

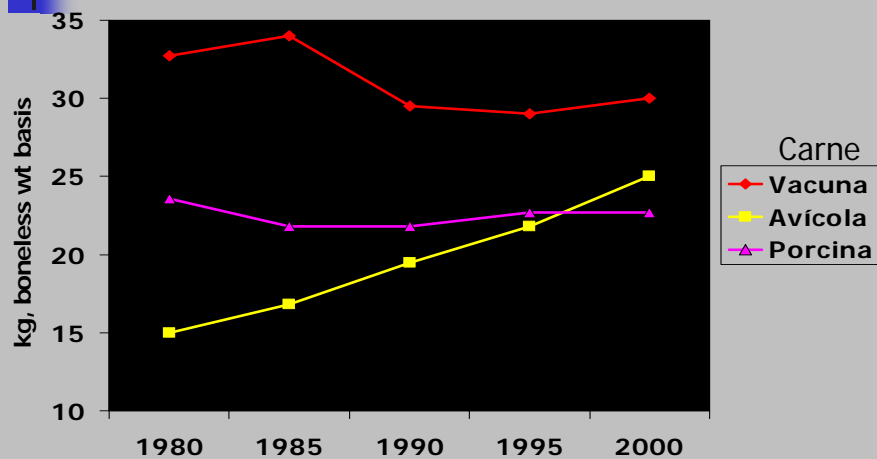
## More Reasons to Eat Beef *Mas Razones Para Consumir Carne Vacuna*

Susan K. Duckett



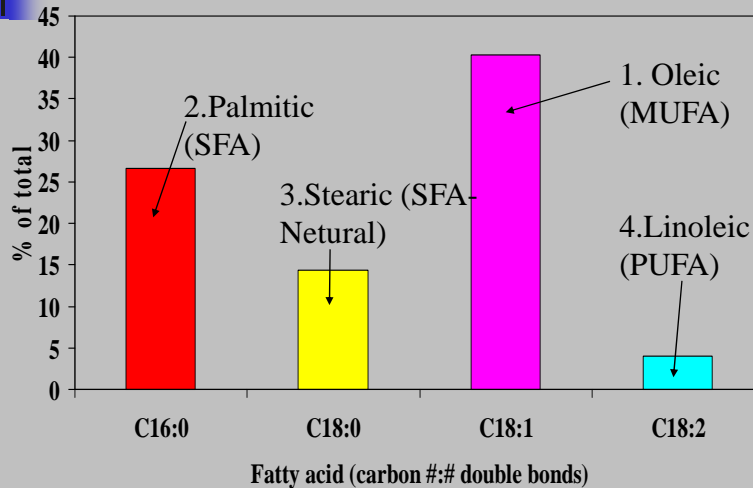
The University of Georgia

## Meat Consumption in USA, per capita



Consumo total de carne es similar en USA y en Uruguay.  
Sin embargo, el consumo de carne vacuna representa solo 1/3 del total en USA.

## Fatty acid composition of beef



Acidos grasos principales en la grasa animal (82%):  
Oleic, Palmitic, Stearic, Linoleic

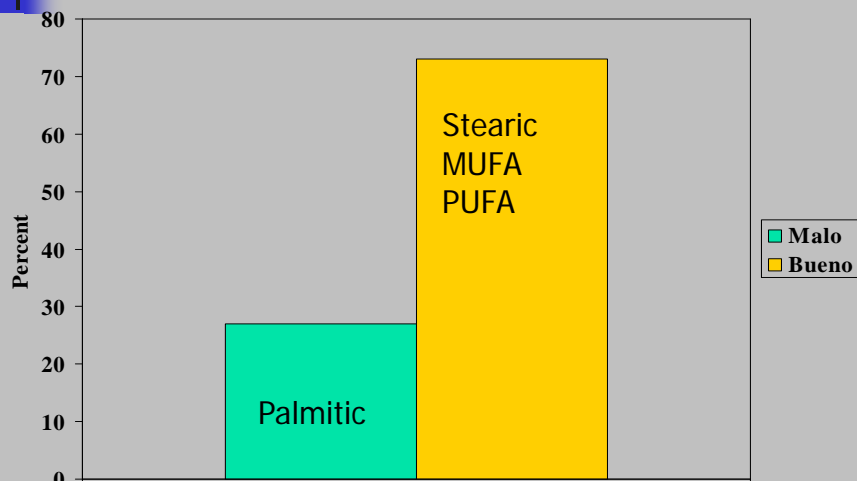
## All Fats are not Equal

- Cholesterol Elevating Fatty Acids:  
*Consumption **increases** serum LDL-cholesterol  
(Bad cholesterol)*
  - 1) Some saturated fatty acids =  
Myristic (C14:0) and Palmitic (C16:0)
  - 2) Trans fatty acids =  
formed when reacting vegetable oils with a base  
(margarine, partially hydrogenated vegetable oils)

