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# "The Influence of Consumer Trends on Oat Quality throughout the Value Chain" Presentation (Summarized Version)

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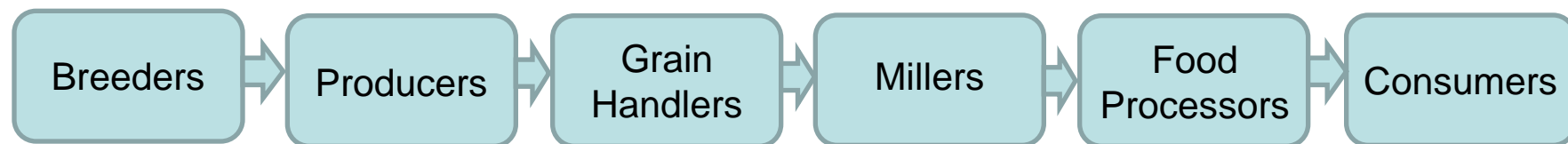
Canada 

# AAFC Cereal Chemistry Research: Value Chain Approach





# Quality factors important to key participants in the food oat value-chain



Breeders	Producers	Grain Handlers	Millers	Food Processors	Consumers
Consider All Quality Factors	Market Opportunities	Preferred Varieties for Processing	Nutrient Content (high fibre; low fat)	Nutrition Labels and Claims	Health Benefits
	Grain Color; No Sprouting; No Frost Damage	Kernel Color & Soundness	No Groat Discoloration; Granulation; Functional Properties; Low Enzyme Activity	Functional Specifications; Sensory Attributes; Shelf Stability	End-Product Color, Flavor/Aroma, Texture & Appearance
	Grain Yield & Grade	Grain Supply; Grain Physical Properties	Milling Yield; Kernel Uniformity	Ingredient Supply; End-Product Pricing	Cost; Convenience
	Free from Disease; Low Dockage	Grain Appearance; Free from Contaminants	Clean Grain; Free from Microorganisms & Mycotoxins	Free from Microorganisms & Mycotoxins	Food Safety

Source: **Ames, N.**, Rhymer. C., Storsley, J. (2013) Food Oat Quality Throughout the Value Chain. In: *Oats Nutrition and Processing: Heart Health and Beyond Volume* Editor: YiFang Chu Publisher: Wiley-Blackwell Target Publication: January 2014, ISBN: 978-1-118-35411-7



# How are consumer trends impacting the oat value chain?

Some consumer trends will impact how we interpret oat quality and allow us to find new food markets for oats.



