

Spirulina alga prevents impairment of peak bone mass acquisition induced by an isocaloric low protein diet

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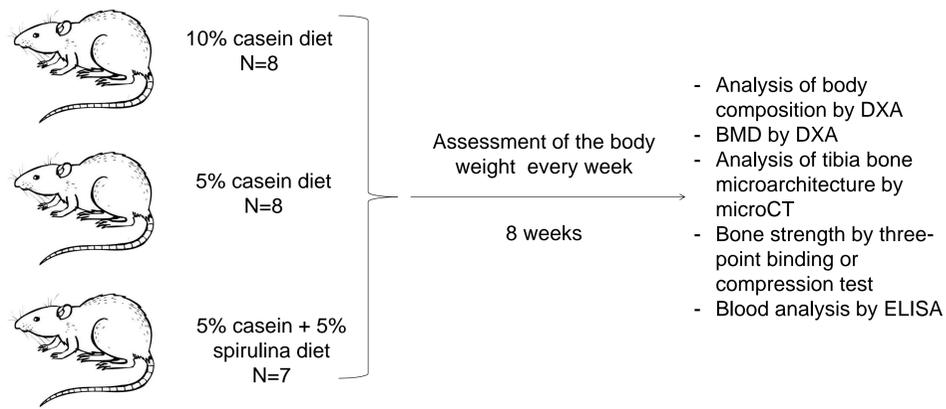
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Objective:

New food strategies should be developed to fight against child malnutrition and growth retardation in developing countries. Spirulina alga, one of the richest sources of vegetable protein, contains all essential amino acids. We hypothesized that impaired peak bone mass acquisition caused by dietary protein deficiency could be prevented by Spirulina supplementation in growing rats.

Material & Methods:

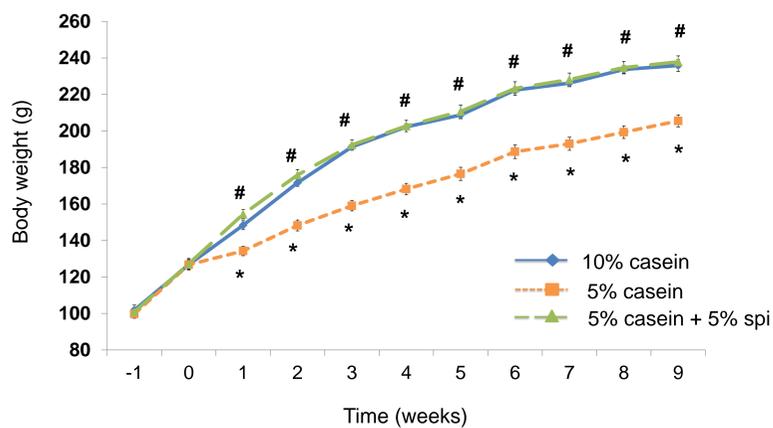
One-month old female Sprague Dawley rats were fed three different isocaloric diets during 8 weeks:



Results are expressed as means +/- SEM. The significance of difference between groups was evaluated using a one-way analysis of variance (ANOVA) or repeated measures ANOVA for the evolution of body weight, followed by a Fisher's test. A p-value <0.05 was considered as statistically significant.

Results:

