

Modified Atmosphere Packaging: Consumer Perceptions, Willingness to pay Opportunities for Canada's Meat Industry?

Sven Anders*, Carola Grebitus*, Helen H. Jensen**,
Joseph G. Sebranek**, and Jutta Roosen****

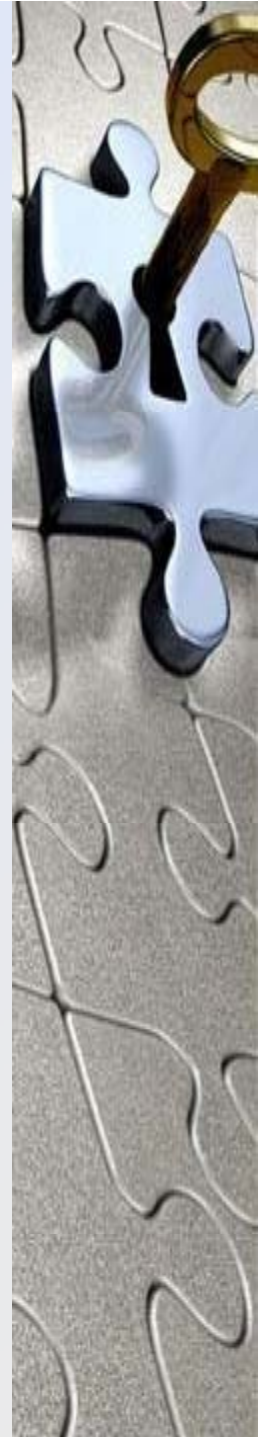
* University of Alberta, Canada; *** Iowa State University, USA

** Bonn University, Germany; **** Technische Universität München, Germany

*CMC Symposium - New Packaging Technologies to Improve and Maintain
Food Safety, Toronto, September 18-19, 2008*

“Packaging technology innovations and ingenuity will continue to provide MAP that is **consumer oriented,** **product enhancing,** **environmentally responsive,** **and cost effective,** but continued research and development by the scientific and industry sectors will be needed.”

McMillin, 2008



“Consumer perception is viewed the most significant factor limiting application of new product technologies so

there is great need to translate technical information into understandable communication forms so consumers are able to understand more clearly about packaging and products.”

Bugusu & Bryant, 2006



Consumer Behaviour

Purchase or Non-purchase Decision

Concern
Driver
Packaging

Quality

Convenience

Safety

Environment

o Premium
o QAS
o Price

o Easy-to...
o Cooking
o Functional

o Health
o Recalls
o Trust

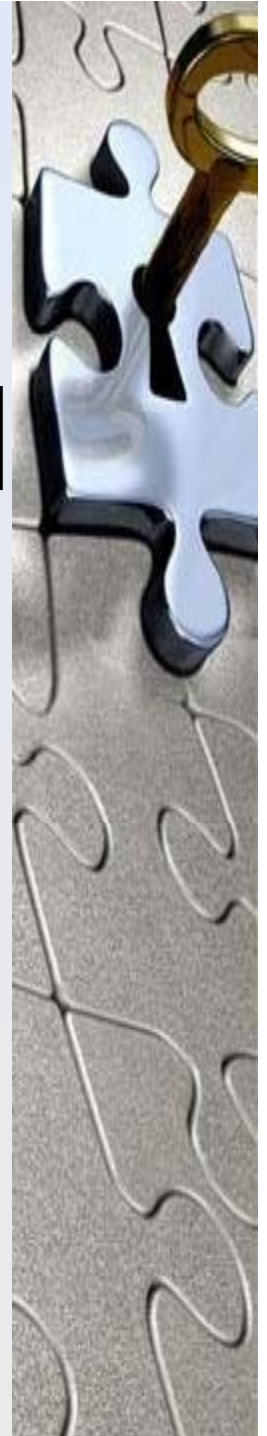
o Environment
o Local/ COOL
o Waste

o Flavour
o Colour
o Texture

o Shelf life
o Palatability

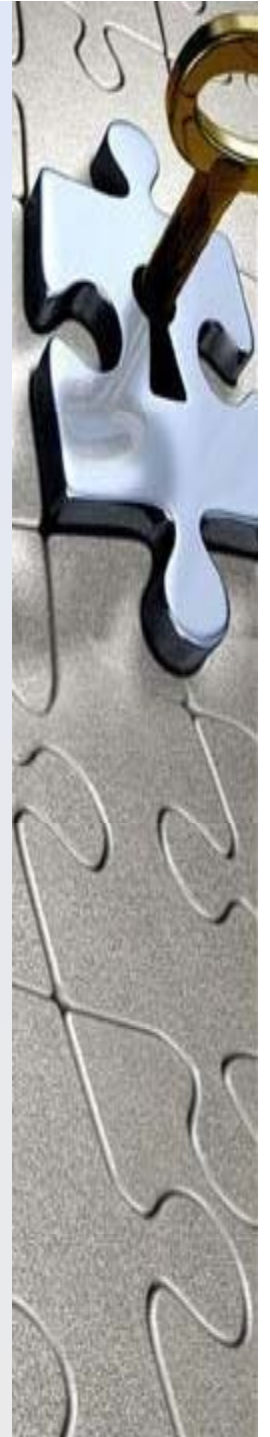
o Microbial
safety

o Pack. waste
o Bio-packaging



Consumer Issues

- Consumers evaluate “perceived risks” and benefits;
- Imperfect / asymmetric information crucial in understanding why consumers act the way they do;
- Consumer activist groups oppose MAP/CO, claiming it potentially masks spoilage;
- In fact: consumers using color as single indicator of meat freshness without paying attention to expiration dates might be at risk;
- Stabilized color may also open opportunities for fraud regarding expiration dates.