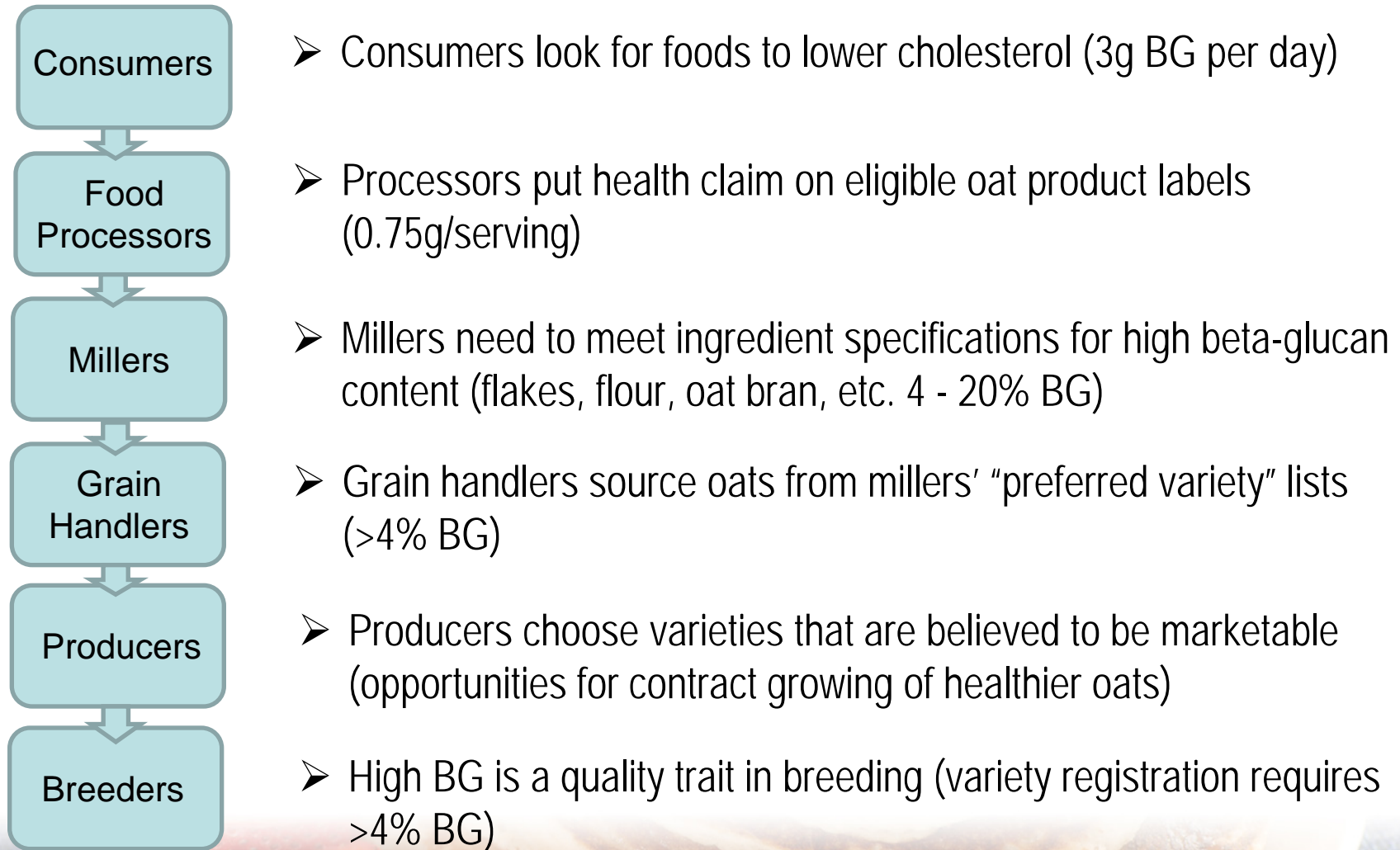
# Trend #1: Healthy Eating

- With an aging population and strains on health care costs, **healthy eating and lifestyle has become very important** to today's consumer.
- Consumers are seeking out food **products that will promote good health.**
  - healthy eating beyond the Food Guide
  - foods that target specific health outcomes ("functional foods")



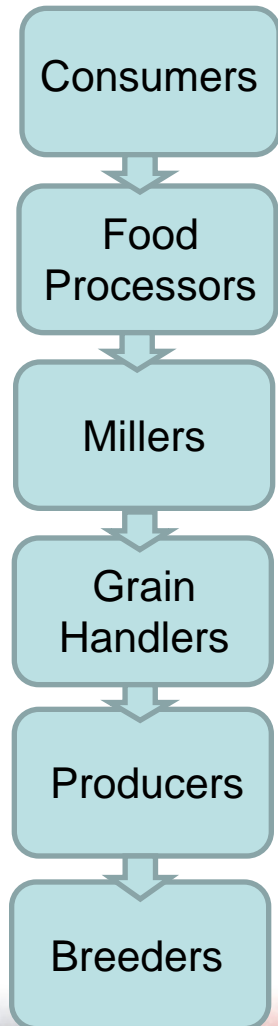
# Influence on oat quality down the value chain

E.g. Beta-glucan in oats is proven to lower cholesterol



# New Opportunities for Additional Healthy Traits

E.g. oat products for the “diabetic” market



- Consumers look for foods to lower glycemic response (EFSA claim 4g BG/30g AVCHO?)
- Processors put health claim on eligible oat product labels (following approval)
- Millers need to meet new ingredient specifications
- Grain handlers source oats from millers' "preferred variety" lists
- Producers choose varieties that are believed to be marketable (opportunities for contract growing of healthier oats)
- New quality traits may include fibre:starch ratios; high BG viscosity



# Oats May Meet Additional Consumer Health Needs

- **Diabetes Prevention**
  - BG viscosity; macromolecule ratios; avenanthramides (possible effect on glucose transport)
- **Satiety & Weight Management**
  - BG viscosity; fibre; protein
  - fibre; protein
- **Gut Health**
  - BG (low MW ?) and resistant starch as a prebiotics
- **Antioxidant Activity**
  - avenanthramides

Current research shows potential – we need to identify quality traits and substantiate health benefits.



