

NIRT Equivalency Project Update



GRAIN INSPECTION ADVISORY COMMITTEE MEETING OCTOBER 27, 2015

**Cathy Brenner, Chief
Inspection Instrumentation Branch**



GIAC Resolution



June 2013 Resolution –

“The Advisory Committee recommends that GIPSA initiate research to determine the feasibility of extending the theory of “equivalency” to multiple-constituent instruments in order to utilize standardized technology while maintaining accuracy and consistency in measurement of wheat protein.”



Challenges to Approving Multiple Official NIR Models



- Customers demand highly accurate and consistent official NIR measurements
- NIR calibrations are more costly and complex than UGMA calibrations to develop and maintain
- Equalizing differences across NIR models to reduce sample-by-sample variation may be difficult
- Replacing current official NIR units with new technology is potentially expensive



NIR Equivalency Study – Cooperative Agreement



- Initiated in 2014 with Dr. Charles Hurburgh – Iowa State University

Objectives:

- Evaluate accuracy & precision among NTEP approved instruments
- Utilize multiple instruments from 3 manufacturers
- Investigate calibration and standardization options to maximize accuracy and minimize differences
- Compare results to current NIR technology



NIR Equivalency Study



- Limit to National Type Evaluation Program models and calibrations.



Perten IM9500



Bruins
OmegAnalyzerG

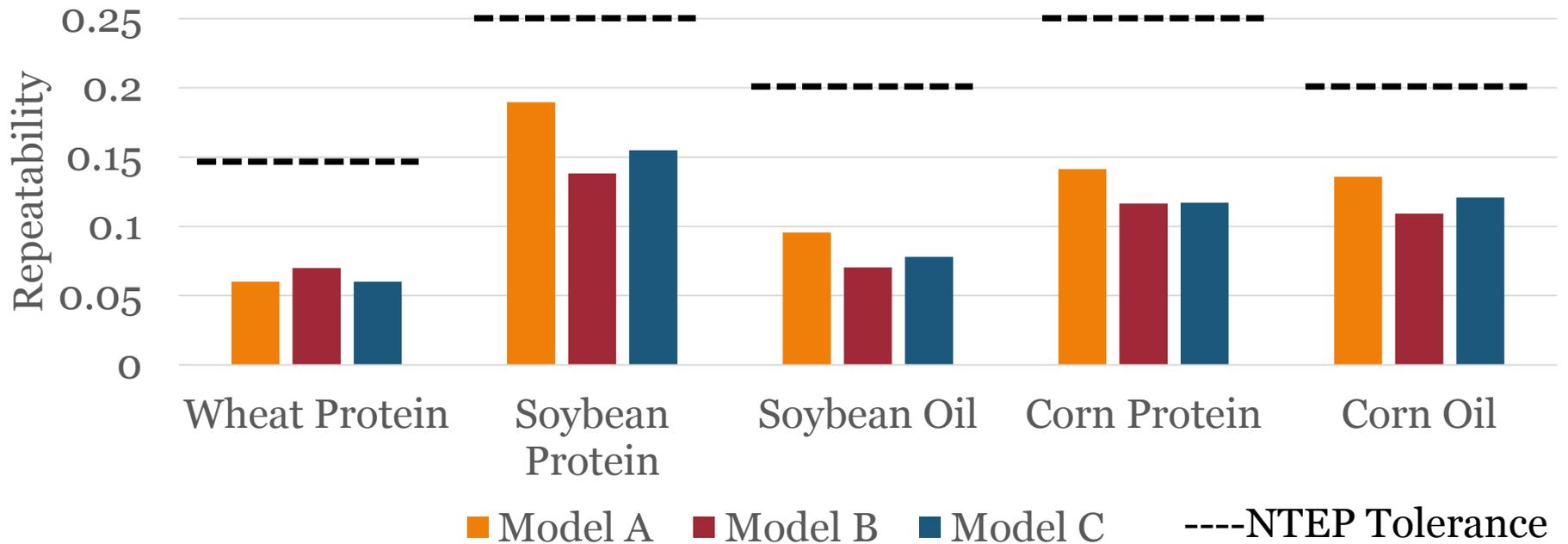


FOSS Infratec 1241

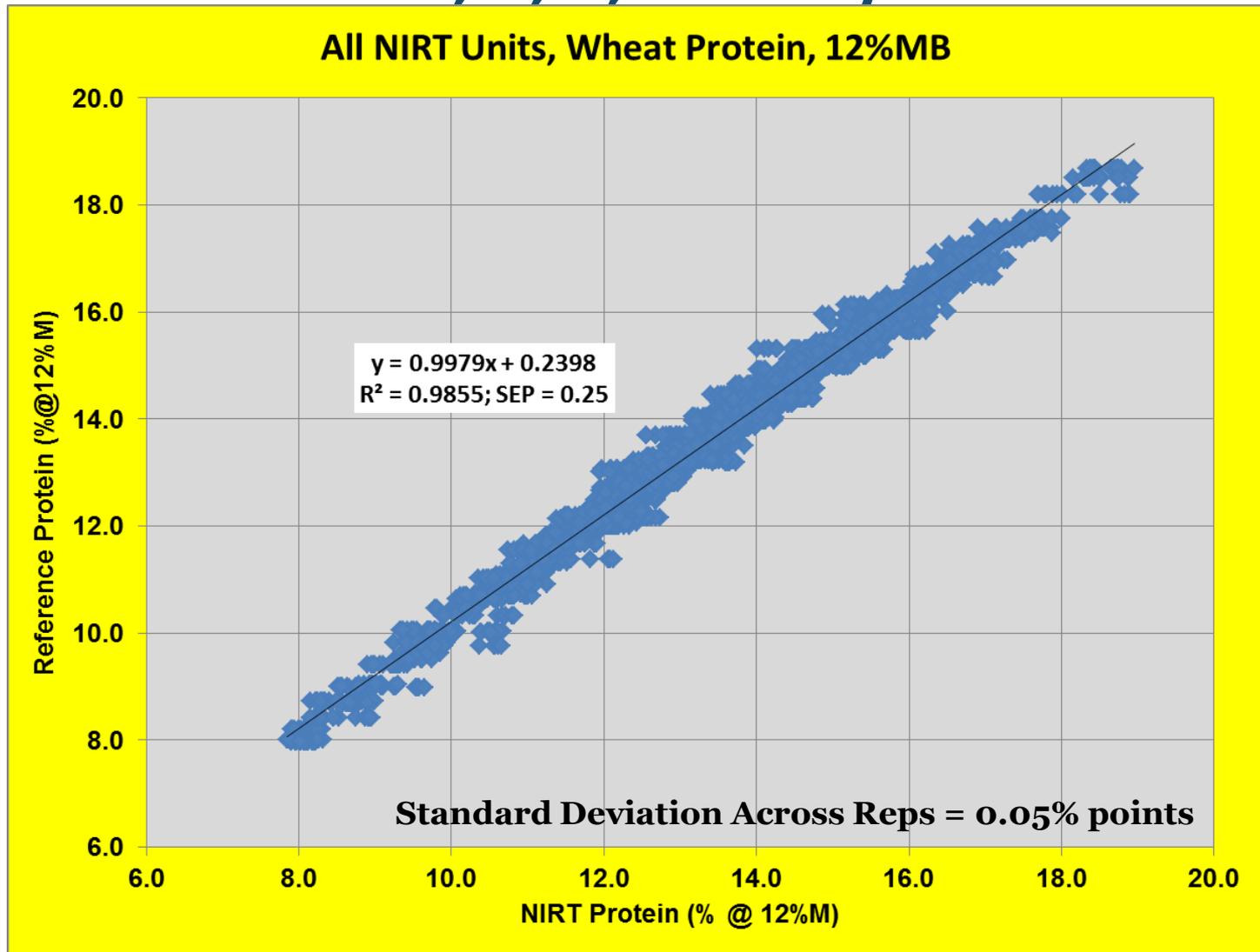
First Consideration



- Is the hardware (design) suitable? Yes
- All meet National Type Evaluation Program Design and Performance Criteria



