**Isolation of (+)-Limonene from Orange Zest**

**Calculations**

1. Mass of Limonene = 6 grams
2. Volume used = 35ml
3. Observed rotation = +10 degrees
4. Path length = 1.2 dm

Literature Value for Specific Rotation= +124 degrees

**Discussion and results**

The main purpose of this experiment was to isolate limonene from the peelings of citrus fruit; through steam distillation and analyze the isolated limonene with IR spectroscopy and polarimetry.

****The overall % yield for the limonene was 1.38%, which seems quiet low, although this makes sense, as the orange peel doesn’t include anything organic. I can confirm that the end product was limonene through the IR spectroscopy and analyzing it. The IR spectra shows that there is a peak at 3083.34 cm^-1(which happen to be between 3100-3000 cm^-1) confirming that there were C-H-alkenes, aromatics in the compound which consists a portion of the limonene structure. In addition there are two peaks: 1676.56 cm^-1, 1644.34 cm^-1 (which fall between 1680-1640 cm^-1) identifying C=C-alkenes, which can be seen in limonene as well. There was another peak of 1594.99 cm^-1 (which lies between 1600-1585 cm^-1) identifying C-C-aromatics which can be found in limonene as a benzene ring. Through all the analyzing of IR spectra’s peaks in relation to the limonene structure, I can confirm that the end product was that of limonene.

The calculated observed rotation was +49.02 degrees, which happens to be extremely off in comparison to the literature value in. This rotation is based on how much the compound rotates when exposed to polarized light. The (+) sign means that the limonene rotated clockwise. The literature value was +129 degrees, which signify that the limonene happened to be impure, could be a result of a possible aldehyde contaminant and possibly water being added to it due to the mixture of multiple limonene from different groups for the polarimetry. Also, a lot of other students blended their orange peels in the same blender used by our group. Thus, an extra amount of orange peel and other impurities could have been added to the result of the specific rotation to be quiet off by the literature value.