Synthesis and Analysis of Nifedipine

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The skyrocketing expansion of the pharmaceutical industry requires an ever-increasing number of qualified technicians and research specialists. If the trend continues, it could even be that our education system will be unable, in a near future, to provide sufficient manpower.

One of the ways to get students interested in this high-tech field is to have them work in the laboratory to develop and prepare real drugs that can be fairly easily synthesized, and that do not require expensive equipment or reagents.

This activity describes the synthesis of nifedipine. This compound belongs to a group called calcium-channel blockers, used to treat angina and hypertension. It was developed and patented by Bayer (famous for Aspirin) over thirty years ago.

Although this experiment was originally developed in an Analytical Chemistry Techniques course, it can easily be adapted to Organic Chemistry courses in the Science program, as:

- The synthesis is performed in one step with affordable reagents;
- The resulting compound can be easily identified through conventional, readily available methods, e.g. determining the melting point and conducting infrared (IR) and ultraviolet (UV) spectroscopic analyses.

For the *Analytical Chemistry Techniques* program, the synthesized compound may be analyzed using other methods, if available (thin layer chromatography, high-performance liquid chromatography, gas chromatography coupled with mass spectrometry, and nuclear magnetic resonance).