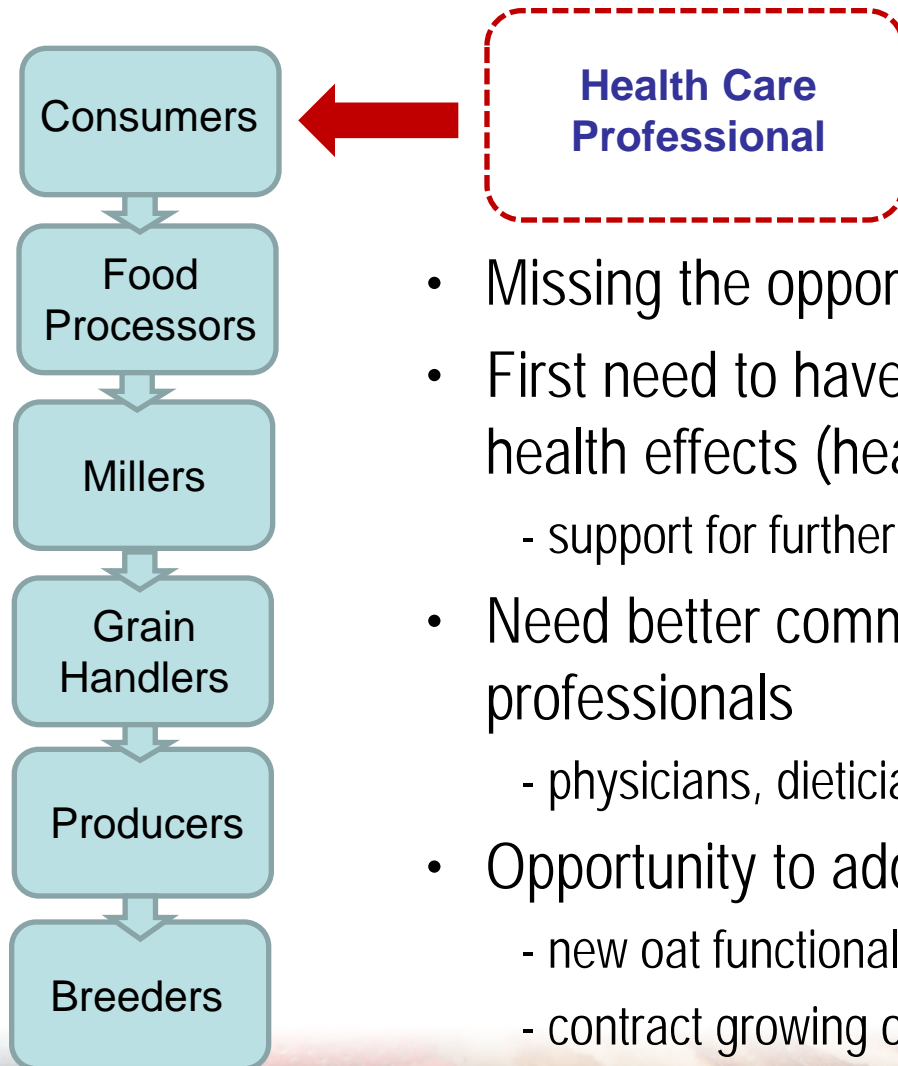


## Trend #2: Advice from Health Care Professionals

- Consumers trust health care professionals and seek advice and reassurance from them regarding health food consumption
  - E.g. recommendation of probiotics and fish oils
- Increase in consultations with aging population



# Need to include health care professionals in the value chain



- Missing the opportunity to educate health professionals
- First need to have scientific evidence to substantiate health effects (health claims)
  - support for further research
- Need better communication with a range of professionals
  - physicians, dieticians, nurses, practitioners and Dr. Oz!
- Opportunity to add value for the producer
  - new oat functional foods will stimulate demand
  - contract growing of varieties with specific health promoting traits