Three Country Study

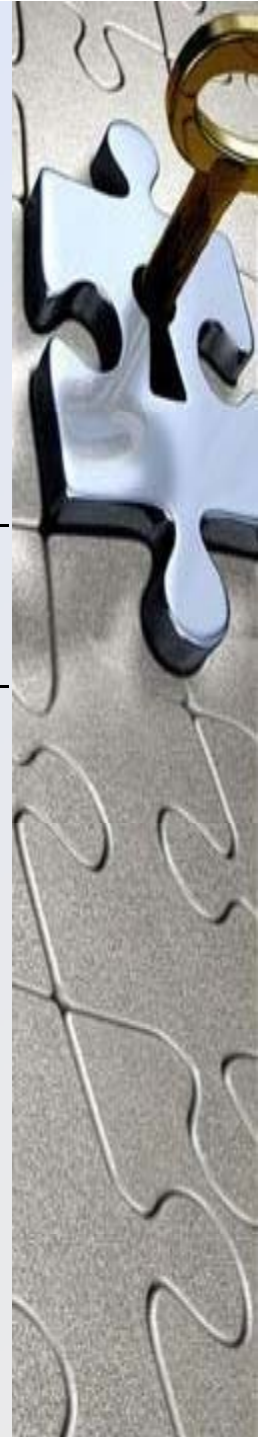
Economic evaluation of consumer perceptions and purchase decision towards MAP technology in meat demand

USA

Canada

Germany

- A. Analyze consumer preferences in selecting new MAP technologies related to meat quality & safety;
- B. Investigate effects of:
 - color stabilization – MAP technology
 - shelf life extension – MAP with CO
 - “Natural” MAP (rosemary extract)
- C. Estimate consumers’ WTP for MAP ground beef.



Project Design

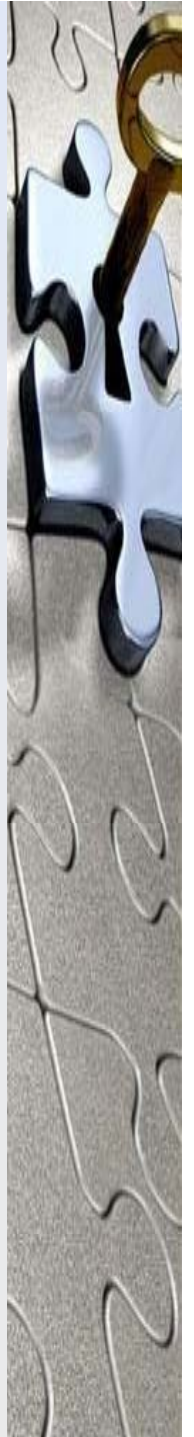
- Recruitment of participants within general public;
- Compensation / Endowment \$20;
- Participants make repeated purchase choices between 1lb. packages of lean ground beef
= Real Choice Experiments.

U.S. (Iowa)	Canada (Alberta)	Germany
Fall 2007	Summer 2008	Summer 2009
106 participants	205 participants	120 participants
Exp. completed. Analysis underway.	Exp. completed. Preparing data.	Exp. preparation starting shortly.



Consumer Experiments

- Two ground beef alternatives randomly placed on nine trays;
- Participants chose to buy one of the two ground beef alternatives or no-purchase;

