

# STRAIGHT TOX

## The 2C-phenethylamines Have Arrived

by Dwain C. Fuller, D-FTCB, TC-NRCC

*To see a world in a grain of sand,*

*And a heaven in a wild flower,*

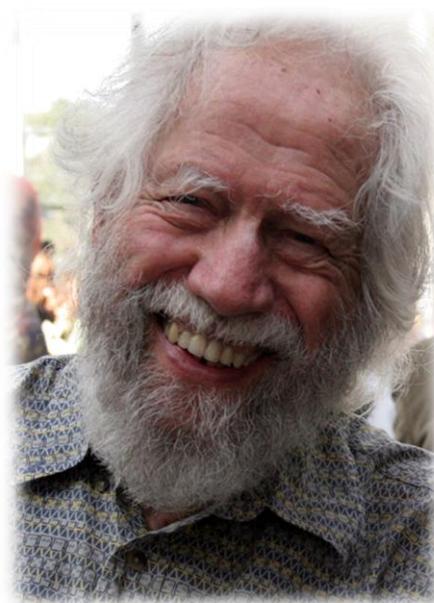
*Hold infinity in the palm of your hand,*

*And eternity in an hour. – William Blake*

I found this opening stanza from William Blake's poem *Auguries of Innocence*, while looking for some clever way to use the letters "2C" as the words "to see". That quest was unsuccessful, and probably thankfully so, but these words were so appropriate in describing the psychedelic experiences of users of the 2C compounds that I felt compelled to include them here. Perhaps Blake would forgive me.

According to Wikipedia the term "2C" was coined by Alexander Shulgin of PIHKAL and TiHKAL fame as a descriptor of phenethylamine homologs having two carbons between the benzene ring and the amine group. While the 2C designation apparently originates with Shulgin, this specious explanation doesn't ring true to a chemist; by definition, all phenethylamines have two carbons between the benzene ring and the amine group. A better explanation appears to be that Dr. Shulgin used the 2C designation for those compounds having an unsubstituted two carbon chain between the benzene ring and the amine group. Be that as it may, there doesn't appear to be any doubt that it was Dr. Shulgin that brought the synthesis and pharmacodynamics of these compounds to light.

For those not acquainted with Dr. Shulgin and his "contribution" to pharmacology, I offer this brief bio: Alexander Theodore Shulgin, known as Sasha to his friends, was born on June 7, 1925 in Berkeley, California. Shulgin studied organic chemistry at Harvard until dropping out to join the Navy in 1943. After the end of



World War II, Shulgin returned to Berkeley and earned his PhD in biochemistry from UC Berkeley in 1954. Dr. Shulgin performed post-doctoral work in pharmacology and psychiatry at UC San Francisco and worked for a brief period as research director for Bio-Rad Laboratories, a name familiar to toxicologists, before working at Dow Chemical as a senior research chemist, prior to leaving to pursue his own interests. According to the LA Times, it was his experience with the phenethylamine, mescaline, that was seminal in setting the course of his future work.

Dr. Shulgin is credited with popularizing MDMA and has synthesized and tested on himself and volunteers, hundreds of compounds of pharmacological interest and has published much of this information in the books, PIHKAL (Phenethylamines I Have Known And Loved) and TiHKAL (Tryptamines I Have Known And Loved), both of which are available online, as well as various laboratory notebooks and peer-reviewed publications.

In short, Dr. Shulgin is both a blessing and a curse to the forensic toxicologist. On the one hand he has provided ready access to recipes for the synthesis of a large number of psychoactive chemicals to anyone who may be interested. On the other hand, however, he has provided the forensic toxicologist with at least a rudimentary idea of the expected pharmacodynamics of these compounds. Sinner or a saint? I'll let you be the judge.

### **The 2C's:**

The 2C compounds have been around for several years. Curtis, et al. reported a finding of a 2C-T-7 death in 2003. As with the emergence of synthetic cannabinoid-containing potpourri and MDPV-laced bath salts, there seems to have been an awakening to the Shulgin's 2C compounds.

In Coon Rapids, Minnesota one teenager died and ten others were hospitalized after ingesting 2C-E (2,5-dimethoxy-4-ethylphenethylamine). The drug was first believed to be 2C-I (2,5-dimethoxy-4-iodophenethylamine) until tested by authorities.

In Konawa, Oklahoma seven people were hospitalized and one died after allegedly being given 2C-E at a party.