## Trend #3: Listening to the Needs of Different Consumer Sub-Groups

- As consumers become more educated on health topics and well being, they expect products to meet their needs
- Consumer sub-groups may be defined by age, gender, health status, demographics, etc.
- Different consumer sub-groups may require different quality characteristics
- Opportunities for developing new oat products and related quality traits



AAFC Research: Oat Pasta  
Frozen Entrée  
3 g of  $\beta$ -glucan per serving



# Oats Can Answer the Needs of Consumers

## Children

Food Safety (mycotoxins)  
Nutrient Balance

## Adults

Reduce cholesterol  
e.g. need for foods that fit into  
lifestyle

Good carbs for energy and  
satiety

Reduce glycemic response

## Teenagers

Convenience – Eating healthy on  
the go

Oatmeal now at fast food venues

Increase fibre in acceptable  
foods

## Seniors

Convenient meal replacements

High fibre for regularity

Palatability & Texture e.g. dental  
condition affects textural  
preferences





## Trend #4: The Hype of Social Media

- Social media plays a role in the consumer health food industry
- Social networks represent an opportunity to promote health benefits and affect consumer perception of oats
- Studies have confirmed that negative word of mouth spreads at faster rates than positive feedback
  - E.g. “Wheat Belly” blog– also advises against oats
  - E.g. On internet websites: consumers question whether instant and quick oats are as healthy as large flakes and steel cut (“is more processing bad for you?”)
  - Need to substantiate the science before we can look at quality attributes (e.g. more resistant starch?)

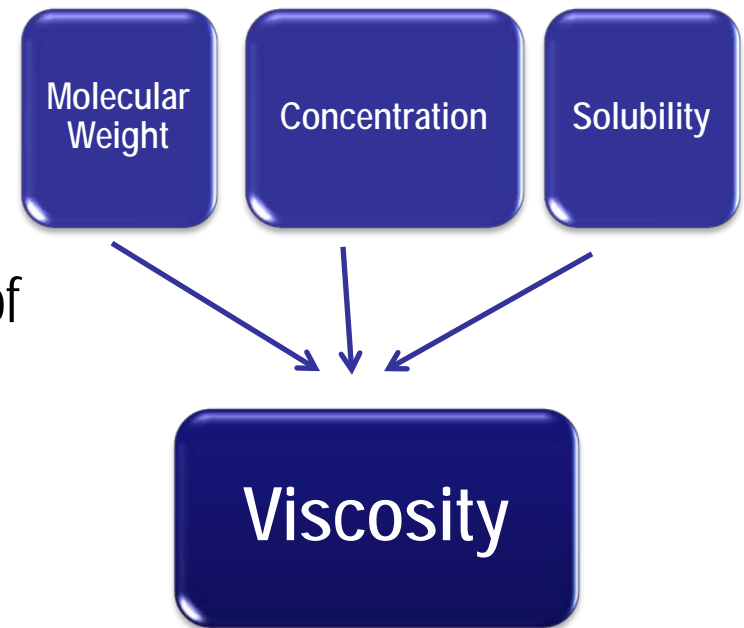


# On-Going AAFC Oat Research



## Beta-Glucan Viscosity

- Highly viscous nature of beta-glucan is thought to impart its health benefits
  - e.g. Oat studies show that viscosity of beta-glucan does affect glucose response in humans
- Physicochemical properties contribute to viscosity
- External factors affecting one or more of these BG properties therefore have potential to influence physiological efficacy



Gamel, T.H., Abdel-Aal, E-S.M., Wood, P.J., Ames, N.P., and Tosh, S.M. (2012). "Application of the Rapid Visco Analyzer (RVA) as an effective rheological tool for measurement of  $\beta$ -glucan viscosity.", *Cereal Chemistry*, 89(1), pp. 52-58.



# Studying Factors Affecting Beta-Glucan Viscosity

- Heat/moisture treatments used during oat processing impact beta-glucan properties such as molecular weight, solubility and viscosity
  - BG viscosity may become a new quality trait important to food processors
- Beta-glucan viscosity also varies with oat cultivar and growing location
  - Selecting oat cultivars and growing locations for high BG viscosity may become an important quality factor for producers and grain handlers





# Avenanthramide Research

- Investigating the potential for oat food products with enhanced avenanthramides in the management of glucose levels in pre-diabetic and diabetic populations
- Studying GxE effects on oat avenanthramide content
- Cell culture techniques are being used to screen oat varieties for their capacity to inhibit intestinal glucose transport (uptake)

High avenanthramide content may become an important quality trait for breeders.