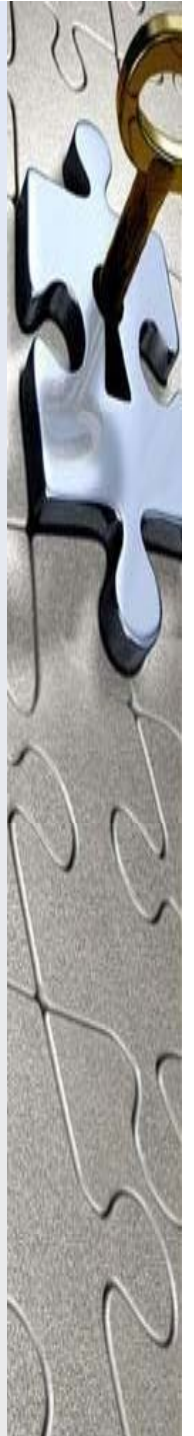


Consumer Experiment

- Experimental design includes three ground beef attributes in three levels

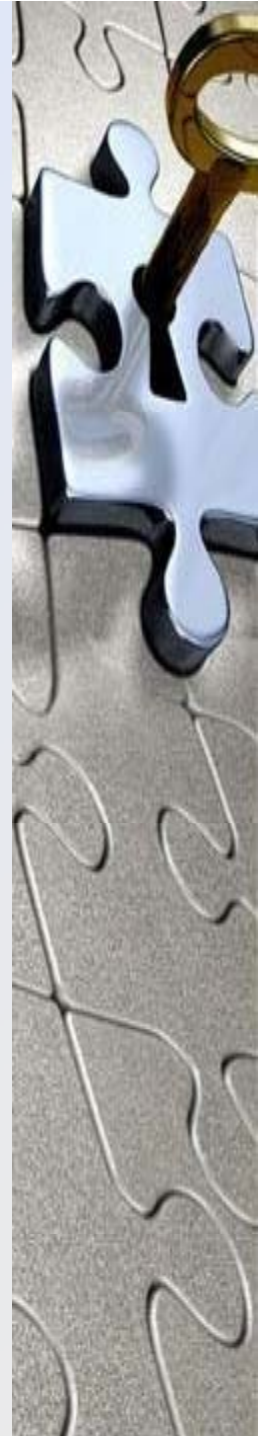
Attribute	Price	Shelf life	Colour
Level	\$2.85/lb.	3 days	Light red
	\$3.05/lb.	5 days	Cherry red
	\$3.25/lb.	14 days	Brownish red

- “Light red” — pure air
- “Cherry red” — MAP/CO (0.4%)
- “Brownish red” — U.S.: pure air, irradiate
— Canada: metmyoglobin

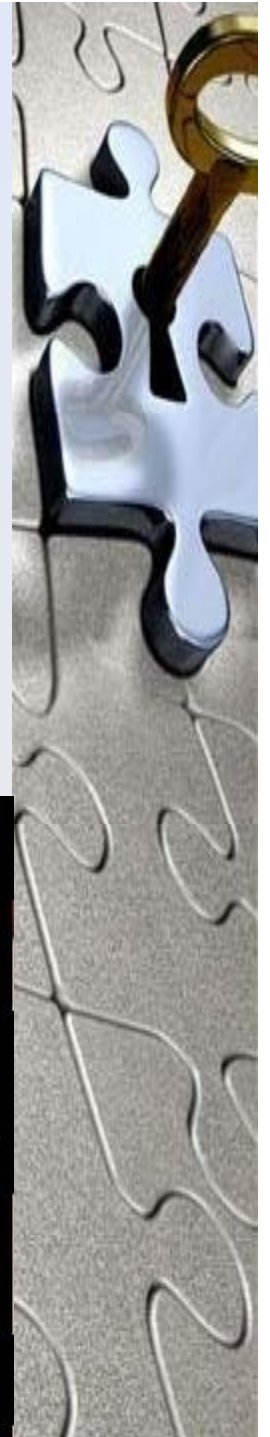


Experiment – Information

Round	Information	Label
T 1	None	None
T 2	MAP for extending shelf life	“modified atmosphere packaging” (packages with 14 day shelf life)
T 3	MAP/CO for stabilizing color	“modified atmosphere packaging with carbon monoxide” (packages with cherry red colour)
T 4	Rosemary for stabilizing color	“modified atmosphere packaging with carbon monoxide” or “modified atmosphere packaging with “rosemary extract” (packages with cherry red colour)



Extreme Colour Change from Red to Grey



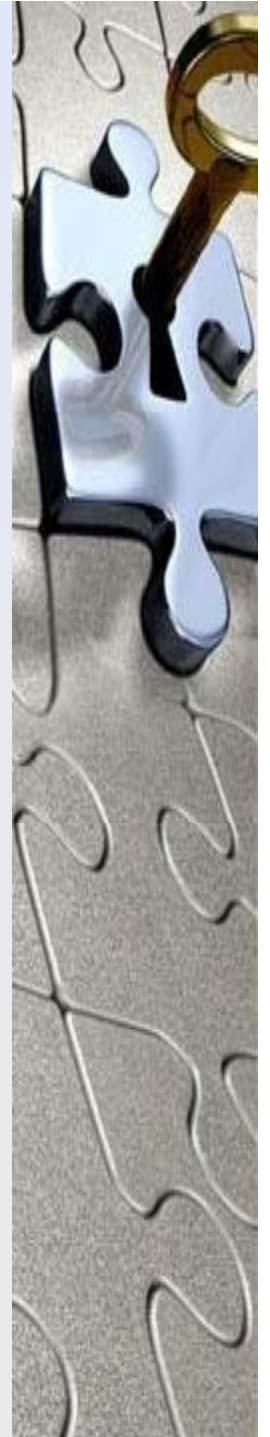
Economic Methodology

Economic modelling of consumer's decision process incorporating:

- Participants socio-demographic data;
- Ground beef choice in all experiment rounds;

