

An assessment of the water quality of the Isinuka springs in the Transkei region of the Eastern Cape, Republic of South Africa

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Abstract

The physico-chemical properties of Isinuka springs, a "wonder" water resource in Port St Johns area of Eastern Cape Province, were investigated over three seasonal regimes. Water samples were collected from the five spring sources, along Isinuka river and from Ferry Point Cottage spring and analysed for their quality parameters. Most of the water quality variables measured were found to show seasonal fluctuations. Isinuka spring water is not fresh as it contains high salt contents and the results indicate that it is not suitable for drinking without treatment. The water is moderately hard, salty and fairly neutral with pH ranging from 6.87 to 8.33. One of the five sources continually emits a characteristic odour and the five spring sources were characterised by very high concentrations of TDS, turbidity, Cl⁻ and NH₄⁺-N which exceeded the maximum permissible levels recommended for drinking waters. The NO₃⁻-N and NO₂⁻-N were, however, present at levels far below the critical value of 10 mg/l above which the occurrence of blue baby syndrome (methaemoglobinaemia) due to NO₂⁻ poisoning might be a problem in pregnant women and bottle-fed infants. Water from Ferry Point Cottage spring met the water quality guidelines for drinking water.

Introduction

Surface waters (e.g. rivers, streams and ponds), groundwater, rain-water and springs are the main sources of water available to the rural settlement dwellers in South Africa. The qualities of these water bodies vary widely depending on location and environmental factors. Among the factors determining the qualities of natural waters, groundwaters and springs in particular, are the chemical composition of the underlying rocks, soil formations and the length of time that the water body has been trapped underground (Van der Merwe, 1962). To protect the water sources, several national and international policies and acts have been enacted (DWA, 1997; SDWA, 1996;) and criteria and guidelines established for water quality standards (EEC, 1980; SABS, 1984; USEPA, 1996; WHO, 1984 and 1993)

From the data available in the literature, there is an increasing awareness of the need to control the pollution of South African water resources (SWLR, 1995; DWA, 1986) and to protect their quality (Quilbell et al., 1997; Jagals, et al., 1997 and Dallas and Day, 1993). The present study focuses on the water qualities of Isinuka springs and the adjoining river. The location of the springs has become a popular tourist centre in the Port St Johns' area and is believed to be a mystery water source. The springs are also the main source of domestic water supply for the villagers. Its historical background suggests some latent scientific value which is worthy of investigation. The physico-chemical properties of Isinuka springs are reported and the results are compared with data from the Isinuka River, together with recommended water guidelines for drinking and domestic uses.

Ferry Point Cottage provides the only other spring source available in the Port St Johns' area. In addition to evaluating the suitability of its water for domestic uses, the spring will serve as a

control and reference. It is also envisaged that the baseline data will contribute to the understanding of the physical and chemical behaviour of other spring sources in the region.

The study areas

Isinuka springs and river

Isinuka springs are situated approximately 20 km west of Port St Johns, a town noted for its beautiful beaches and holiday resorts in the Transkei Region (Fig. 1). There are five spring sources strategically located on top of a mountain about 800 m a.m.s.l. The springs have long been considered a sacred source in the Eastern Cape Province of South Africa as they are believed to possess some potent qualities and mystical powers for curing all diseases. The location and description of the five spring sources are given in Table 1. Down the mountain valley is the Isinuka River which drains into the Umzimvubu River, an important water body discharging into the Indian Ocean at Port St Johns.

In Isinuka Village, there is a small well associated with the original source of the Isinuka spring. This source dried up when the public was denied free access to the spring and the water was partially commercialised. The well emits a pungent gas and because of this, the area is called "VICKS". Visitors to Isinuka believe that by inhaling the gas their headaches, backaches and other body problems can be cured.

Ferry Point Cottage spring

Ferry Point Cottage is a bed-and-breakfast (B&B) guest house located by the mountain side south-west of Port St Johns and close to the point where ferries are boarded on Umzimvubu River. The name of the Cottage was derived from its location. The spring's source is on top of the mountain. The management of the cottage depends solely on this water source and are therefore interested in its suitability for drinking and other domestic uses.

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