A University of Montana student was arrested in March 2011 for allegedly selling 2C-B, among other drugs.

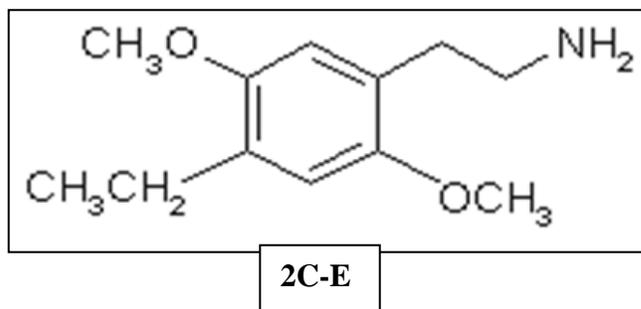
So what is the 2C class of compounds? The 2-C compounds described by Dr. Shulgin are, with perhaps a few exceptions, 2,5-dimethoxy-phenethylamines. Various substitutions at the 4 position are the principle difference in all of these compounds. To quote Dr. Shulgin, "There is a broad variety of chemical groups that can be attached to the benzene ring, at one or more of the five available positions, and in an unending number of combinations. And, in any given molecule, the greater the number of substituents on

the benzene ring, the greater the likelihood that there will be psychedelic action rather than stimulant action.”

In PiHKAL, Dr. Shulgin describes thirty or more 2C compounds. However, I will limit the discussion to just the following few. Among these, the first four are the 2C compounds included in Dr. Shulgin’s self-described “magical half dozen”. I have also included 2C-I, which anecdotal evidence would indicate is becoming popular.

### 2C-E

Of the 2C compounds currently being seen on the street, 2C-E, (2,5-dimethoxy-4-ethylphenethylamine) seems to be the most prevalent. 2C-E is commonly ingested orally in the 10 – 20 mg doses, but is sometimes insufflated in doses typically less than 5 mg. As with all of the 2C compounds, insufflation is not a popular route of administration as these

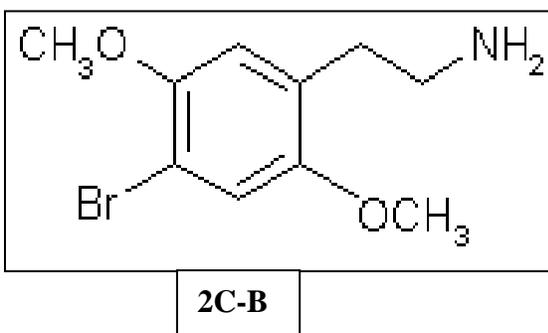


compounds apparently cause considerable pain in the nasal passages for ten minutes or so after use. The reported effects of 2C-E are intensely psychedelic in nature, similar to LSD. The onset of effects are reported to occur in about 20 – 90 minutes with a duration of 6 – 10 hours. The effects on sound perception by 2C-E are reported to be notable, with users reporting, shifting of pitch, echoing, and flanging.

Currently 2C-E is unscheduled in the United States.

### 2C-B

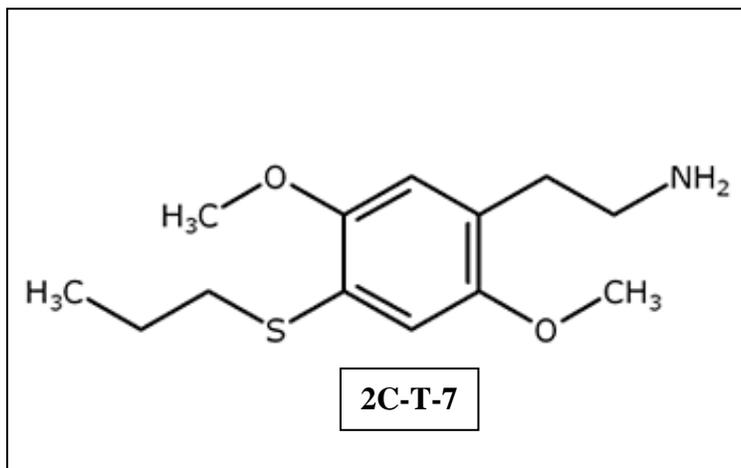
2C-B, (2,5-dimethoxy-4-bromophenethylamine) was first synthesized in 1974. PiHKAL lists the dosage range as 16 -24 mg, ingested orally. 2C-B has been used in the psychiatric field as an aid in therapy and has seen recreational use under the trade name “Eros”, manufactured by the German pharmaceutical company Dittewelle. 2C-B was also sold in the Netherlands under the name “Nexus”. The reported effects of 2C-B are psychedelic in nature and come and go in “waves”. The onset of effects are reported to occur in about 30 – 90 minutes with a duration of 2 – 5 hours.