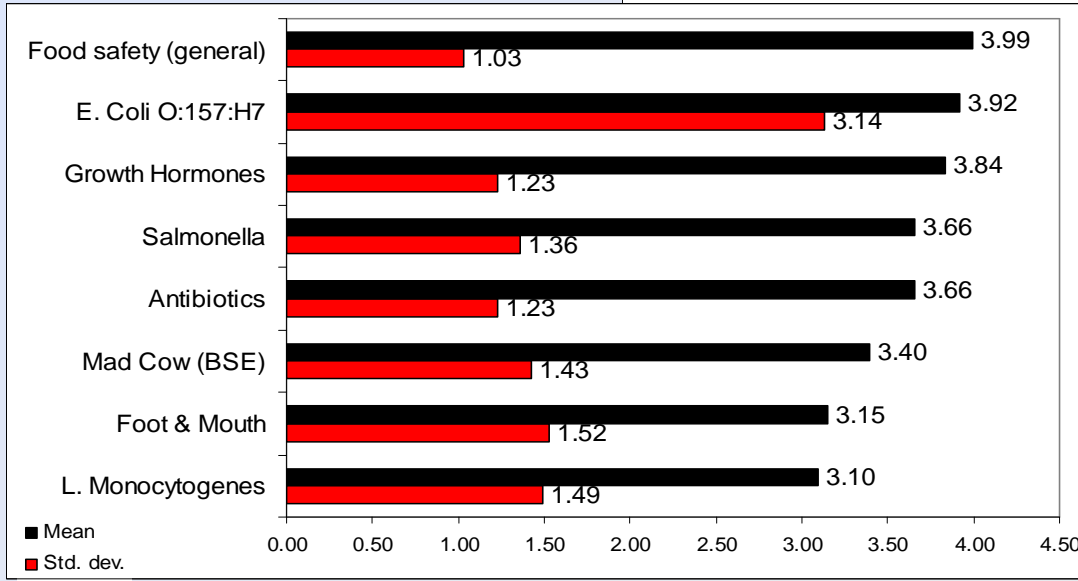
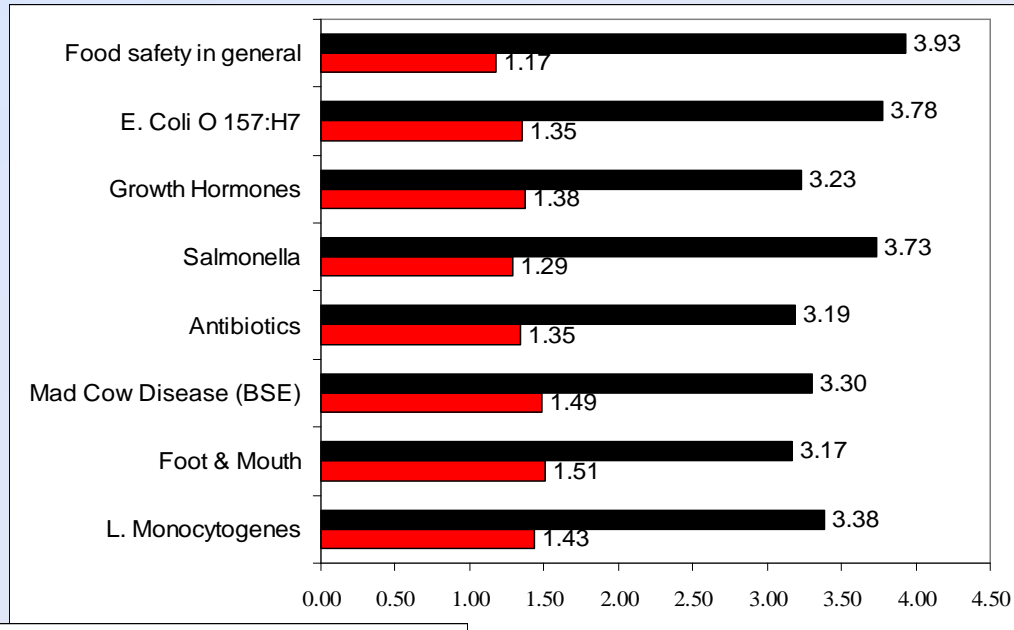
Allows us to explore:

- Random taste variation
- Unrestricted substitution across product attributes
- Correlation in unobserved factors over the sequential treatments