## Good (Neutral) Fats

- Cholesterol Reducing Fatty Acids:  
*Consumption **reduces** serum LDL-cholesterol*
  - 1) Monounsaturated Fatty Acids – Oleic (C18:1) acid
  - 2) Omega-6 Polyunsaturated Fatty Acids –  
Linoleic (C18:2) acid
  - 3) Omega-3 Polyunsaturated Fatty Acids –  
Linolenic (C18:3), EPA (C20:5), DPA (C22:5),  
DHA (C22:6)
- Neutral: Stearic (C18:0) acid

## Fatty acid composition of beef



Mas del 70% de la composición de la grasa no es perjudicial para la salud



## Omega-6 vs. Omega-3 Fats

- Omega-3 fatty acids lower blood pressure, risk of blood clots, and tumor growth.
- Consumption of diets high in omega-3 fatty acids is associated with reduced risk of heart disease, stroke and cancer.
- Americans consume much greater amounts of omega-6 polyunsaturated fatty acids than omega-3.
- Recommendations are that we should consume a balance of omega-6 to omega-3 fatty acids ( $\leq 4:1$  ratio).



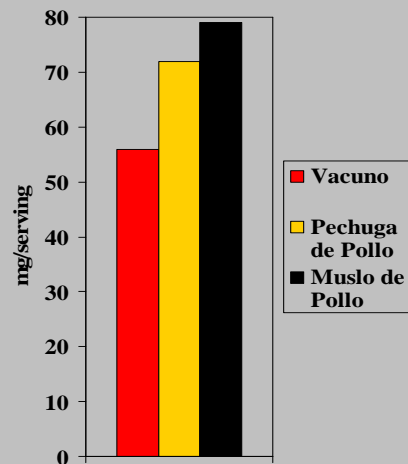
## Anticarcinogenic Compounds in Beef

- Conjugated linoleic acid (CLA) is present in all ruminant products (carne vacuna, carne ovina, leche, manteca, queso, helado).
- CLA is an anticarcinogen as it reduces tumor proliferation in experimental models of carcinogenesis of skin, stomach, colon and mammary cancer.
- Cis-9, trans-11 isomer is thought to be the biologically active isomer for anticarcinogenic effect

## Cholesterol Content of Meat

- Cholesterol levels in beef are unaffected by dietary treatment or quality grade.
- Cholesterol is present in all cell membranes including muscle and fat.
- Difficult to regulate serum cholesterol by reducing dietary cholesterol intake.