2C-B is a Schedule I controlled substance in the United States.

**2C-T-7**

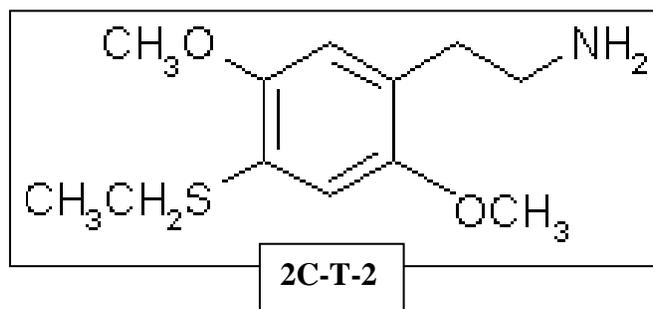
2C-T-7, (2,5-dimethoxy-4-propylthiophenethylamine), according to PiHKAL, is used in oral dosages of 10 -30 mg. 2C-T-7 was sold in Dutch and Japanese smart shops and is referred to as Blue Mystic, T7, Beautiful, Tripstay, and Tweety-Bird Mescaline. The reported effects of 2C-T-7 are psychedelic and entheogenic and may last as long as 8 – 15 hours. There have been at least three reported deaths involving the use of 2C-T-7 as well as many hospitalizations.



2C-T-7 is a Schedule I controlled substance in the United States.

**2C-T-2**

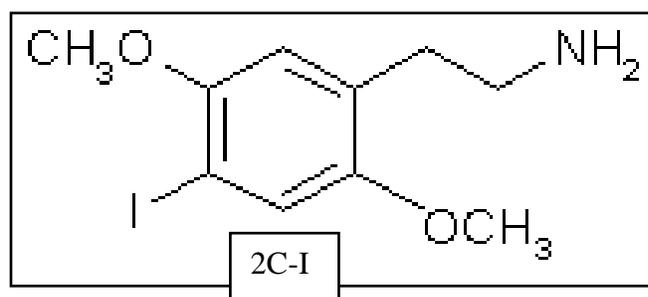
2C-T-2, (2,5-dimethoxy-4-ethylthiophenethylamine) was first synthesized by Dr. Shulgin in 1981. As can be clearly seen, it is very similar to 2C-T-7, having an ethyl group attached to sulfur rather than a propyl group. 2C-T-2 is reported to have pharmacodynamic properties similar to 2C-T-7. PiHKAL lists the dosage range as 12 – 25 mg. Effects can reportedly last up to 16 hours.



2C-T-2 is currently unscheduled in the United States.

**2C-I**

2C-I, (2,5-dimethoxy-4-iodophenethylamine) is reported to be a stimulant as well as an empathogen-entactogen and an entheogen. Larger doses are reported to produce psychedelic effects. In the early 2000's 2C-I was sold in smart shops in the Netherlands after the ban of 2C-B, but was banned itself in April 2003. A typical oral dose is reported to be 10 – 25 mg with effects lasting from 4 – 12 hours.



2C-I is currently unscheduled in the United States.

### Summary

The 2C compounds are making their way to the streets and, predictably, as one 2C compound becomes scheduled another one takes its place. These compounds, unlike some others encountered in the past, should not present any great analytical challenge to laboratories. Due to their similarity to the amphetamine class of compounds, the 2C compounds should be readily extractable by procedures designed to isolate alkaline drugs, or more specific amphetamine extractions. Likewise, the primary amine would be predicted to derivatize utilizing any derivatizing scheme successfully employed in routine amphetamine procedures. Laboratories may, however, wish to check their mass spec database and add these spectra, if not already present. A recent check of one popular drug standard supplier showed that 2C-B, 2C-I and 2C-T-7 analytical standards are currently available.

### References and Further Reading

Alexander Shulgin Biography.

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2C-I, <http://en.wikipedia.org/wiki/2C-I>

2C-I Vault, <http://www.erowid.org/chemicals/2ci/>