Findings - Issues affecting meat consumption patterns

USA



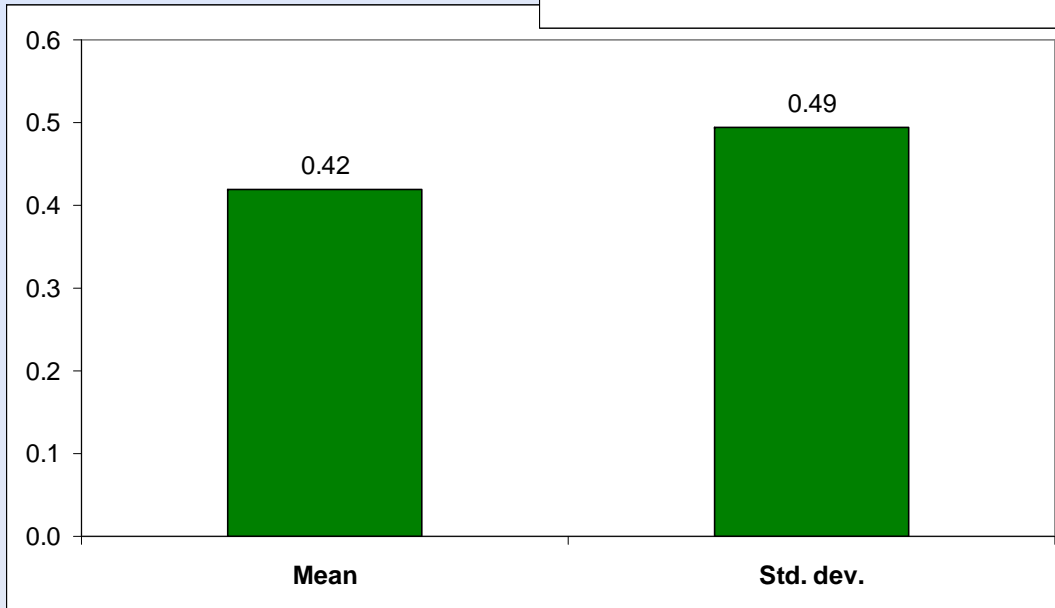
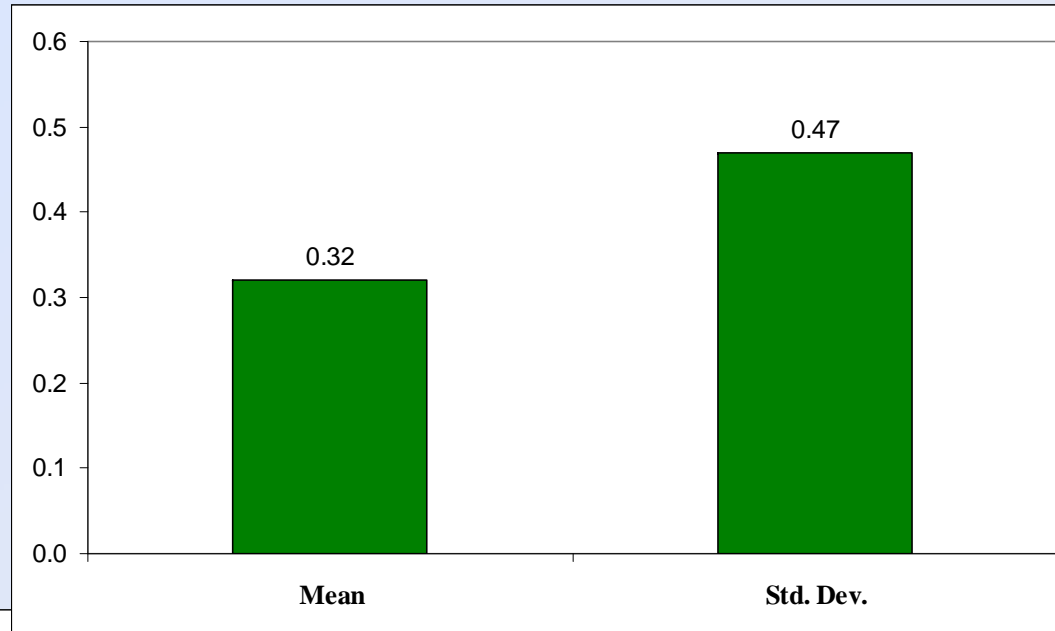
Canada

1 = No effect
5 = Major effect



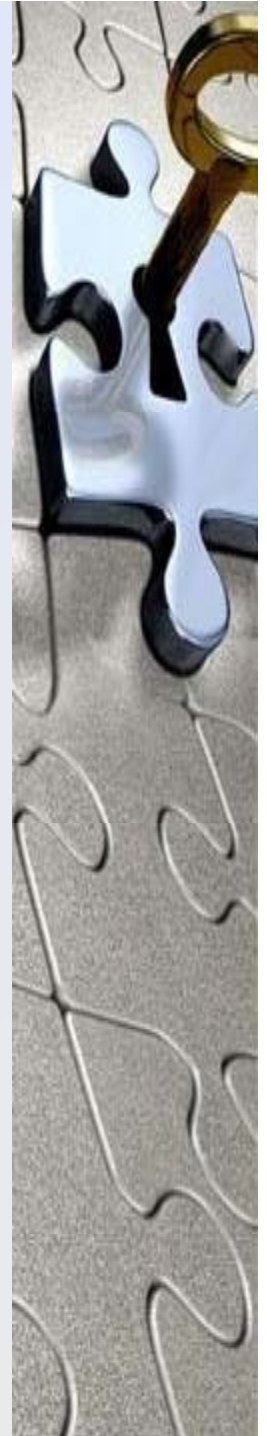
Findings - Reading of "Safe handling procedures"

