

**ADVICE TO  
THE EXPERT ADVISORY COMMITTEE ON DRUGS  
ON:**

**Assessment of 1,3 dimethylamylamine (DMAA)**

**AUGUST 2009**

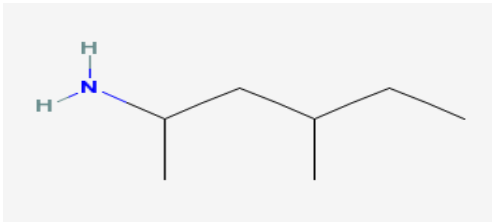
**Prepared by the Ministry of Health**

## Background

1. The Committee has considered papers on benzylpiperazine (BZP)-free “party pills” on two occasions since these products were introduced following the classification of BZP in April 2008. The Committee noted that preliminary testing had identified the substance 1,3-dimethylamylamine (DMAA) as an active ingredient in these products, but did not consider there to be sufficient evidence available to make recommendations regarding the control of this substance on either of these occasions.
2. This paper provides the Committee with known information on DMAA in view of assessing the risk of this substance against the criteria outlined in the Misuse of Drugs Act 1975.

## Substance identification

3. 1,3 dimethylamylamine, [CAS 105-41-9], is a simple aliphatic amine with sympathomimetic physiological effects. DMAA is also known by other chemical names including 4-methylhexane-2-amine.



4. A literature search suggests that DMAA was first synthesised by Lilly Pharmaceuticals in the 1940s for use as a nasal decongestant under the trade mark Forthane™. More recently, DMAA is understood to have been included in a line of body building supplements and weight loss products in the American market under the trademark Geranamine™ and at least one New Zealand vendor is distributing these products domestically.<sup>1</sup>
5. DMAA is understood to be active when taken orally at doses of around 25-30mgs. It has been claimed by users of this substance that doses around 100mgs can be nauseating.<sup>2</sup>
6. The testing of ten varieties of “new generation party pills” sold in New Zealand at two time points since the introduction of these products following the classification of BZP, indicates that DMAA is the primary active stimulant incorporated into the current range of ‘legal party pills’. The majority of these products are understood to contain between 50 – 100mgs of DMAA per dose,<sup>3</sup> sometimes in combination with caffeine and other substances such as glaucine or kava extracts.<sup>4</sup>
7. Raw powder that is claimed to be 99.98% pure DMAA has also been sold in quantities of 1 and 5 grams by internet vendors and some retail outlets throughout

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<sup>1</sup> [http://www.afan.co.nz/index.php?main\\_page=product\\_info&products\\_id=349](http://www.afan.co.nz/index.php?main_page=product_info&products_id=349)

<sup>2</sup> <http://www.drugs-forum.co.uk/forum/showthread.php?t=30801&page=2>

<sup>3</sup> Submission from Stargate International – “Proposal to Schedule and regulate DMAA and other psychoactive substances”

<sup>4</sup> Results of ESR testing dated 18 June 2009

New Zealand. However, in October 2008 the Ministry issued a request for the voluntary suspension of the sale of pure DMAA powder by retailers following some adverse reactions to this substance. Initial indications are that most retailers have complied with this request. However, only DMAA in powder form was recalled and party pills containing DMAA are still widely available.

8. Oral administration of party pills containing DMAA is generally the favored route of administration of this substance. However, at least one serious hospital presentation has been reported in New Zealand whereby a comparatively large quantity of pure DMAA was injected. Furthermore, a known supplier of 'pure DMAA' in powder form has provided information to retailers that the substance can be smoked<sup>5</sup> and it has also been noted by users that DMAA can be snorted<sup>6</sup> for the purpose of inducing a psychoactive effect.

### **Current classification**

9. DMAA is not currently controlled under the Misuse of Drugs Act 1975 (MODA) or Medicines Act 1981. The Ministry is not aware of any other jurisdictions that have placed controls on DMAA and the substance is not restricted by any international treaties.

### **The likelihood or evidence of drug abuse**

#### **Prevalence**

10. Party pills containing DMAA can be easily purchased online or in person through a large number of retailers in New Zealand. The industry claims to have sold around 100,000 DMAA based party pills since April 2008.<sup>7</sup>
11. There is no prevalence data available for use of DMAA by the general population but it is understood that use of this substance is low. A University of Auckland survey undertaken in December 2008 indicates that only 11.9% of respondents who had previously used BZP based party pills, had tried DMAA containing party pills following the classification of BZP.

#### **Seizures**

12. DMAA is not currently restricted and commercial importations of DMAA are understood to have increased over the past 12 months. The Auckland International Mail Center has encountered 8 packages of DMAA being imported into New Zealand since November 2007 with each package containing between 1-8kgs of the substance<sup>8</sup>.

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<sup>5</sup> 'Sunrise DMAA fact sheet (supplied to retailers of DMAA powder)

<sup>6</sup> [http://www.tripme.co.nz/component/option,com\\_fireboard/Itemid,73/func,view/id,4625/catid,7/](http://www.tripme.co.nz/component/option,com_fireboard/Itemid,73/func,view/id,4625/catid,7/)

<sup>7</sup> Submission from Stargate International – "Proposal to Schedule and regulate DMAA and other psychoactive substances"

<sup>8</sup> Personal correspondence with James Oughton, Senior Advisor – Medsafe (Based at the international mail centre) on 21 May 2008.