Diet	-2%
Statin drugs	-30%



## Uruguayan Beef

Pastura



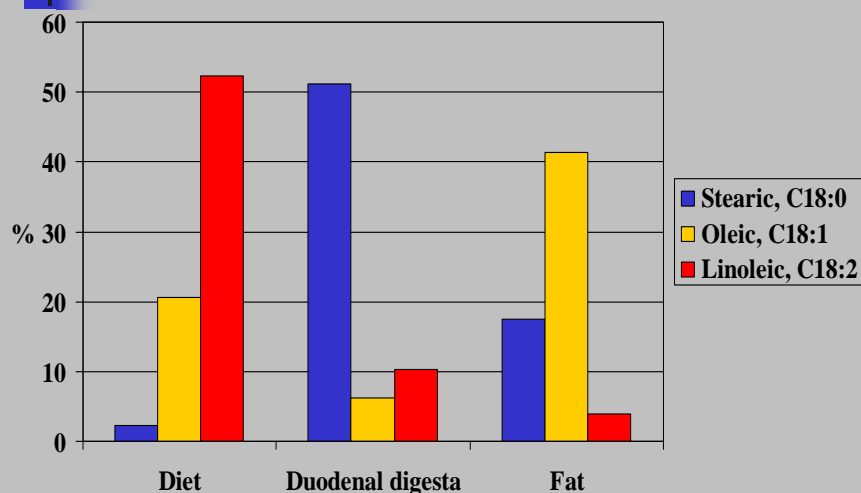
Grano



## Ruminal Biohydrogenation

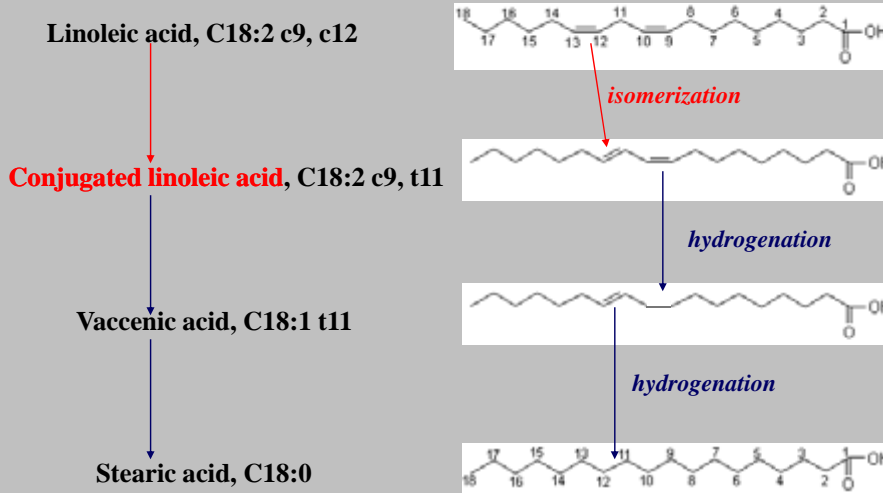
- In ruminant animals, tissue fatty acid composition does not reflect dietary fat intake.
- Dietary unsaturated fatty acids are hydrogenated by rumen bacteria.
- This process results in conversion of unsaturated fatty acids to some intermediate compounds (conjugated linoleic acid and trans-octadecenoic acids) and saturated fatty acids.