USA



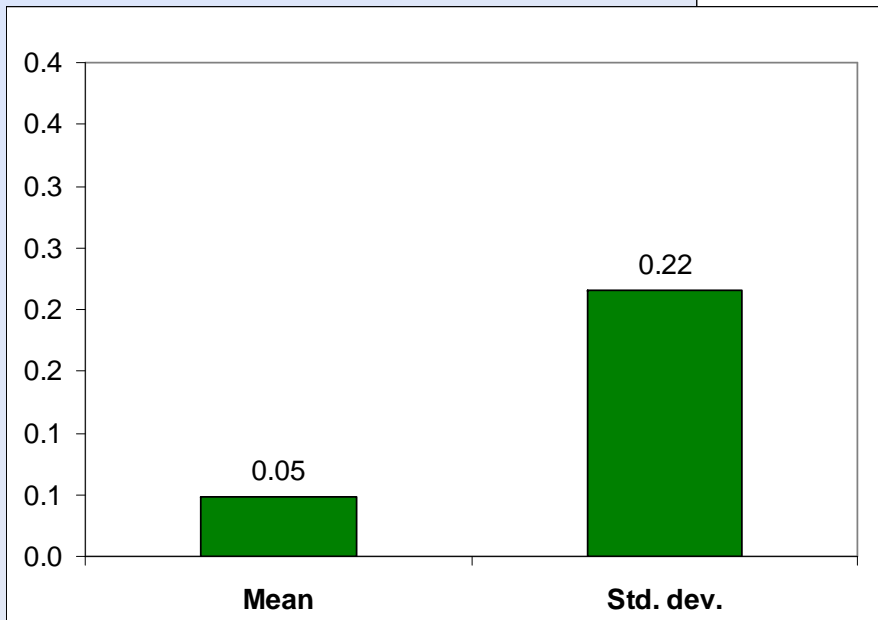
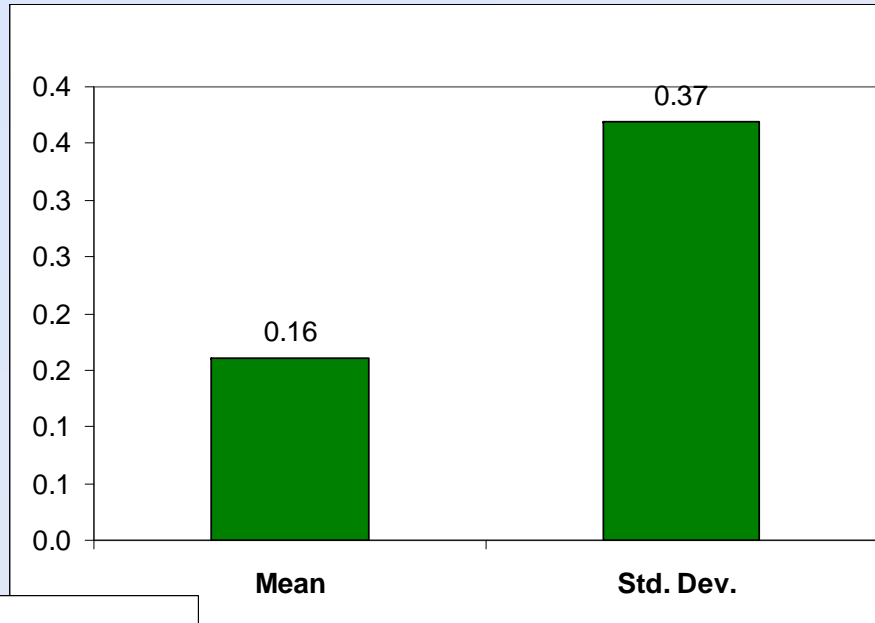
Canada

1 = Yes
0 = No



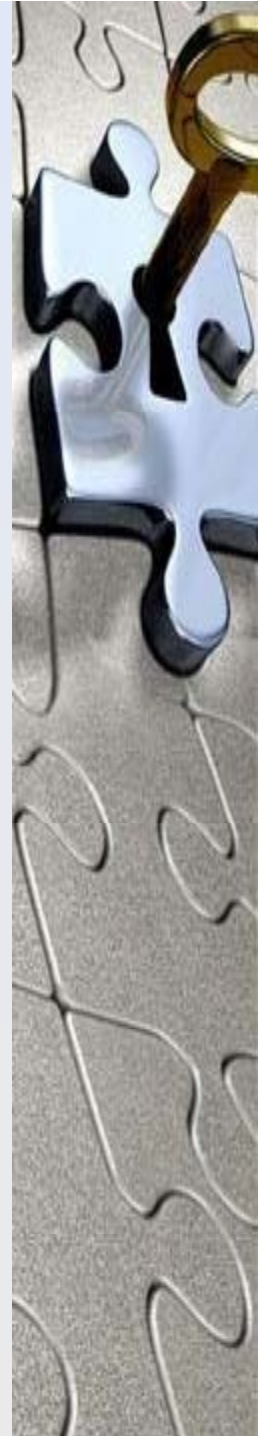
Findings - Recently heard about MAP in the Media