## Specific effects of the drug

13. No international peer reviewed research is available on the pharmacodynamics of this substance. However, it is understood that DMAA broadly resembles the endogenous substance epinephrine (adrenaline) and has similar sympathomimetic effects. DMAA is thought to have lesser stimulant effects on the Central Nervous System than ephedrine and is claimed by the industry to be somewhat less psychoactive than BZP.

## Risks to public health

14. No peer reviewed data is available on the toxicology of DMAA. However this substance is understood to have broadly similar toxic effects on overdose to xanthine (caffeine) poisoning.<sup>9</sup> The effects of DMAA on driving performance can be assumed to be similar to that of other known sympathomimetic substances.
15. The Ministry is aware of four hospital presentations during June and July of 2008 involving users who had consumed comparatively large amounts of a white powdered substance claiming to be '99.98% pure DMAA', as well as one presentation involving a BZP-free party pill with an unconfirmed active ingredient assumed to containing DMAA.<sup>10</sup>
16. The first of these presentations involved a 30 year old female who presented with a headache, vomiting and agitation following ingestion of an unknown quantity of DMAA powder. This patient was treated with IV fluids, morphine and Glyceryl Trinitrate (GTN) for hypertension. The patient was observed overnight and discharged.<sup>11</sup>
17. The second presentation involved a 30 year old male who administered roughly a quarter of a teaspoon of pure DMAA followed by two beers. Correspondence indicates that this user may have potentially injected the DMAA, but the method of administration was not able to be confirmed. This patient reported an initial 'high' from the substance followed by a severe headache and vomiting. Upon presentation to the Emergency Department the patient was hypertensive, vomiting and agitated with a headache so severe that a CT scan was required to rule out the potential for cerebral haemorrhage. The patient was treated with IV fluids GTN and morphine and admitted to hospital.<sup>12</sup>
18. The third case involved a 17 year old male who presented after taking two 'BZP-free party pills' assumed to contain DMAA. When this patient presented he was minimally drowsy but lucid and coherent, he complained of a severe headache associated with nausea and vomiting, and had decided to present as he was concerned about the adverse effects he was experiencing. The patient had marked hypertension (BP 205/120) with relative bradycardia (58) and normal respiration and oxygen saturation. No focal neurology deficits were revealed on physical examination and the patient had a normal ECG. This patient was treated with IV fluids and metoclopramide 10mg I.V plus Midazolam 1gm I.V after which his blood

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<sup>9</sup> Email from Dr Paul Quigley. Emergency Department Physician – Capital and Coast District Health Board on 12 May 2008.

<sup>10</sup> Email from Dr Dell Hood – Medical Officer of Health, Waikato District Health Board

<sup>11</sup> Ibid

<sup>12</sup> Ibid

pressure settled to 150/90. He was observed in the Emergency Department for a further 4 hours at which time he was asymptomatic, his heart rate at rest was in the mid 60's and blood pressure 140/90.<sup>13</sup>

19. A fourth case involved a 45 year old male who presented to hospital with a haemorrhagic stroke 18 hours after consuming an unknown quantity of DMAA powder. Similar symptoms to other suspected DMAA presentations were noted however as the patient is also a long term heavy smoker he may have been at risk of cerebral haemorrhage irrespective of consuming DMAA.<sup>14</sup>

### **Therapeutic value of the drug**

20. DMAA was originally trialled as a nasal decongestant. However there are no current therapeutic uses for this substance.

### **Potential for use of the drug to cause death**

21. The Merck encyclopedia of Chemicals Drugs and Biologicals report that the LD50 of 1,3 dimethylamylamine is 185mg/kg when administered in rodents.<sup>15</sup>

### **Ability of the drug to create physical or psychological dependence**

22. The ability of DMAA to create physical or psychological dependence is unknown. However, the Ministry understands that a large portion of users who try this substance do not find the effects pleasant or worthwhile and do not continue its use.

### **International classification and experience of the drug in other jurisdictions**

23. DMAA has been incorporated in a line of body building supplements and weight loss products in the American market under the trademark Geranamine™. The Ministry is not aware of any other jurisdictions placing DMAA under control.

### **Comment**

24. Upon analysing known hospital presentations due to this substance, and taking into consideration the experiences voiced by users of this substance, it is apparent that a potential exists for DMAA to cause some degree of harm when large doses are administered. However there is also insufficient data available to form a conclusion about the level of harm DMAA represents. It is also evident that this potential for harm is greatly increased when methods of administration other than oral administration, such as the injecting, or insufflating (snorting) of this substance are adopted.
25. Accordingly, it is suggested that should the Committee agree that the evidence is insufficient to recommend the classification of DMAA as a controlled drug, that

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<sup>13</sup> Ibid

<sup>14</sup> Ibid

<sup>15</sup> Merck Index; an Encyclopedia of Chemicals, Drugs, and Biologicals", 11th ed., Rahway, NJ 07065, Merck & Co., Inc. 1989 Volume(issue)/page/year: 11,957,1989

consideration be given to the controls provided by the restricted substances framework of the Misuse of Drugs Amendment Act 2005. The Scheduling of DMAA as a restricted substance would not make the supply and possession of this substance illegal, but would provide for robust controls around its marketing and availability that could address concerns regarding its known risks.

26. Furthermore, should the Committee agree to advise that DMAA be scheduled as a restricted substance, the Committee may wish to endorse the making of further regulations requiring all synthetic restricted substances to be sold only in tablet or capsule form. Such a requirement would make it an offence to sell any restricted substance as a pure chemical powder. This would greatly reduce the potential for overdose as well as the likelihood that more harmful methods of administration, such as interventions administration, of these substances be utilised,

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