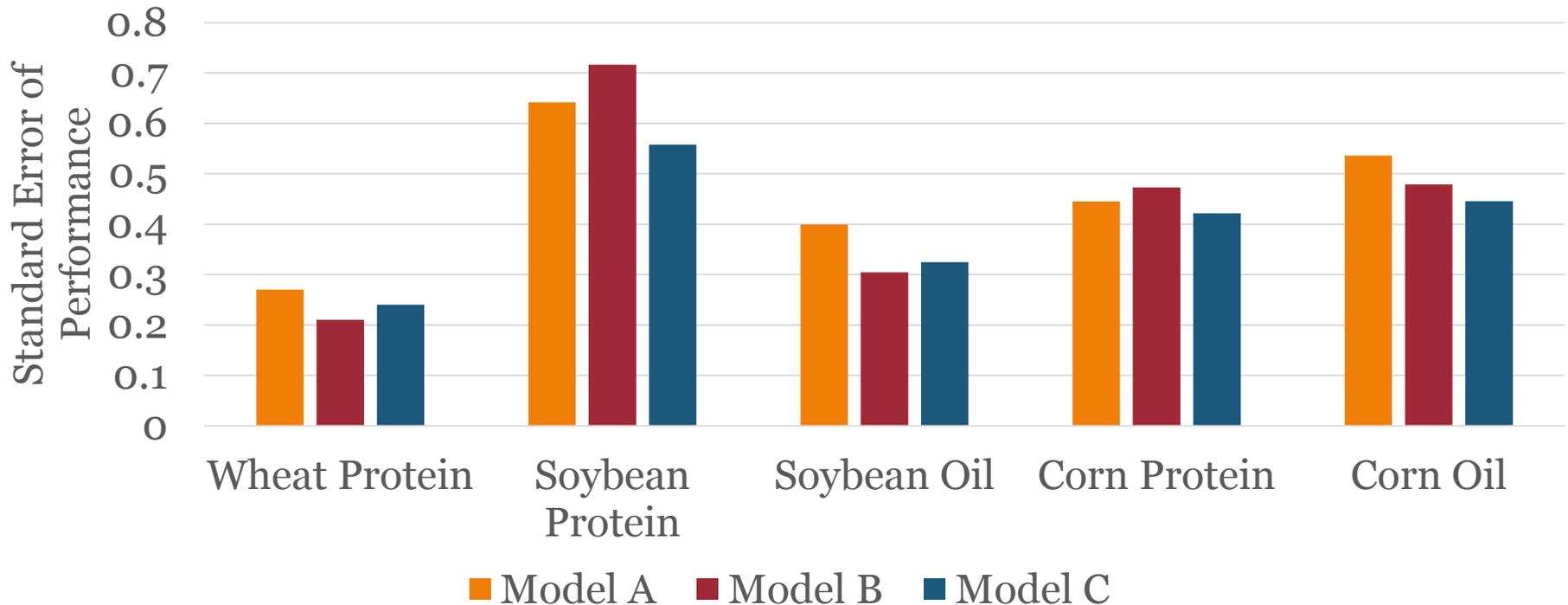
All Data: A, B, C; 5 Units/Brand



Second Consideration



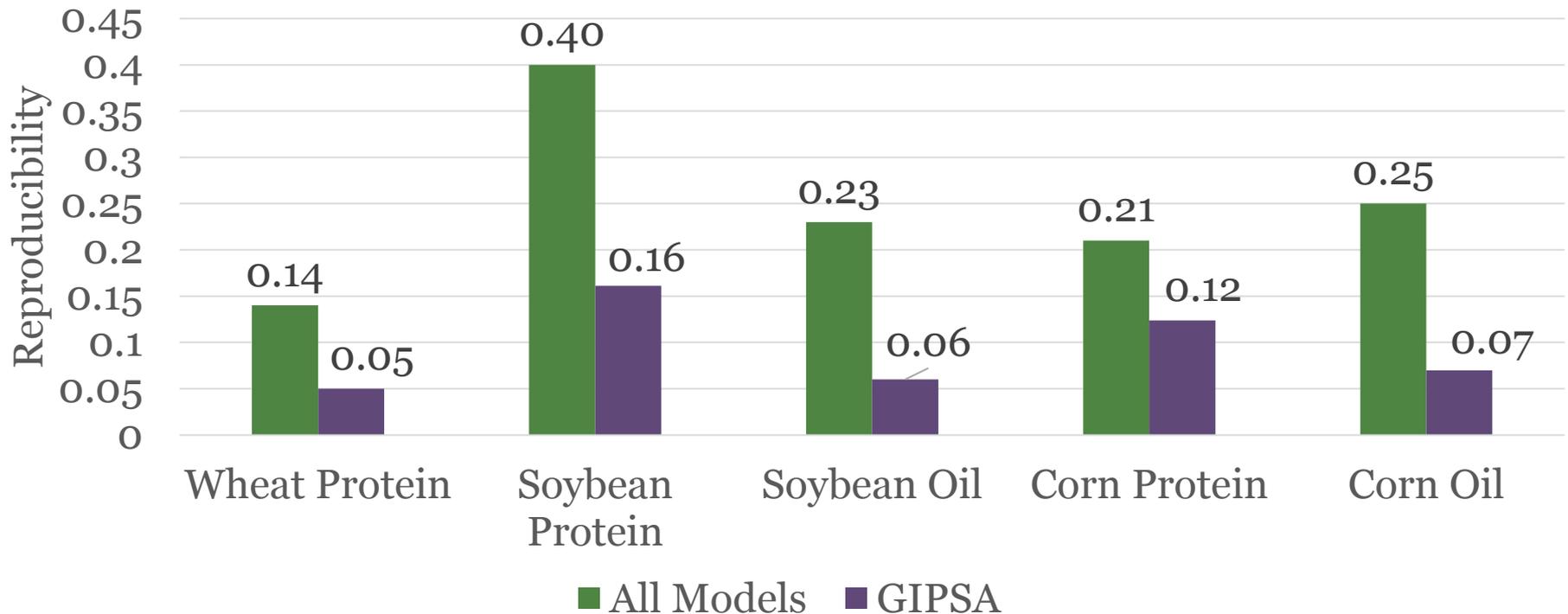
- Are the calibrations accurate to the reference method?
 - All models could be improved by including newer varieties



Third Consideration



- Is the agreement between models (reproducibility) acceptable?



Hard Red Spring Wheat



- Estimated range based on reproducibility results if all three models are in use with the associated discounts and premiums

Target Protein	Minimum Protein	Discount/ Premium	Maximum Protein	Discount/ Premium
14.0%	13.7%	- \$0.20	14.3%	+ \$0.08
12.0%	11.7%	- \$1.20	12.3%	- \$0.90
16.0%	15.7%	+ \$0.64	16.3%	+ \$0.88



Summary



- Hardware is suitable
- Calibrations are good but could be improved
- Reproducibility among all three models in this study gave an estimated range of 0.6% in protein
- GIPSA reproducibility in this study resulted in an estimated range of 0.2% in protein
- All three models are not equivalent
- Possible to improve the agreement between models by using a common core sample set in the calibration



Questions?

