclear Magnetic Resonance (NMR) was used to analyze the structures of each step. Green chemistry works to reduce hazardous materials including carcinogens and other hazards through substituting other materials. We made our reaction greener by using methyl t-butyl ether rather than dichloromethane for the solvent. Methyl t-butyl is greener than dichloromethane because it is less flammable and not harmful if inhaled. Sodium hydroxide was used as a green reagent in place of sodium ethoxide. Hazards for sodium ethoxide include being corrosive and an unstable reactant. Purity is also easier to achieve by removing water than sodium ethoxide. Price was also a factor in terms of having a green reagent. Most people will not consider a green reagent if it costs more than a non green reagent. Both of the green alternatives cost much less than the less green alternatives.