## Fatty acid composition of diet, duodenal digesta, and fat of American grain-fed beef

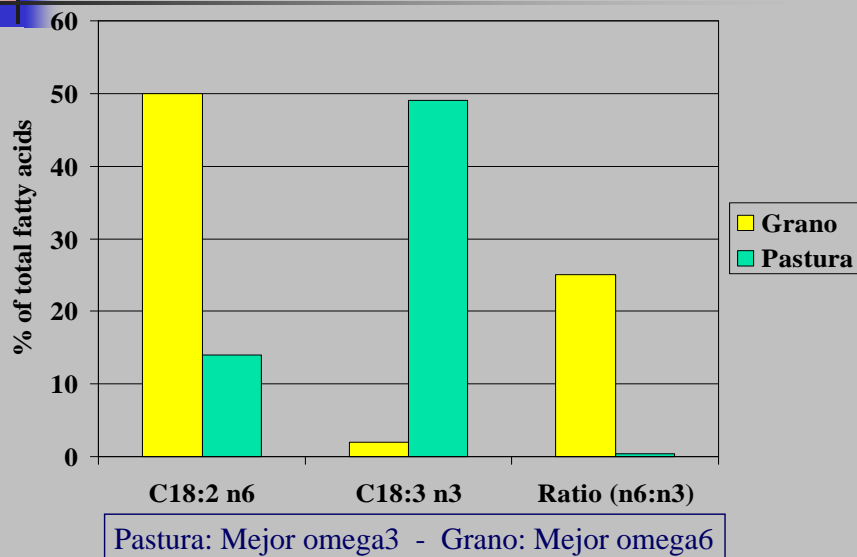


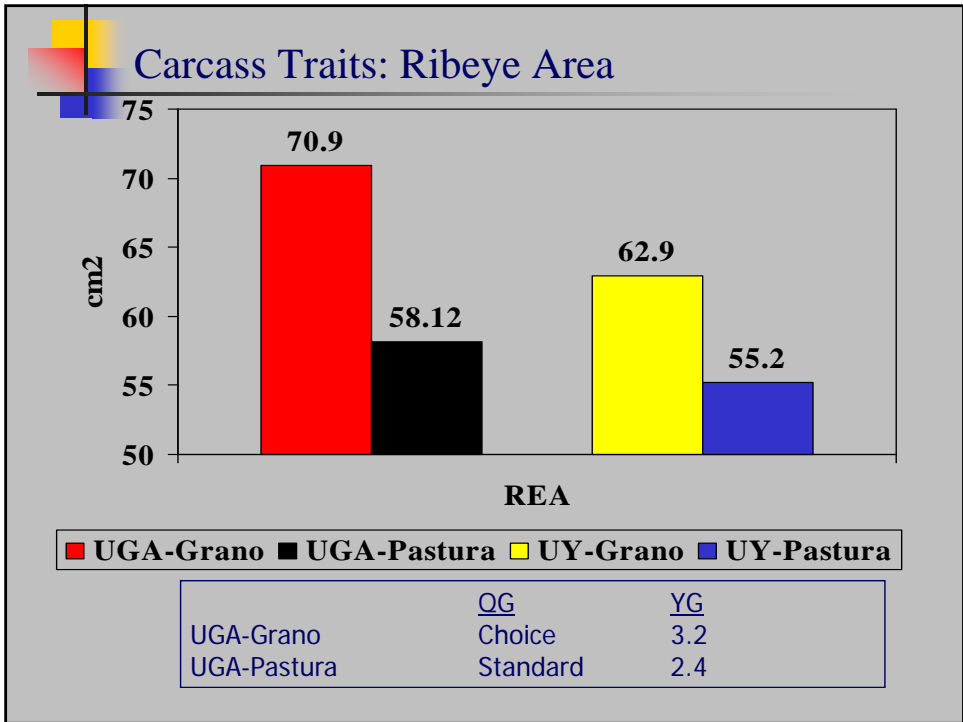
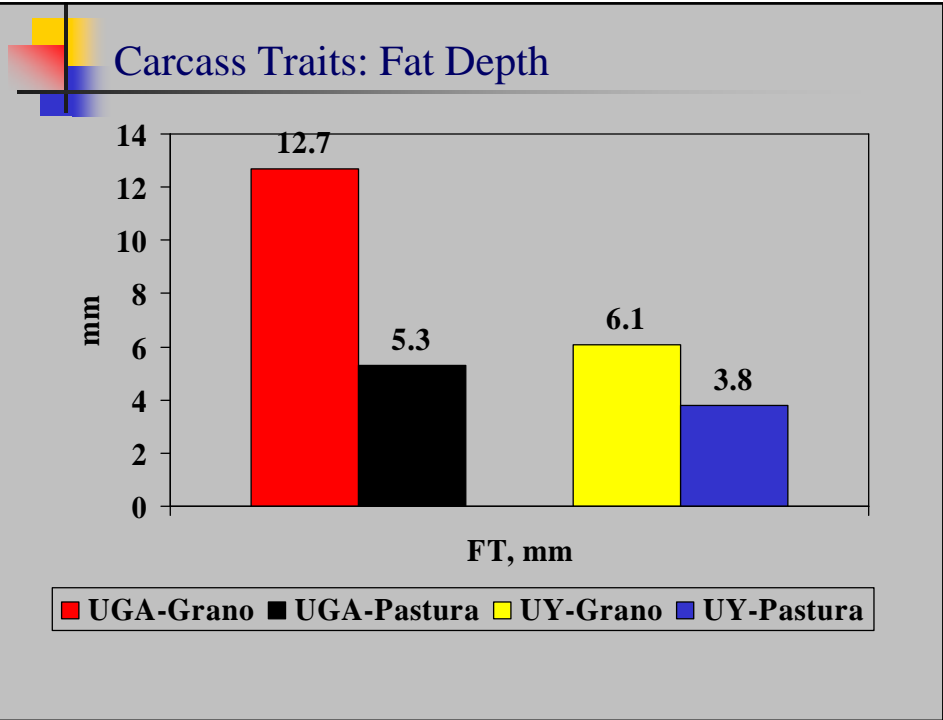
La grasa animal no refleja la grasa de la dieta en rumiantes

