B82 Pyrolysis Products of BK-2C-B and BK-2C-I, Beta-Keto Analogs of 2,5-Dimethoxy-4-Bromophenethylamine

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The goal of this presentation is to develop a better understanding of the products that result from the pyrolysis of the ß-keto analogs of the 2,5-dimethoxyphenethylamines: (1) 2-amino-1-(4-bromo-2, 5-dimethoxyphenyl)ethan-1-one (ßk-2C-B); and, (2) 2-amino-1-(4-iodo-2, 5-dimethoxyphenyl)ethan-1-one (ßk-2C-I).

This presentation will impact the forensic science community by identifying the products produced during pyrolysis of the beta-keto analogs of the 2,5-dimethoxyphenethylamines and their potential toxicity. Detecting these products in biological samples may also aid toxicologists in the identification of the drug and the route of administration.

The family of psychedelic phenethylamines called "2Cs" were first synthesized in the 1970s by Alexander Shulgin and published in his book, *Phenethylamines i Have Known and Loved* (PiHKAL).[1] The chemical structure of the 2C compounds has methoxy groups at the 2 and 5 positions of a phenethylamine ring. The acronym of 2C refers to the two carbon atoms between the benzene ring and the amino group.

Although 4-bromo-2,5-dimethoxyphenethylamine (2C-B) was scheduled in 1995, the beta-keto analog did not appear as a legal high until 2013.[2,3] The only structural difference between 2C-B and *bk*-2C-B is the addition of the beta keto group at the carbon beta to the amino group. Even though 2-amino-1-(4-bromo-2,5-dimethoxyphenethyl)ethanone (*bk*-2C-B) was first synthesized in 1974, there is little scientific data available on its use as a recreational drug. The first literature report was a 2004 study of β-oxygenated analogs of 1-(4-Bromo-2,5-dimethoxyphenyl)-2-aminopropane.[4] Power et al. recently reported on the synthesis and *in vitro* metabolism of *bk*-2C-B and compared it to a purchased sample.[5] They also determined that *bk*-2C-B reacts in the injector port of the Gas Chromatography (GC) to form decomposition products, namely 1-(4-bromo-2,5-dimethoxyphenyl)-ethanone, and a dimer.[2] In this work, *bk*-2C-B was pyrolyzed in order to identify the substances inhaled when the drug is smoked.

For the pyrolysis reaction, a sample of *bk*-2C-B (5mg-9mg) was loaded into an aluminum foil boat, placed in the bottom of a 20ml crimp vial, and heated with a disposable lighter for approximately 30s until yellow vapors formed in the vial. The foil cup was removed and the flask was rinsed with acetonitrile to dissolve the residues for GC/MS. The derivication was an acetylation performed using 100 µL of acetic anhydride and heating at 70°C for three hours. The vial was cooled to room temperature and the contents analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). For Trimethylsilyl (TMS) derivatization, the residue was taken up in N,O-Bis(trimethylsilyl)trifluoroacetamide (BSTFA) /toluene (1/1) and analyzed by GC/MS.

Twelve products were detected and confirmed by comparison to standards synthesized at Trinity College Dublin. They are primarily the result of bond cleavage and halogenation. Unlike cocaine and methamphetamine, most of the *bk*-2C-B decomposed during pyrolysis. The primary products from the pyrolysis of *bk*-2C-B are 1-(4-bromo-2-hydroxy-5-methoxyphenyl)-ethanone and 1-(4-bromo-2,5-dimethoxyphenyl)-ethanone. The Iodo analogs were also detected after the pyrolysis of *bk*-2C-I. Four additional analogues to the *bk*-2C-B pyrolysis products and one distinct structure, 1-(2,5-dimethoxyphenyl)ethan-1-one) have been identified for *bk*-2C-I.

The pyrolysis of *bk*-2C-B produces chemicals that have been tested as fungicides and proton chromophores. The 1-(2,5-dimethoxyphenyl)ethan-1-one) is a skin, eye, and respiratory irritant, an ingredient in pesticides, and has been tested as a potential anti-cancer agent. Analysis is ongoing.

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2,5-Dimethoxyphenethylamine, Pyrolysis, Legal High