# Developing New NIR Calibrations



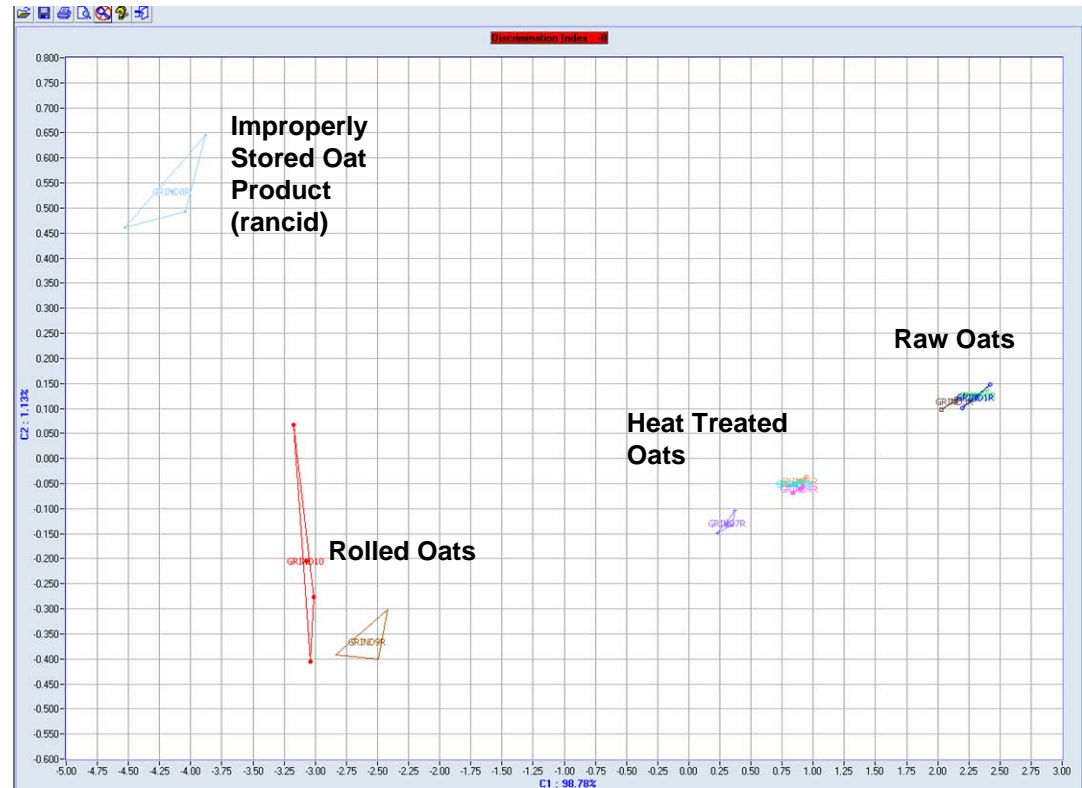
Using the NIR to predict:

- starch
- Fibre components (HMW Insoluble, HMW Soluble, LMW Soluble)

