

Evaluation of the toxicity of *Arthrospira (Spirulina) platensis* extract

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Abstract In this study, the methanol extract of *Arthrospira (Spirulina) platensis* was examined for acute and subchronic toxicities. The extract did not produce any sign of toxicity within 7 days after feeding it at a single high dose of 6 g kg⁻¹ body weight to female and male Swiss mice. For the subchronic toxicity test, the extract at doses of 6, 12, and 24 mg kg⁻¹ body weight was orally administered to six male and six female Wistar rats daily for 12 weeks. Throughout the study period, we did not observe any abnormalities on behavior, food and water intakes, and health status among the treated animals. The hematology and clinical chemistry parameters of treated groups did not significantly differ from those of the controls in both sexes. Postmortem examination of the test groups also showed no abnormalities in both gross and histological findings. These results thus suggest that the methanol extract of *A. platensis* did not cause acute or subchronic toxicity in our experimental animals.

Keywords Acute toxicity · *Arthrospira platensis* · Blue-green algae · Methanol extract · *Spirulina* · Subchronic toxicity

Introduction

Spirulina, now named *Arthrospira*, is an edible blue-green microalga (cyanobacterium) characterized by multicellular cylindrical trichomes in an open left-hand helix along the entire length (Tomaselli 1997). Due to its high content of good quality protein as well as being rich in vitamins, minerals, and other components beneficial to health such as essential fatty acids and antioxidant pigments like carotenoids, chlorophyll, and phycocyanin, this cyanobacterium has received much attention as a most promising and nutritious food source (Dillion et al. 1995). Also, its diverse biological and pharmacological properties (Belay 2002; Becker 2003; Khan et al. 2005; Mani et al. 2008) have promoted *Arthrospira (Spirulina)* as being a functional food, and thus, consumption of this microorganism as a nutritional therapeutic supplement gains popularity. Not only the “whole” *Arthrospira (Spirulina)* but also a wide range of the alga components primarily arisen from the two species, *Arthrospira platensis* and *Arthrospira maxima*, are now sold in health food markets worldwide. Commercialization of *Arthrospira (Spirulina)* for food and special feeds has occurred since the 1970s (Sánchez et al. 2003). This dietary microalga, however, has been utilized for many years without any reports of undesirable effect in living organisms, and its safety evaluations for human consumption have been extensively performed. Despite a number of toxicological reports having concluded that *Arthrospira* per se is not toxic (Krishnakumari et al. 1981; Chamorro et al. 1985, 1988, 1996, 1997; Chamorro and Salazar 1988; Salazar and Chamorro 1990; Salazar et al.

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