USA



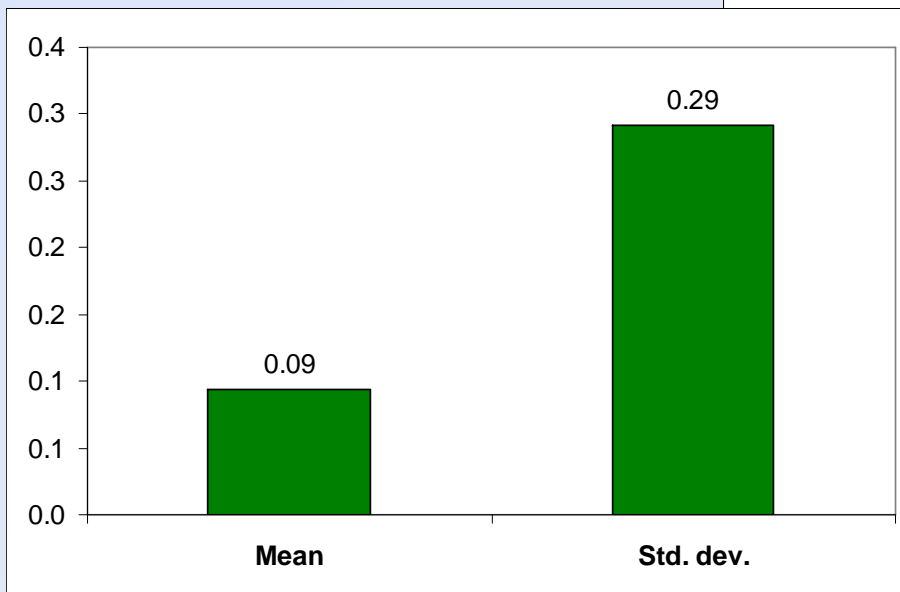
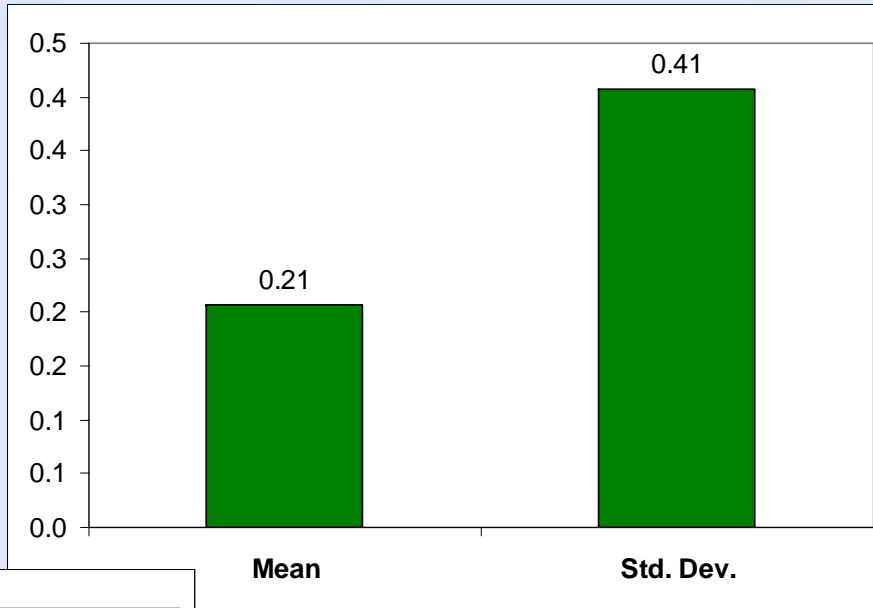
Canada

1 = heard about MAP
0 = otherwise



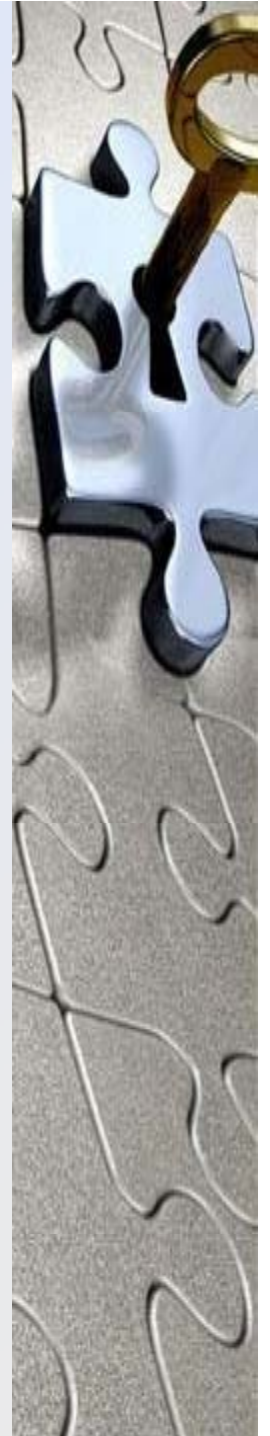
Findings - Recently heard about CO used in MAP Food Packaging in the Media

USA



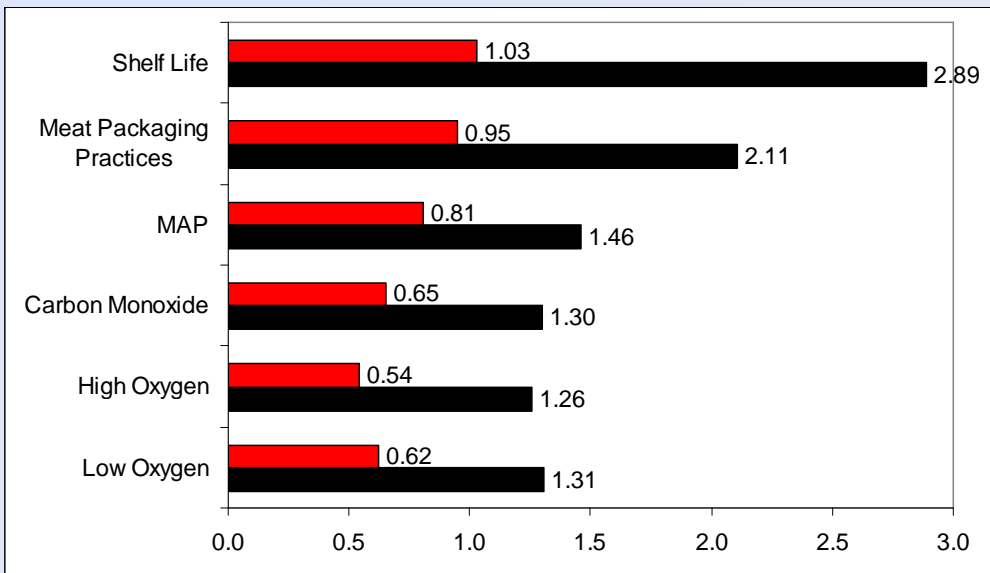
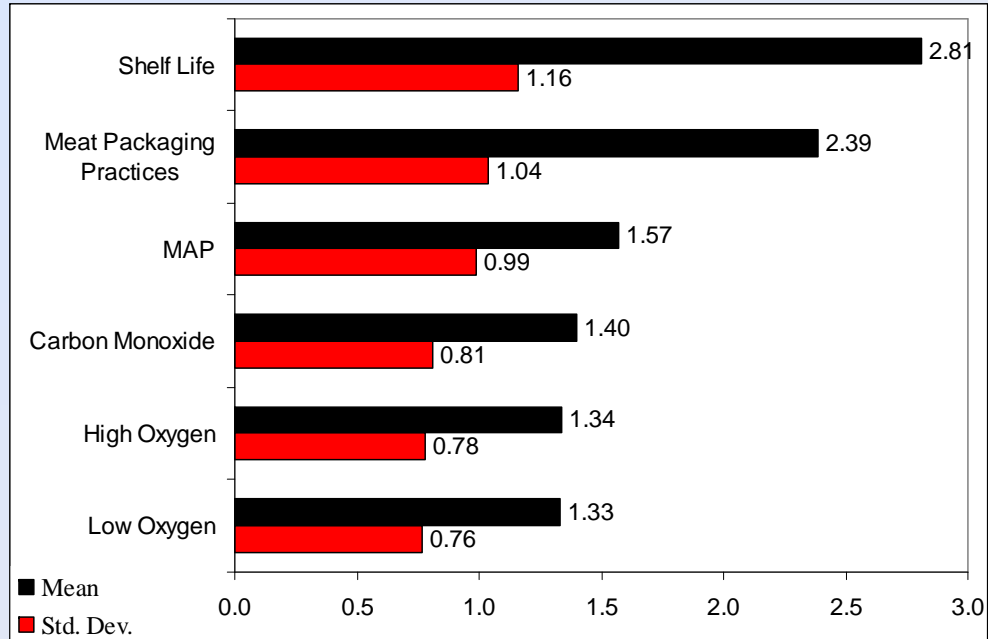
Canada

