

## Emerging Designer Drug Monograph

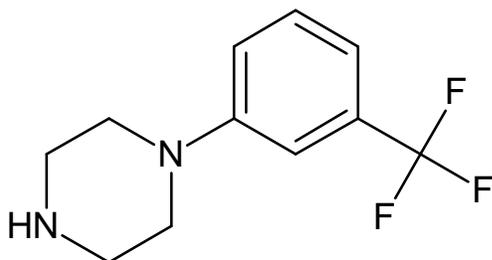
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**Author(s):** Megan Record, Barry K. Logan

**Drug Name:** TFMPP

**Synonyms:** 1-(3-Trifluoromethylphenyl)piperazine

**Structure:**



**Formula:** C<sub>11</sub>H<sub>14</sub>ClF<sub>3</sub>N<sub>2</sub>

**Molecular Weight:** 266.70

**Pharmacological Drug Class:** TFMPP is typically found in tablet or capsule form containing BZP as well as TFMPP (2).

**Metabolism:** Rosenbaum et al. demonstrated that TFMPP affects SERT which is a serotonin transporter in the same mechanism as MDMA and other amphetamines. TFMPP is primarily excreted as metabolites and the most common method is by hydroxylating the aromatic ring by the cytochrome P450 isoenzyme CYP2D6 (8). TFMPP also metabolizes by sulfation, or glucuronidation, and partial N-acetylation (8). The major metabolite that is excreted from the parent drug is 4-hydroxy-TFMPP. It excretes within 48 hours of ingesting the parent drug TFMPP. TFMPP excretes mostly in the glucuronide conjugate form and the parent drug TFMPP is barely excreted unchanged. The metabolite was excreted at 64% and the parent drug TFMPP was excreted at less than 0.7% (1).

**Blood Concentrations:** Elliot and Smith reported blood concentration levels in fatalities the first being in a traffic accident where the person had not been known to be a user of BZP or TFMPP with the TFMPP blood concentration level of 0.05 mg/L in the presence of BZP at a blood concentration of 0.71 mg/L, ethanol blood concentration of 77 mg/dL, and ketamine blood concentration of 0.96 mg/L. In the urine his TFMPP concentration was 1.04 mg/L, BZP 15.73 mg/L, and other drugs found in the urine such as cannabinoids, cocaine, ephedrine, ketamine, and ethanol. The other fatal case involving TFMPP the 17 year old boy fell through a roof after having been at a party and was carrying several tablets that contained TFMPP and BZP. The blood concentration of TFMPP was 0.15 mg/L with BZP blood concentration of 1.39 mg/L, ethanol was also found in his system but no other drugs. His urine concentrations were TFMPP 0.92 mg/L, BZP 8.72 mg/L (2). BZP blood

concentrations ranged from 0.02 to 1.2 mg/L in living users (2). In Wood et al. the 3 cases studied; two 18 year old boys and one 19 year old boy all went to the emergency room after attending the same party where they ingested the same 4 tablets, each tablet was sold from a different person at the party. The boys thought the tablets were Ecstasy. They showed concentration range of TFMPP of 0.03-0.06 mg/L and BZP of 0.26-0.27 mg/L. Cannabinoids were found in one of the patients but that was the only other drug detected in the toxicology screening (7). In Elliot's review an author studied 96 patients for 2 years and reported BZP concentrations between 0 and 6.29 mg/L with a mean of 0.68 mg/L. In nonfatal cases reported blood concentrations of BZP and TFMPP concentrations as 0.32 mg/l and 0.08 mg/L, and in another case as 0.47 mg/l and 0.10 mg/L respectfully no data on other potential drugs present was available (1). The TFMPP blood concentrations in the fatalities ranged from none detected but present in the urine, and when detected in the blood < 0.03 mg/L to 0.3 mg/L. In these cases BZP and TFMPP were found in the urine but not necessarily found in the blood (1). There were typically other drugs such as cocaine, MDMA, cannabis, alcohol, and several other drugs present. Many of these fatalities also have other causes that may be the cause of death such as hanging, heroin, or methadone use (1). In another case where a woman had multiple gunshot wounds as well as other drugs in her system had a TFMPP blood concentration levels measured at 1.1 mg/L but they could not determine the cause of death to be directly linked to the TFMPP overdose (3).

**Effects and Toxicity:** TFMPP is usually combined with BZP (2). TFMPP mixed with BZP produces MDMA like effects (4). TFMPP has increases the 5-HT concentrations (7). In the review by Elliot, reports of mild stimulant and hallucinogenic effects were produced by TFMPP, but no toxicity effects of TFMPP alone have been reported. BZP in post-mortem cases have a BZP concentration of > 0.25 mg/L, TFMPP of 0.093 mg/L (6). TFMPP urine levels have been found to be >0.5 mg/L (3). Wood et al. described BZP blood concentrations to be 0.26-0.27 mg/L and TFMPP blood concentrations to be 0.03-0.06 mg/L. Symptoms when taken with BZP include anxiety, headaches, vomiting, palpitations, tachycardia, collapse, confusion, hypertension, and seizures (2).

**Analysis:** TFMPP can be analyzed by HPLC as demonstrated in Young et al. Wood et al. performed toxicological screening via GC/MS. Other analyses include capillary electrophoresis, HPLC-DAD, LC-MS, IR, and TLC. The most prominent forms of analysis are GC-MS and LC-MS but the HPLC-DAD method allows identification of isomers of the piperazine derivatives (2). An SPE method by Zaney et al. showed that SPE with LC/MS/MS is more efficient than LLE and drugs like BZP and TFMPP can now be detected (9). One study suggests that there is some cross reactivity seen with BZP and TFMPP on the CEDIA Amphetamine/Ecstasy assay (5).

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