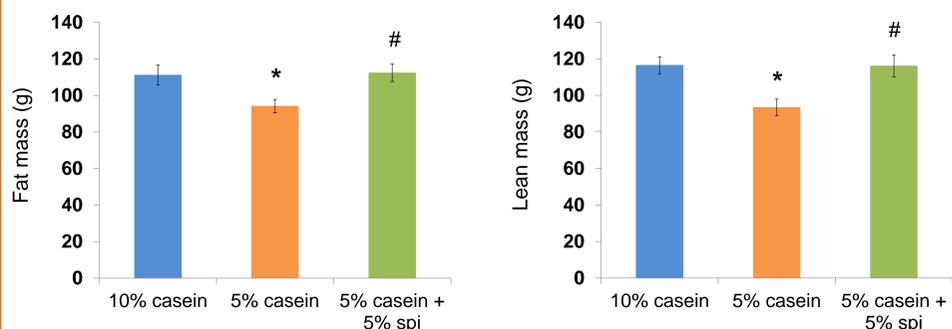
Body weight evolution



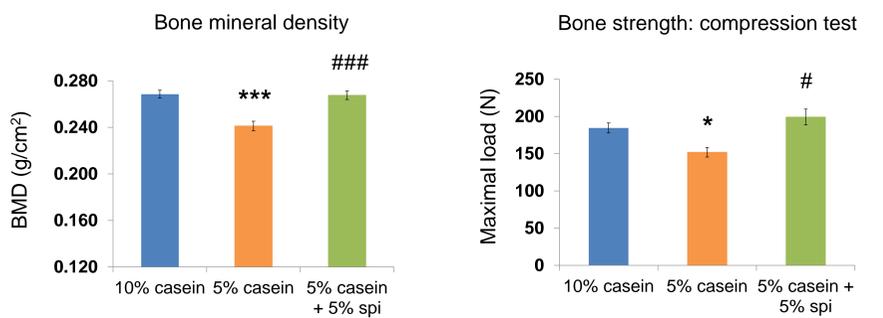
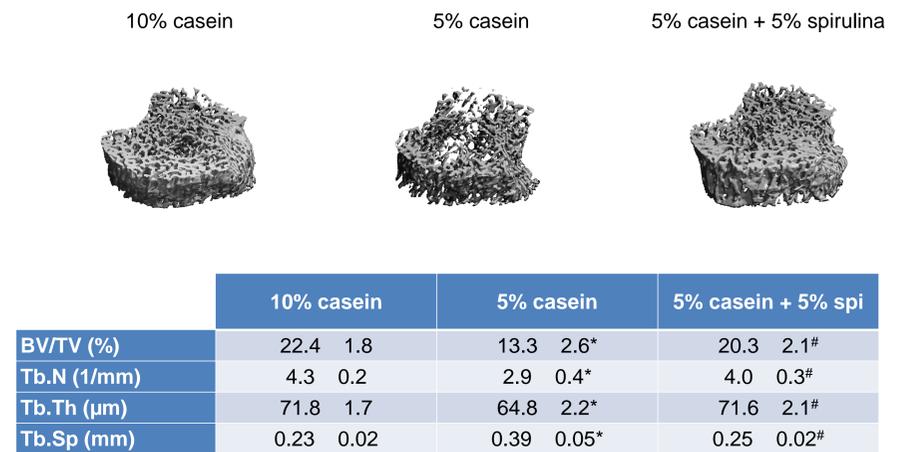
* p<0.05 between the 10% casein and the 5% casein groups.

p<0.05 between the 5% casein and the 5% casein + 5%spirulina groups

Body composition

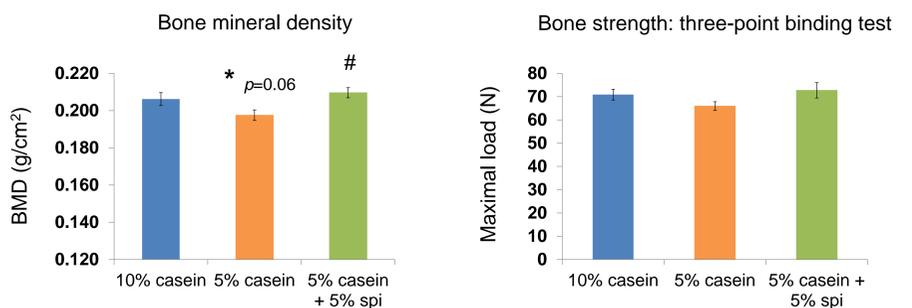


Proximal tibia

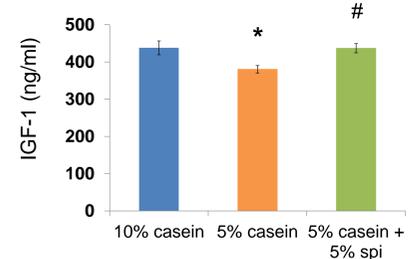


Midshaft tibia

	10% casein		5% casein		5% casein + 5% spi	
TV (mm³)	4.7	0.11	4.5	0.11	4.9	0.11#
BV (mm³)	3.6	0.1	3.3	0.1* p=0.06	3.7	0.1#
Ct.Th (µm)	0.62	0.003	0.59	0.016	0.64	0.016



Serum Insulin like growth factor-I (IGF-I)



Conclusion:

We demonstrate that Spirulina supplementation prevents cortical and trabecular bone alterations, as well as bone strength decrease induced by isocaloric dietary protein deficiency during growth, in association with the maintenance of optimal IGF-I levels. Spirulina is an effective nutrient to prevent impaired peak bone mass acquisition in protein deficient growing rats.