

Bio-Converted Spirulina for Nutraceutical Chewing Candy Formulations Rich in L-Glutamic and Gamma-Aminobutyric Acids

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This study aimed at evaluating changes of microalgae *Spirulina* during its fermentation with *Lactiplantibacillus plantarum* No. 122 strain, and further at incorporating *Spirulina* bio-converted for nutraceuticals rich in L-glutamic (L-Glu) and gamma-aminobutyric acids (GABA) into sucrose-free chewing candy (gummy) preparations. Fermented *Spirulina* had higher b^* (yellowness) coordinates than untreated (non-fermented), and fermentation duration (24 and 48 h) had a statistically significant effect on colour coordinates. The highest contents of L-glutamic and gamma-aminobutyric acids (4062 and 228.6 mg/kg, respectively) were found in 24 and 48 h-fermented *Spirulina*, respectively. Fermentation increased the content of saturated fatty acids and omega-3 in *Spirulina*, while monounsaturated fatty acids and omega-6 were reduced. The addition of fermented *Spirulina* (FSp) significantly affected hardness, decreased lightness and yellowness, and increased the greenness of chewing candies. All chewing candy samples (with xylitol) prepared with 3 and 5 g of FSp and 0.2 μ L of Citrus paradise essential oil received the highest scores for overall acceptability, and the highest intensity (0.052) of emotion "happy" was elicited by the sample group containing xylitol, agar, ascorbic acid, 3 g of FSp, and 0.1 μ L of *Mentha spicata* essential oil. As an outcome of this research, one may conclude that fermented *Spirulina* has significant potential as an innovative ingredient in the production of healthier sucrose-free nutraceutical chewing candies.