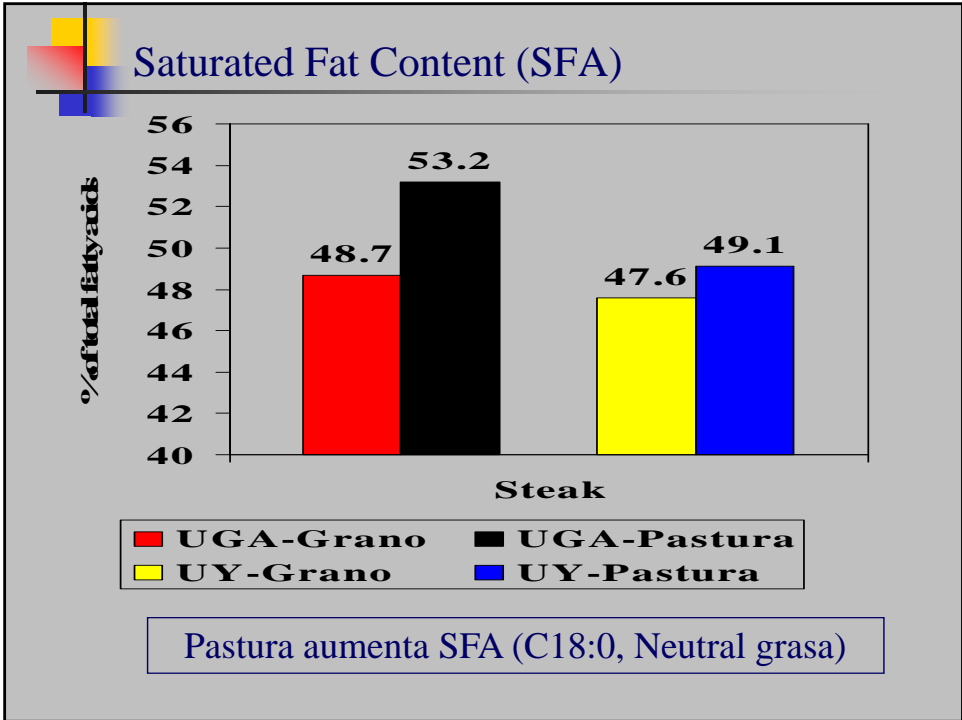
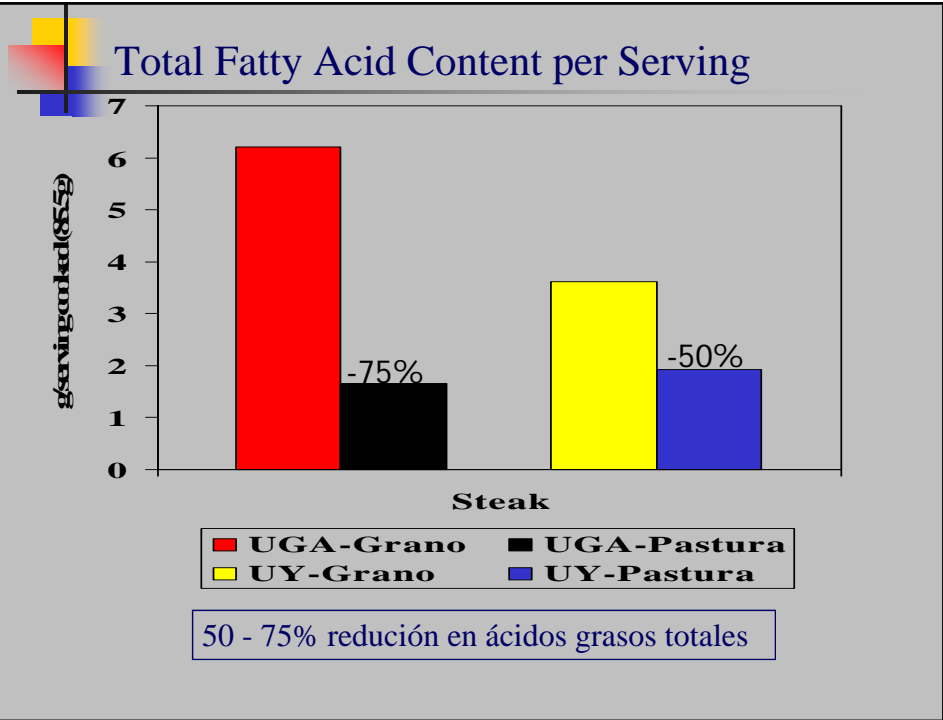
## Ruminal biohydrogenation of linoleic acid



