EFFECTS OF CONSUMPTION OF BEEF FROM DIFFERENT FEEDING REGIMEN ON BLOOD PARAMETERS OF HEALTHY MEN AND WOMEN

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Introduction

Despite the large body of convincing evidence and the learner cuts of beef now available, controversy over the relationship between red meat consumption and coronary heart disease risk factors continues to affect the nutritional counselling provide to many hypercholesterolemic persons. There are a number of reports that show grass-fed beef contain elevated concentrations of beta carotene and alfa tocopherol, increased levels of n-3 fatty acids, a more desirable n-3/n-6 ratio and increased levels of conjugated linoleic acid (CLA), all substances reported to have favourable biological effects on human health (Garcia et al, 2005).

The objective of the present study was study the effects of the daily consumption of 150 and 200 g of lean beef, respectively for women and men, in a balanced meal, on several blood parameters. The meals differed only in the source of beef, pasture (P), pasture and grain supplemented (M) or feedlot (F) from production systems habitually used in Argentine.

Subjects and methods 24 male and 24 female subjects who had no major medical or psychiatric problems, and were judged to be reliable in maintaining the dietary requirements of the protocol were included. All subjects provided written informed consent, and all clinical procedures were under control by the Instituto Cardiovascular Buenos Aires (ICBA). During the first four weeks, the subjects were under a self-selected dietary. During the second 4-wk period of the study, they were divided in three groups of 16 subjects each (8 man and 8 woman) receiving the 3 diets. A 2 wk washout period was established before any diet changes. The weights of the subjects were monitored during the study, and individual energy intake was adjusted to maintain the original weight. The following blood parameters were evaluated according to the ICBA habitual procedures : hematocrit (HC), hemoglobin (HG), white cells (WC), ERS- Westergreen method, glucose (GLU), urea (U), creatinine (C), uric acid (UA), K, Na, Cl, total, LDL and HDL cholesterol (COL), triglycerides (TRI), alfa, beta and pre-beta lipoproteins (LP), vitamins B12, B6, and E, Zn, beta carotene (BC) and serum fatty acid composition. Weight, abdominal circumference, blood systole and diastole tension, IMC, body composition (fat, muscle and H2O) and glucogen (results no presented), were measured. Serum fatty acids were determined according to Garcia et al., 2005. The selected design for this experience was an Extra Period Balanced Sequence. This is based in a pair of 3 X 3 Latin Square Designs where the columns are the individuals or subjects and the rows are the periods in which they receive the three treatments (diets). The two Latin squares, using 6 subjects, with the addition of an extra period allow the two-period sequences of diets to be balanced: each diet precedes every other an equal number of times. In the fourth period the diet in the third was repeated . This condition covers the assumption that any possible residual effect of a diet would be felt only in the immediate following period. The two squares were repeated four times for each genre (sex), therefore, 24 healthy women and 24 healthy men of age between 21 and 51 years old were the 48 experimental units. Each replication of the two basic Latin squares were randomized. Age and weight intervals were used to choose the three subjects in each square.

Results & discusion

The parameters studied were not affected significantly by the beef type. Significant differences ($p<0.05$) were detected only for Vitamin B6 in women (20.7 vs 15.9 and 18:5 for M versus P and F), 18:3 n-3 in men (0.35, 0.34 and 0.30 for P, M and F), 20:3 n-6 in women (1.89, 1.96 and 2.08 for P, M and F respectively) and urea in men (30.1 vs 33.3 and 33.3 for F, P and M respectively). The basal blood parameters were affected, with variable intensity, for the different beef types. The affected parameters are shown in Tables T1 and T2.

Table 1. Parameters differences among basal and experimental meals.

Item		Men	Women	Item		Men	Women
Hemoglobin	P	-0.27	-0.22	*Triglyceride*	P	1.52	-5.02
	M	-0.02	-0.37*		M	4.46	-12.04*
	F	0.07	-0.30*		F	3.27	-0.92
White cell s	P	-50	-808*	*Alfa LP*	P	-0.167	-0.958*
	M	-256	-566		M	-0.271	-0.625

	F	194	-156		F	-0.250	-1.146***
Glucose	P	-10.4**	-5.2	*Beta LP*	P	-0.771	-0.770
	M	-5.4*	-7.3**		M	-0.500	-0.500
	F	-4.6*	-6.8**		F	-0.042	-1.00*
Urea	P	0.44	2.33*	Pre *Beta LP*	P	0.938	1.739**
	M	0.73	2.39		M	0.771	1.250
	F	-2.21	1.79		F	0.292	2.146***
Sodium	P	1.29*	0.188	*Zin c*	P	-43.31**	-51.9
	M	1.88**	0.167		M	-9.21***	-48.0
	F	1.27*	0.313		F	-28.52	-58.3*
Potasium	P	-0.052	-0.027	*Vit E*	P	7.13***	5.28***
	M	-0.035	-0.104		M	6.41***	4.43***
	F	-0.146*	-0.040		F	5.92***	4.56***
Total chol	P	-20.9***	-20.3***	*B carotene*	P	0.948***	0.835***
	M	-12.5*	-23.3***		M	0.681***	0.819***
	F	-11.9*	-21.2***		F	0.631***	0.871***
HDL chol	P	0.04	-5.38***	*Vit B12*	P	-84.2***	-71.6
	M	-1.69	-2.96		M	-55.7*	-102.9*
	F	-0.40	-4.08***		F	-55.1	-23.7
LDL chol	P	-21.0***	-11.5*	*Vit B6*	P	-4.74	-4.05*
	M	-11.2*	-17.9***		M	-6.54**	0.56
	F	-11.7**	-15.0***		F	-6.62*	-1.09

Table 2. Differences in serum fatty acid composition among basal values and experimental meals.

Item		Men	Women	Item		Men	Women
C15:0	P	-0.294***	-0.240***	*18:3 n-3*	P	0.010	0.105
	M	-0.214***	-0.181**		M	-0.008	-0.003
	F	-0.199**	-2.19**		F	-0.052	0.052
C*16:0*	P	0.091	-0.578	*CLA*	P	-0.058	-0.028
	M	0.560*	-0.570		M	-0.055*	-0.043
	F	0.577	-0.473		F	-0.037	0.016
C17:0	P	-0.304***	-0.364***	*C20:3 n-6*	P	0.197*	0.071
	M	-0.236***	-0.388***		M	0.083	0.137
	F	-0.280***	-0.371***		F	0.021	0.244**
C17:1	P	-0.057	-0.045*	*C20:4 n-6*	P	0.170	0.533**
	M	-0.014	0.001		M	0.079	0.802***
	F	-0.039	-0.004		F	0.046	0.553**
C18:0	P	-0.156	-0.330	*C20:5 n-3*	P	0.148	0.132**
	M	-0.068	-0.232		M	0.100*	0.090
	F	-0.169	-0.467**		F	0.051	0.065
C18:1t	P	-0.032	-0.112*	*C22:5 n-3*	P	0.113**	0.105
	M	0.006	-0.097*		M	-0.010	0.055
	F	-0.024	-0.102**		F	0.006	0.084
C18:1	P	0.433	0.328	*C22:6 n-3*	P	0.158	0.097
	M	0.612	0.789		M	0.039	0.137
	F	1.293	1.111**		F	-0.100	0.172*

* p<0.05 ** p<0.01 *** p<0.001

Conclusions

The beef production system, pasture, pasture and grain supplemented or feedlot do not had significant effects on the studied blood parameters. On the contrary, the effects on the basal control differed according to the type of beef included in the meals.

References

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