

Nutraceutical supplementation on behavioral and biochemical alterations in fibromyalgia

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Fibromyalgia (FM) is a chronic condition that affects 1% to 5% of the population. FM is marked by widespread musculoskeletal pain, exhaustion, cognitive problems, and mood swings and it is also characterized by neuropathic/neurodegenerative modifications, oxidative and nitrosative stress. An appropriate therapy is hard to find and the currently used treatments are able to target only one of these aspects. Strong antioxidant, antinociceptive, and neuroprotective properties have been documented in spirulina. The aim of this study was to assess spirulina's beneficial abilities in protecting rats against reserpine-induced FM. Wistar rats were injected with reserpine (1 mg/kg; subcutaneous; once daily for three days) to induce FM, inducing a significant increase in pain pro-inflammatory mediators and in neuroinflammation. The rats received food supplementation with spirulina (orally at the dose of 400 mg/kg) for 21 days. Behavioral analyses were conducted at the beginning of the experiment and at 3, 5, 7, 14 and 21 days from the first reserpine injection. Numerous biochemical and behavioral characteristics were assessed from the brain tissue. Important cytokines such as IL-1 β , IL-2, IL-4, IL-6, IL-10, TNF- α , and IFN- γ are all regulated by spirulina. This protein extract exhibits chelating capabilities, lowers lipid peroxidation and DNA damage, and scavenges free radicals. Different behavioral changes were evaluated in addition to the neuroinflammation, oxidative stress, and decrease in biogenic amine levels that were induced by the administration of reserpine. These analyses revealed that the daily food supplementation of spirulina was able to limit biochemical impairment and oxidative stress, improve the physiological antioxidant system and biogenic amines, as well as limit behavioral alterations. In conclusion, the results suggest that spirulina could be used as an additional dietary supplementation food to help prevent and treat FM.