1 = heard about MAP/CO
0 = otherwise



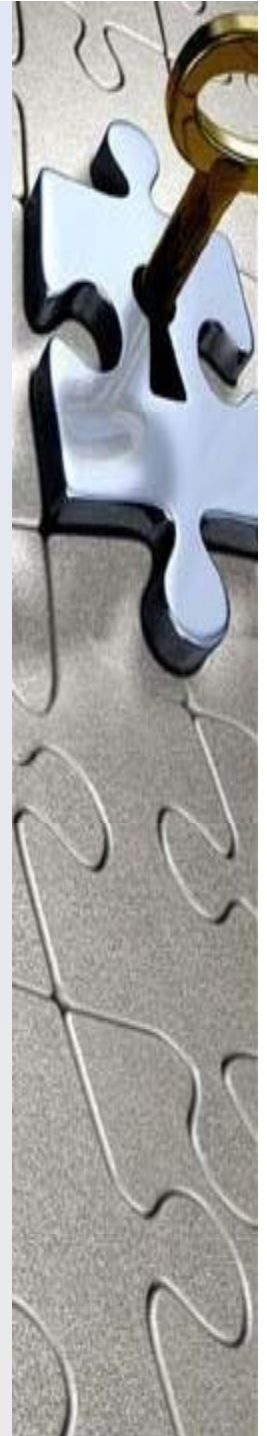
Findings - Knowledge about MAP Technology

USA



Canada

1 = No knowledge
5 = Very knowledgeable



WTP - U.S. Consumers

WTP (US\$) Information	T 1		T 2		T 3		T 4	
	None		MAP		MAP/CO		MAP/ CO Rosemary	
Shelf life	0.03		0.01		0.00		0.02	
St. dev.	0.00		0.01		0.00		0.00	
Light	0.65	***	0.59	***	0.30	***	0.33	***
St. dev.	0.19	**	0.24	***	0.12	***	0.22	***
Cherry	1.04	***	0.80	***	0.31		0.32	
St. dev.	0.24		0.02		0.19	**	0.08	



Findings

- Participants received different MAP information:
 - WTP for extended shelf life and stabilized meat color;
 - Willingness to accept MAP technologies;
- Shelf life extension has no effect on consumers' WTP for ground beef;
- Light & cherry red colour clearly preferred, adding about \$0.3 - \$1 /lb.;
- Emphasis of importance of color stabilization.



Conclusions

- After learning about MAP/CO, WTP for preferred color decreases significantly;
- Prior knowledge (edu, media) has no effect on WTP for ground beef;
- Perceived benefits of red color and WTP for MAP beef may dissipate when consumers receive information about packaging technologies;
- Findings on consumer's WTP for new technologies in fresh meat processing has implications for:
 - public health policy
 - marketing
 - R&D



Dr. Sven Anders

Dept. Of Rural Economy

Faculty of Agriculture, Life and Environmental Sciences

515 GSB, University of Alberta

Sven.Anders@ualberta.ca

Acknowledgements

- USDA, National Integrated Food Safety Initiative (Grant No. 2003-51110-02077);
- Cargill Meat Solutions, Wichita, KS.;
- Alberta Livestock Industry Development Fund (ALIDF);
- Beef Information Center;
- Canadian Meat Council;
- Agri-food Discovery Place, University of Alberta.



UNIVERSITY OF
ALBERTA

Department of Rural Economy