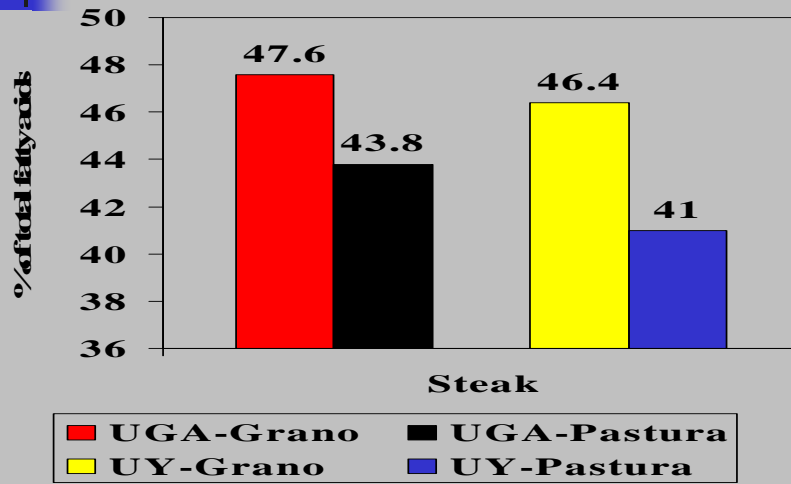
## Dietary Fat Intake: Grain vs. Grass





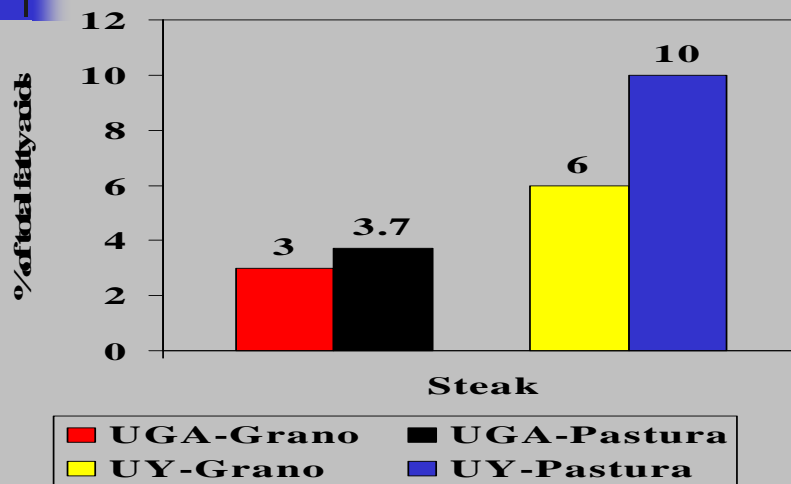


### Monounsaturated Fat Content (MUFA)



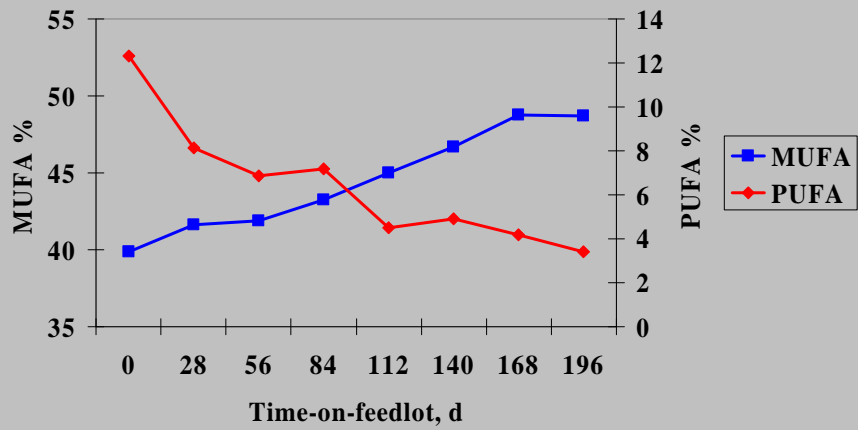
Grano aumenta MUFA C<sub>18:1</sub>

### Polyunsaturated Fat Content (PUFA)



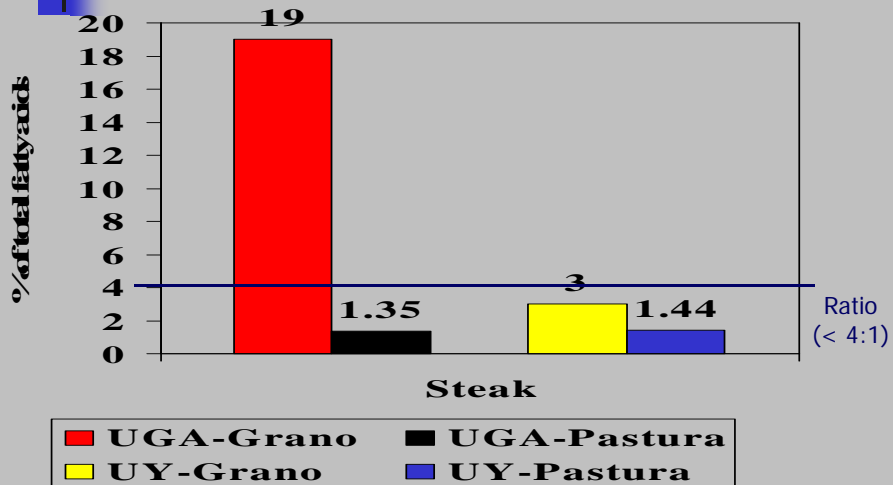
Pastura aumenta PUFA

## Grain-fed: Time-on-Feedlot

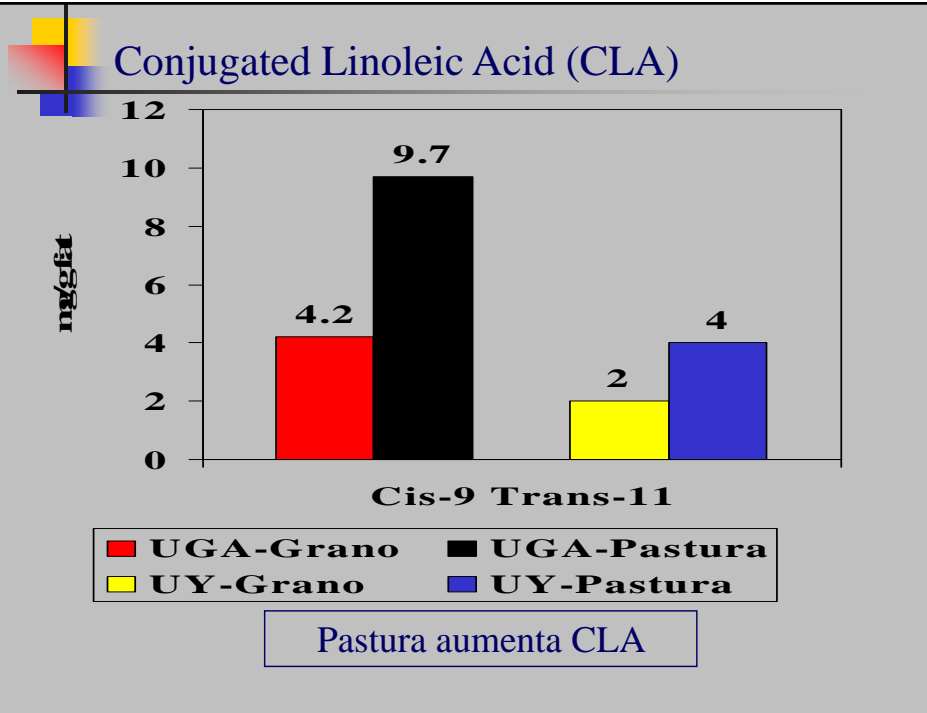


Días en feedlot: disminuye PUFA y aumenta MUFA

## Ratio of Omega-6 to Omega-3

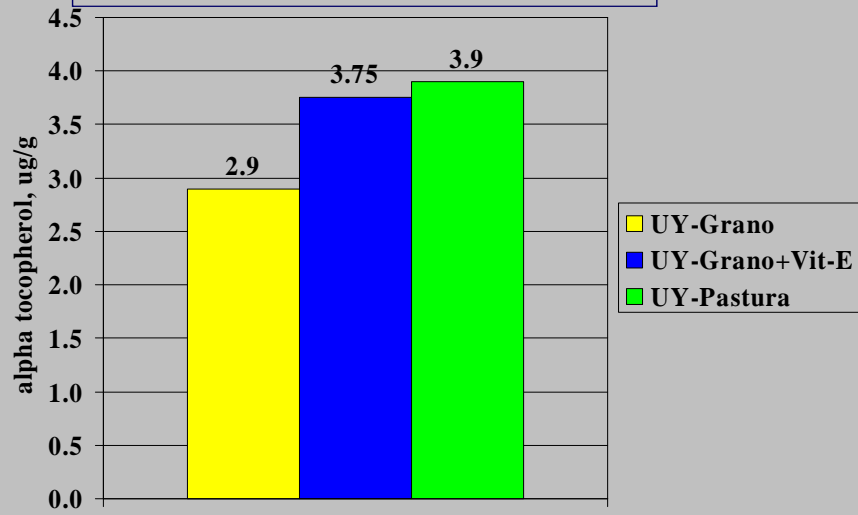