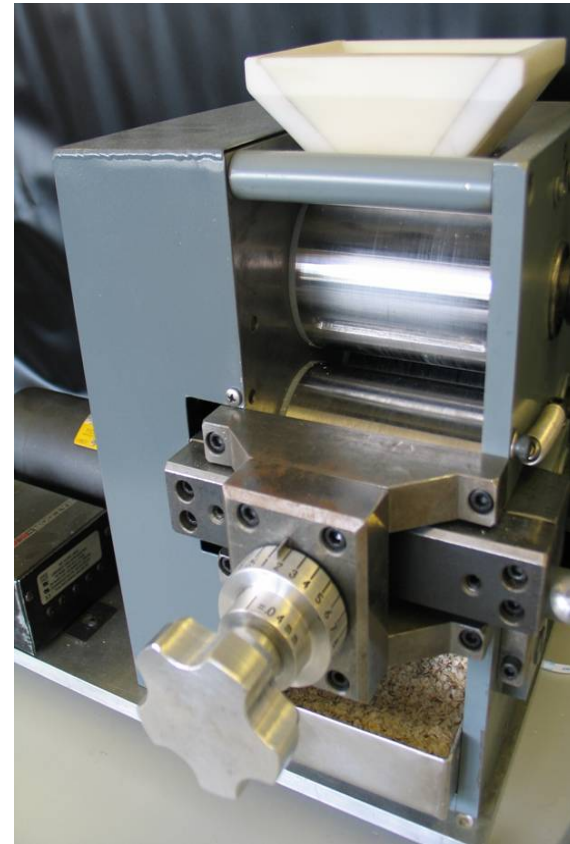
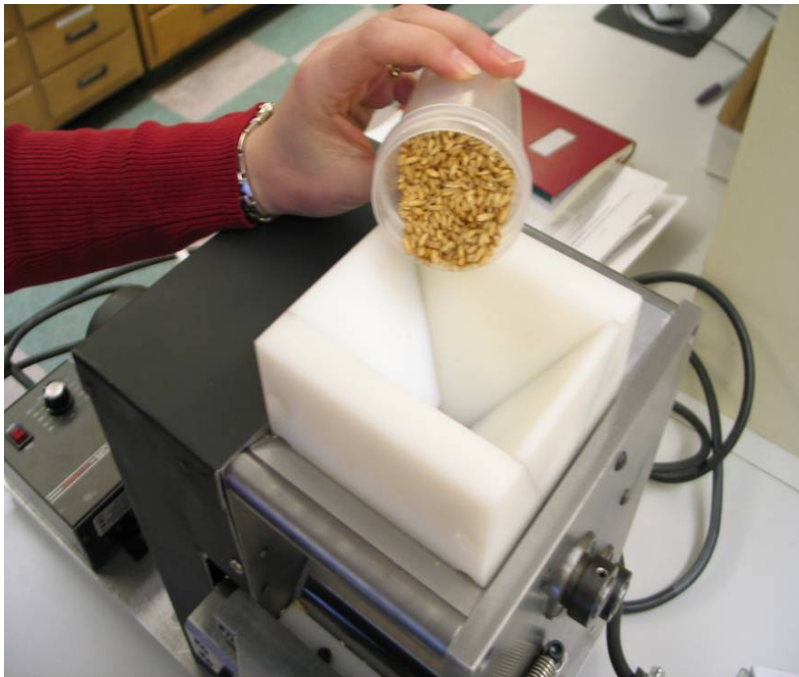


# Oat Flavour & Aroma Characterization

- Study effects of oat ...
  - Product Types
  - Processing
  - Storage / Shelf Life (relates to hexanal levels)



# Measuring Traits that Affect Variation in Oat End Products: Sensory Properties



Ames and Rhymer, 2003. Cereal Chem 80(6):699-702



# Summary

- Oat growers, distributors, millers and food processors all have unique criteria that determine quality at their respective stages of production.
- Understanding the consumer trends and issues that shape the food oat market is an important aspect of the processing and marketing of good quality oat products.
- Beta-glucan is an excellent example of how consumer demand for foods with substantiated health benefits has shaped the quality definition and marketability of oats.



## Summary (cont.)

- Validating additional health benefits and educating health professionals (new partner in the value chain) will create market opportunities for oats that can be expanded to include products offering nutritional benefits and specific end-use attributes that appeal to consumer populations.
- New markets that address key consumer trends and issues may require identification of superior quality traits and development of new varieties
  - E.g. 18 years ago BG was not a quality criteria in our breeding program



## Additional information on related research can be found at the following links:

- <http://www.agr.gc.ca/eng/science-and-innovation/research-centres/manitoba/cereal-research-centre/scientific-staff-and-expertise-cereal-research-centre/ames-nancy-phd/?id=1181927055960>
- <http://www.agr.gc.ca/eng/science-and-innovation/science-publications-and-resources/agri-science-e-zine/agri-science-e-zine-agri-food-food-innovation/?id=1368651096741#a5>
- <http://www.agr.gc.ca/eng/news/feature-articles/barley-is-in-when-it-comes-to-heart-health/?id=1378999685709>







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