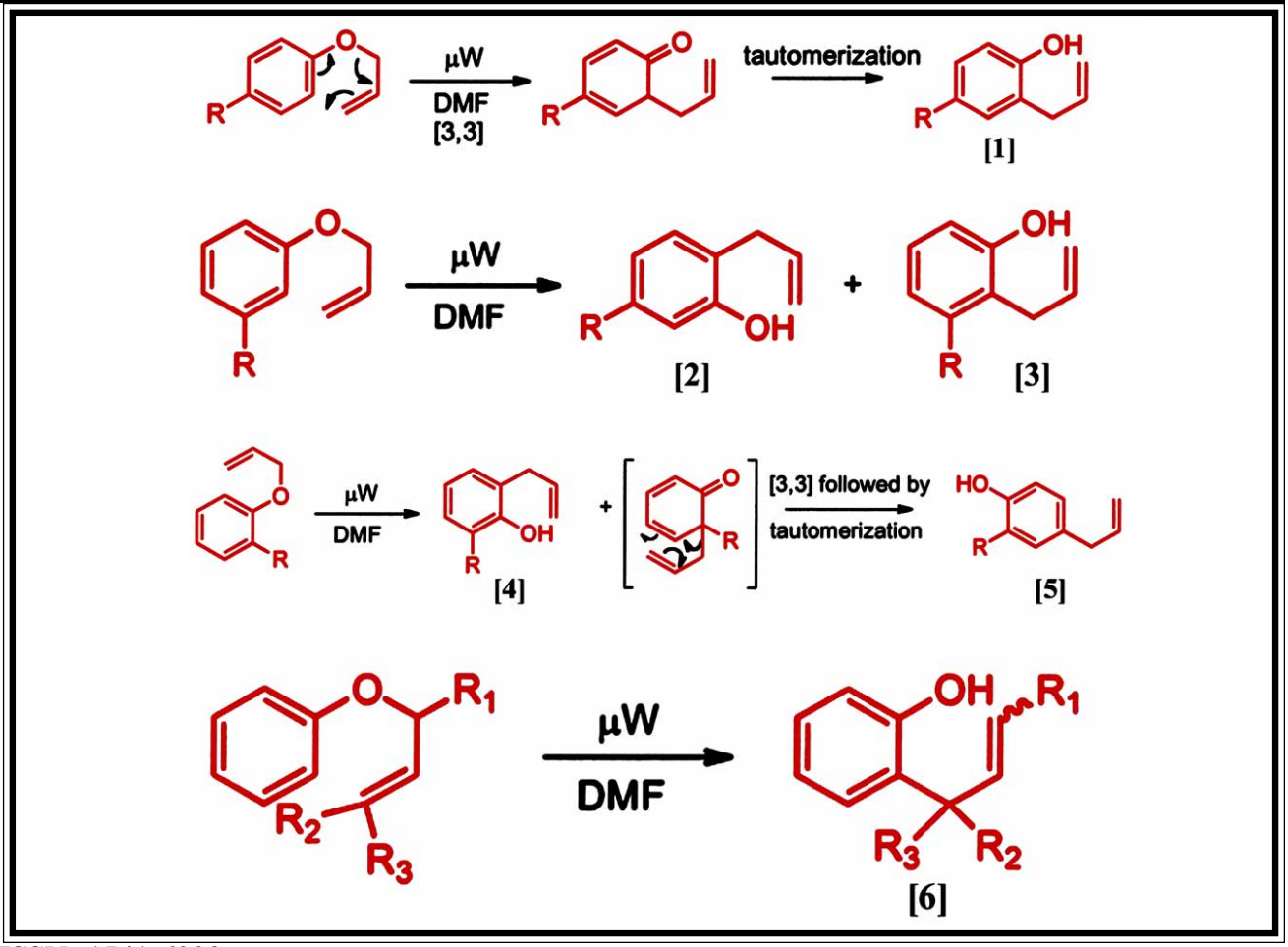
Summer 2010 Volume 9, Number 3

Journal of Undergraduate Chemistry Research



ISSN: 1541-6003

Volume 9, Number 3 **Summer 2010**

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EFFECT OF ADDING MILK ON THE ANTIOXIDANT POTENTIAL OF BLACK, GREEN, AND DECAFFEINATED TEAS

Addition of various types of milk caused significant reduction in the antioxidant potential of various tea preparations. Whole milk caused 50% reduction in black, green and decaffeinated black tea teas. Two-percent reduced fat milk caused 40% reduction in black and decaffeinated black teas and only 30% in green tea. On the other hand, reduced fat free liquid milk resulted in a greater reduction in decaffeinated black tea (40%) compared to 30% reduction in black and green teas. Adding malted powdered milk caused significant reductions in the teas (50%- 80%), compared to the 30-50 percent and 30-40 percent caused by non-dairy and fat free powdered milk types respectively. The reduction in the antioxidant potential of teas was found to be higher when high fat content milk was added. This may be due to formation of complexes of milk proteins with tea catechins.