Pastura ofrece una mejor relación omega6-omega3

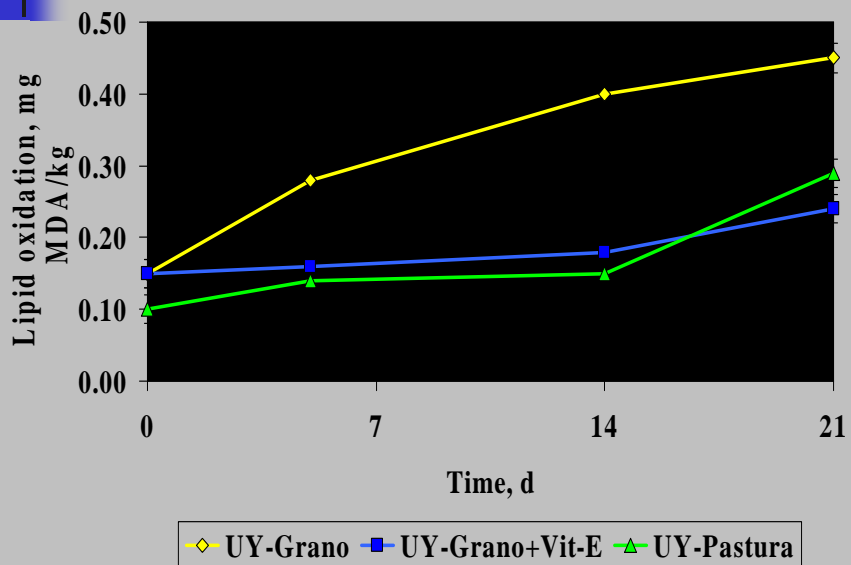


## Antioxidant Level

1000 IU of Vitamin E for 100 d

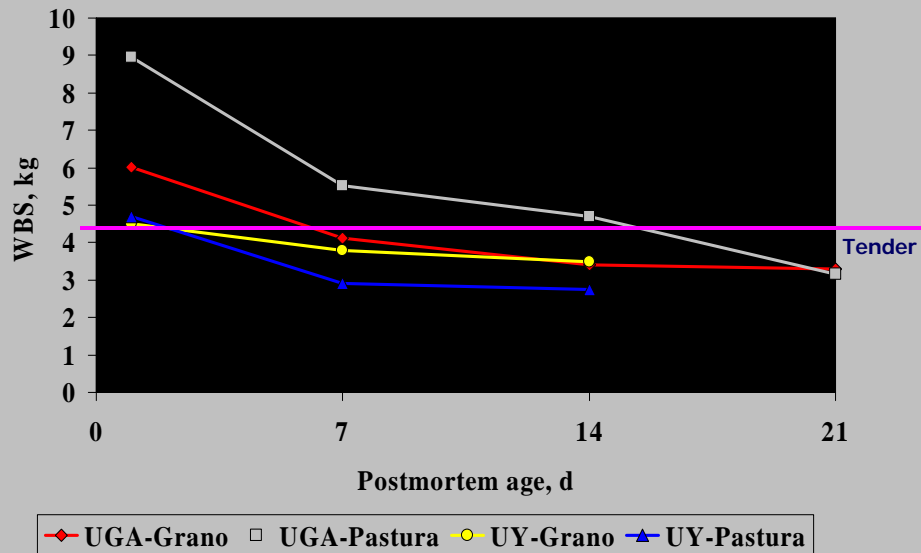


## Lipid Oxidation: Steaks



## Tenderness

Warner-Bratzler Shear Force (WBS): objective measure of tenderness



## Conclusions

- Both grass-fed and grain-fed beef contain over 70% of total fat as good or neutral fats.

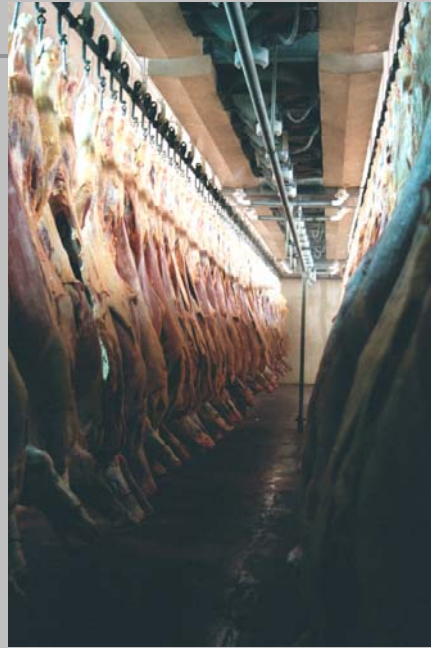
### Bueno grasa

UGA-Grano	70%
UGA-Pastura	74%
UY-Grano	74%
UY-Pastura	77%

- Grass-fed beef contains less total fat with higher percentages of neutral saturated fatty acids, polyunsaturated fatty acids, omega-3 and CLA.
- Grain-fed beef contains more total fat with higher percentages of monounsaturated fat.

## Conclusions

- Each beef product has advantages depending upon market demands.
- Opportunities for Uruguayan beef in natural market.
- US Natural Beef Market is increasing in demand and selling at a high price (\$2.72 - \$9/kg).



Muchas Gracias por la participación de:

