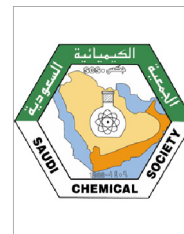




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## ORIGINAL ARTICLE

# Elemental composition of *Cyrtanthus obliquus* and *Lippia javanica* used in South African herbal tonic, Imbiza

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## KEYWORDS

*Cyrtanthus obliquus*;  
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Imbiza;  
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**Abstract** Imbiza is a herbal tonic, which has gained popularity amongst South Africans as an immune booster and for the treatment of many minor and chronic illnesses. Main ingredients of Imbiza are extracts from two medicinal plants namely *Cyrtanthus obliquus* and *Lippia javanica*. The concentrations of various elements in these two plants are examined. The total and water extractable elemental concentrations were determined in both the plants. The elemental concentrations in the water extracts more closely represent concentrations in the herbal tonic. Concentrations of selected elements in *C. obliquus* bulbs collected from eight market sites around the KwaZulu-Natal province were investigated. The levels of the elements in decreasing order were  $\text{Ca} > \text{Mg} > \text{Fe} > \text{Zn} > \text{Mn} > \text{Cu} \approx \text{Se} > \text{Pb} > \text{Cr}$  for total concentrations; and  $\text{Ca} > \text{Mg} > \text{Fe} > \text{Zn} > \text{Mn}$  for water extractable forms. Elemental levels in *C. obliquus* bulbs were dependent on the source, which suggested the importance of collection sites on elemental levels. A high percentage of Zn (77.5–91.5%) was found in water extracts.

The levels of selected elements in *L. javanica* leaves collected from ten different locations around the KwaZulu-Natal province were also investigated. The levels of the elements were found to be in the decreasing order of  $\text{Ca} > \text{Mg} > \text{Fe} > \text{Zn} > \text{Mn} > \text{Cu} > \text{Se} > \text{Cr} > \text{Pb} > \text{Co} > \text{Cd}$  for total concentrations and  $\text{Ca} > \text{Mg} > \text{Fe} > \text{Zn} > \text{Cu} > \text{Cr} > \text{Pb}$  for water extractable forms. It was evident from the study that the herbal tonic was a good source of Ca and Mg, thus accredited as a viable immune booster and toxic metals were below the recommended levels in the investigated samples.

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## 1. Introduction

Traditional, complementary and alternative medicines are quite prevalent, and herbal and traditional medicines such as Ayurveda (India), Siddha (South Asia), Unani (Arabic), traditional Chinese medicine, homoeopathy, acupuncture, chiropractic etc. are practiced and utilized by millions across



**Figure A.1** Map of eight chosen market sites in KwaZulu-Natal, South Africa, from which *C. obliquus* bulbs were purchased. Sites: A1-Durban, A2-Umzinto, A3-Eshowe, A4-Verulam, A5-Stanger, A6-Tongaat, A7-KwaNkalokazi and A8-Ixopo.

the globe (Boedeker et al., 2005). China and India have standardized their own indigenous medicine and pharmacopoeia yet countries in Africa, despite the pressures of disease and the abundance of plant species, have not followed suit. Most of the existing texts on traditional medicine in Africa deal only with medicinal plants and their uses, ignoring chemical and pharmacological studies (Sofowora, 1993). Studies indicate that almost 80% of Africans utilize and rely on traditional medicine for their healthcare needs (Gqaleni et al., 2007; Goggin et al., 2009). Many South Africans regard traditional medicine as a safe, cheaper and desirable alternative to treating their health problems (Mander et al., 2007). Studies in South Africa have shown a link between traditional medicine and diseases such as AIDS (Green et al., 1995; King et al., 2009; Richter, 2003; UNAIDS, 2002). This is because a variety of herbal tonics that are purported to treat and cure these ailments are prepared by traditional healers. One such well-known herbal tonic is Imbiza. Imbiza is a decoction prepared from a variety of medicinal plants that are collected from wild populations or bought from informal plant traders or traditional healers (Mander, 1998). Imbiza has been used to treat ailments such as colds, chest infections, skin infections, diabetes, tuberculosis, cancer and symptoms of HIV and AIDS

(UNAIDS, 2006; Ndhlala et al., 2009). Although this decoction has claimed medicinal value, it is also known to cause poisoning if the administered dosage is too high (Zikulu et al., 2012).

*Cyrtanthus obliquus* (*Umathunga*), of the plant family Amaryllidaceae, is found mostly in the Eastern Cape, South Africa. The bulbs of *C. obliquus* are used to treat diseases such as scrofula, leprosy and chronic coughs (Watt and Breyer-Brandwijk, 1962). *Lippia javanica* (*uMsuzwane*) of the plant family Verbenaceae is found in grasslands and woodlands, throughout the eastern and central parts of Southern Africa (Roberts, 1990; van Wyk et al., 2009). The leaves of *L. javanica* are commonly used to fight colds and flu and they are also used to make a caffeine-free tea (Shikanga et al., 2010). A study done by Palgrave et al. (2003) reported that the tea infusions of the leaves are used by patients in KwaZulu-Natal to treat common symptoms associated with HIV and AIDS including the treatment of lung infections and diarrhoea. *C. obliquus* and *L. javanica* are two of the five medicinal plants used to prepare the herbal tonic, Imbiza.

Since Imbiza is widely consumed by the South African population, the elemental distribution in these two plants was examined to assess their benefits and potential elemental toxic-

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