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MICROWAVE-ASSISTED CLAISEN REARRANGEMENTS

Claisen and Cope rearrangements are common thermal [3,3] sigmatropic reactions. A protocol was developed utilizing DMF as a solvent and microwave irradiation to promote the Claisen rearrangement of several substrates. This protocol was applied to a series of allyl aryl ethers and substituted allyl aryl ethers to produce the resulting allyl phenols. In some cases, the Claisen rearrangement was followed by a subsequent Cope rearrangement.

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COMPARISON OF ALGAL BIODIESEL FROM AUTOTROPHIC HYDROGEN-PRODUCING *CHLAMYDOMONAS REINHARDTII* AND HETEROTROPHIC GLYCEROL-METABOLIZING *SCHIZOCHYTIRUM LIMACINUM*

The finite supply of fossil fuels, and the desire to replace imported oil necessitates the search for alternative sources of liquid transportation fuels. Algae have emerged as possible sources of biodiesel, but the search for the appropriate strains and for optimal lipid production is an active area of research. *S. limacinum* (*Sl*) has been identified as an organism capable of conversion of glycerol waste products from standard biodiesel production into additional biofuel. *C. reinhardtii* (*Cr*) has been used to produce biohydrogen, but the media required to generate biohydrogen also results in cell death. In this work we investigate whether or not biodiesel can be produced from *Cr*, and compare the yield and composition of fatty acid methyl esters (FAMEs) from the two organisms. The heterotrophic algae *Sl* provided higher lipid content (49%) than the autotrophic algae *Cr* (32.8%). IR spectroscopy clearly indicated the presence of unsaturated fatty acids in FAMEs from both organisms. GCMS indicated a more complex pattern of FAMEs from *Cr* than from *Sl*. In agreement with previously published work, we found 16:0 and 22:6 fatty acids to be most abundant in *Sl*, while methyl 14:0 and 22:4 were the most abundant fatty acids in *Cr*. If large-scale culture of *Cr* is pursued for biohydrogen production in the future, it should be possible to produce additional energy as biodiesel from the biomass waste products.

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HIGH-RESOLUTION TWO-DIMENSIONAL NMR SPECTROSCOPY OF A COBALT(III) COMPLEX CONTAINING TRIS(2-AMINOETHYL)AMINE AND 1,10-PHENANTHROLINE

The compound $[Co(tren)(phen)]Cl_3$ was synthesized and studied by a series of two-dimensional NMR experiments, including COSY, HSQC, HMBC, and NOESY. At high resolution, signals of recognizable multiplicity were obtained for both the aliphatic and aromatic portions of the spectrum. Within the aliphatic portion of the spectrum, it was possible to assign individual multiplets to specific protons, and to determine the relative orientations of the protons with respect to the aromatic ring. It was also possible to assign the proton and carbon resonances in the aromatic ring, including the quaternary carbon atoms, despite the fact that this ring was coordinated in an asymmetric fashion.

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DEHALOGENATION OF ALPHA-BROMO ACYL HALIDES USING PHENYLPHOSPHINE

α-bromo acyl chlorides and α-bromo acyl bromides form dibromophenylphosphine quantitatively on reaction with phenylphosphine in contrast to α-chloro acyl chlorides which form acylphosphines. Acetyl bromide also results in dibromophenylphosphine in contrast to acetyl chloride which forms acylphosphines. When the same reactions are done in the presence of protic solvents, dibromophenylphosphine is not formed. Instead a phosphorus containing species (currently unidentified) is formed irrespective of the acyl halide used.

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NEW CHLORO AND BROMO SUBSTITUTED ACYLPHOSPHINES: A PHOSPHORUS NUCLEAR MAGNETIC RESONANCE STUDY OF THEIR PREPARATION AND REACTIVITY

The reactions of phenylphosphine with a-chloroacyl chlorides result in mono- and bis(α-chloroacyl)phosphines whereas reactions with α-bromoacyl chlorides and α-bromoacyl bromides result in dibromophenylphosphine. On the other hand, reactions of phenylphosphine with both β-chloro- and bromoacyl halides resulted in mono and bis(acyl)phosphines. Mono(acyl)phosphines are not stable in air whereas their bis counterparts are stable as neat liquids. Bis(acyl)phosphines cleave in the presence of hydrogen peroxide to form halosubstituted carboxylic acids. ^{31}P-NMR spectra indicate a shielding effect on phosphorus when electronegative elements are present in close proximity.

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ACKNOWLEDGMENT
The *Journal of Undergraduate Chemistry Research* wishes to acknowledge the generous support of the VMI Chemistry Department and the Virginia Military Institute for their support of this journal.

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