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## Effects of Ultrasonication Time on Pigment Extraction from *Spirulina platensis*'ten Before Solvent Extraction

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### Abstract

Interest on microalgae is increasing in food, pharmacy and cosmetic industries because of their high nutrient contents such as proteins, essential oils, vitamins and pigments. Phycocyanin and chlorophyll which are responsible for blue and green pigments of *Spirulina platensis* have high antioxidative activity and are used as colorant in food (dairy products, chewing gums, gellies etc.) and cosmetics. For high yield pigment extraction from *Spirulina* various methods are used such as solvent extraction, supercritical solvent, freezing/thawing, sonication and enzymation. In this study, effects of ultrasonication process time on extraction of phycocyanin and chlorophyll-a before application of solvent extraction by methanol and aqueous sodium nitrate solution (1.5 % NaNO<sub>3</sub>) and antioxidative potential (Ferric Reducing Antioxidant Power) of extracts were investigated. Ultrasonication for 1, 3, 5, 10, 15, 20, 30, 45, and 60 minutes were applied before methanol and NaNO<sub>3</sub> solvent extraction for 120 minutes at ambient temperature. Chlorophyll-a concentration was increased up to 30 minutes sonication and further sonication concentration remained constant. Chlorophyll-a concentration was calculated as 6.75 and 7.70 mg/g dry weight spirulina for control methanol extraction and 30 minutes sonication followed by methanol extraction respectively. Phycocyanin concentration was increased up to 45 minutes sonication and there were no more increase for further sonication time. Phycocyanin concentrations were calculated as 34.52 and 51.83 mg/g spirulina for control solvent extraction and 45 minutes sonication followed by NaNO<sub>3</sub> solvent extraction respectively. The highest antioxidative activity was obtained by 60 minutes sonic application. Antioxidative activity of chlorophyll-a and phycocyanin were calculated as 15.74 mg/g and 11.98 mg/g respectively for 60 minutes sonic application followed solvent extraction. As a result of this study, before solvent extraction for chlorophyll-a 30 minutes sonication is recommended while 45 minutes sonication for phycocyanin.

Keywords: Chlorophyll-a, phycocyanin, ultrasonication, *Spirulina platensis*