

ARSENIC AND MERCURY IN TRADITIONAL CHINESE HERBAL BALLS

To the Editor: While examining imported traditional Chinese medicines for the presence of products from endangered

Table 1. Ranges of Arsenic and Mercury Concentrations in Herbal Balls.*

| HERBAL-BALL PREPARATION | CHINESE MANUFACTURER | No. ANALYZED | ARSENIC (mg) | MERCURY (mg) |
|--|--|-----------------|--------------|--------------|
| An Gong Niu Huang Wan | Tung Jen Tang Pharmaceutical Factory, Nanjing | 3 | 3.21–36.6 | 80.7–621.3 |
| Da Huo Luo Wan | Guangzhou Chen Li Ji Pharmaceutical Factory, Guangzhou | 6 | ND–0.1 | 12.9–23.3 |
| Dendrobium Moniliforme Night Sight Pills | Tientsin Drug Manufactory, Tientsin | 3 | ND–0.6 | 18.9–28.1 |
| Niu Huang Chiang Ya Wan | Tianjin Drug Manufactory, Tianjin | 3 | 6.9–8.4 | 42.5–45.4 |
| Niu Huang Chiang Ya Wan | Tianjin Drug Manufactory, Tianjin | 3 | 8.5–9.5 | ND |
| Niu Huang Ching Hsin Wan | Peking Tung Jen Tang, Beijing | 3 | 1.3–2.7 | 22.3–181.8 |
| Niu Huang Ching Hsin Wan | Tientsin Drug Manufactory, Tientsin | 5 | 3.4–9.9 | 24.5–70.5 |
| Ta Huo Lo Tan | Beijing Tung Jen Tang, Beijing | 3 | 14.9–22.1 | 41.6–99.0 |
| Tsai Tsao Wan | Peking Tung Jen Tang, Beijing | 3 | ND–0.6 | 7.8–15.9 |

*The herbal balls were dissolved in concentrated hydrochloric acid and nitric acid, and the resulting solutions were analyzed with flame atomic absorption spectroscopy. ND denotes not determined.

species, we have detected potentially toxic levels of arsenic and mercury in certain herbal-ball preparations.

Herbal balls are aromatic, malleable, earth-toned, roughly spherical, hand-rolled mixtures of primarily herbs and honey. They are 1.5 to 2.5 cm in diameter and weigh 2.5 to 9.0 g. The literature accompanying most preparations instructs the consumer to dissolve the balls in warm wine or water and to drink it as a tea. Herbal balls are used as self-medication for a wide variety of conditions, including fever, rheumatism, apoplexy, and cataracts. All of the herbal balls we examined were factory-produced, patented medicinal agents manufactured in mainland China and confiscated at U.S. ports of entry by the U.S. Fish and Wildlife Service for alleged endangered-species violations. Herbal balls similar to those that we analyzed are readily available in specialty markets throughout the United States.

Using atomic absorption spectroscopy, we detected arsenic and mercury in eight of the nine preparations tested. One preparation contained arsenic alone. The mercury content ranged from 7.8 to 621.3 mg, and the arsenic content ranged from 0.1 to 36.6 mg per ball (Table 1). Although we have not identified the molecular forms of the arsenic and mercury, we suspect that they are arsenic and mercury sulfides, on the basis of physical and chemical observations, the prevalence of sulfide forms of arsenic and mercury in nature, and the official listing of arsenic and mercuric sulfides in the Chinese pharmacopeia.

The recommended adult dose of these preparations is two herbal balls daily. Ingesting two herbal balls could theoretically provide up to 73 mg of arsenic and more than 1200 mg of mercury. Chronic arsenic sulfide poisoning from the consumption of traditional Asian medicinal agents in Singapore

has been reported in patients ingesting approximately 10 mg per day.¹ Chronic mercury sulfide poisoning from ethnic Indian remedies has been documented among persons ingesting approximately 260 mg daily in the United Kingdom.² Therefore, most of the herbal-ball preparations we examined pose a potentially serious health risk to consumers. These results contribute to an existing literature that has documented the presence of unlisted, toxic, or controlled substances in traditional Chinese medicinal agents (e.g., diazepam, mefenamic acid, indomethacin, hydrochlorothiazide, and methyltestosterone).³⁻⁵ Health care professionals should be aware that patients who consume traditional Chinese remedies may be exposed to many potentially toxic substances.

EDGARD O. ESPINOZA, DR.P.H.
MARY-JACQUE MANN, M.F.S.
National Fish and Wildlife
Forensics Laboratory

BOB BLEASDELL, PH.D.
Southern Oregon State College
Ashland, OR 97520

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