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MPSG ANNUAL EXTENSION REPORT

PROJECT TITLE: Consumer Taste Testing of Recipes Containing Pulses

PROJECT START DATE: August 1, 2015
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PART 1: PRINCIPAL RESEARCHER

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PART 2: EXECUTIVE SUMMARY

The primary objective of the project was to determine if consumers notice a 25-30% replacement of the wheat flour with bean flour or purees. Using recipes previously developed in a MPSG project (2014), consumers were recruited to taste products and complete a consumer survey to determine their opinion on three sensory attributes as well as assess their consumption of pulses. Three recipes were consumer tested: navy bean perogies, black bean chocolate cake and pinto powerballs. Products were evaluated using a 9 point scale for aroma, texture, and flavour. All products received a 7 to 7.5 (moderately acceptable to like very much) score. Comments did not reveal any reference to unusual flavours or aromas that may come from pulse products.

Nutritional analysis was also completed on recipes before modifications to the recipe to include pulses and after to determine the impact of pulse flours on the nutritional content. Protein, fibre, and iron were boosted with the addition of pulses. The greatest impact was on gluten free recipes made with rice flours and starches. A 25% replacement of rice flour doubled the protein, fibre, and iron.

This project was designed to demonstrate the flexibility and acceptance of pulse products in a variety of foods. It showcased how easy it can be to increase the consumption of pulses at home or in food service settings. Most of these recipes can be easily incorporated into cafeteria menus and restaurants to provide extra protein, fibre and antioxidant properties of Manitoba grown pulses.

PART 3: EXPERIMENT DESCRIPTION & RESULTS

Consumer surveys were conducted in the annex of the Paterson GlobalFoods Institute (PGI), which houses Red River College's School of Hospitality and Culinary Arts. It also serves as the cafeteria space for the short order restaurant, Culinary Exchange. Many people from the business community and general public have lunch or coffee breaks in this area, making it a good location to recruit a variety of people for consumer taste testing.

Surveys were designed using SurveyMonkey and printed to accommodate large volumes of people at a time. The surveys asked participants to rate the products on a 9-point scale for flavour, aroma and texture. This is a common scale used in food product testing. Participants were not specifically told what was in the product, although allergen statements were made for safety reasons. To increase participation, $5 gift cards were given away once the participants handed in their survey. All surveys and consent forms were approved by the RRC's Research Ethics Board.

For three days, the culinary student and lead researcher set up a table in the annex and surveyed 110 to 115 participants. Extra surveys were collected to ensure 100 complete surveys were available for analysis. Some surveys were incomplete or answers were unclear making the survey invalid. Approximately 10% of surveys were incomplete. Data was manually entered into SurveyMonkey to take advantage of the on-line data analysis tools.

Results from the sensory testing is available in Table 1 of the Appendix. Results for all products were positive with no rating lower than 7 out of 9 for any sensory categories. In addition to sensory evaluation, people were asked how frequently they consumed pulses. Approximately 40% of responses indicated they consumed pulses once per week.

Nutritional analysis was conducted using Genesis Nutritional Software by a third party - Intertek Labs. The ingredients and amounts are entered into the computer along with the approximate recipe yield. The final weight and yield of the products can cause minor fluctuations between comparable recipes. This is not the most accurate way to test nutritional information but does provide an estimate to compare the ingredient changes effect on nutrient content. In most cases the only difference is the exchange of wheat flour for bean flour. In some recipes where purees were used, this resulted in a change of other ingredients such as fat or whipping cream. A summary of the nutritional results is included in Table 2 of the Appendix.

PART 4: RELEVANCE TO FARMERS AND FUTURE RESEARCH

Adding bean flour or puree to a variety of products can boost daily pulse intake without compromising the taste and texture of many common food products. The taste tests revealed that most participants do not detect a 25% replacement of wheat flour with pulse flours. This opens up the options, especially in industrial food service outlets such as corporate cafeterias, schools, and retirement homes, to improve nutrition while serving familiar foods. Readily available flours and purees can help reduce time to prepare pulse-inclusive products.

Although the pulse inclusion could potentially be pushed higher per product, a 25% inclusion with a high sensory acceptance could change how common food service items are prepared. Promotion within food service to make these minor modifications could move pulse consumption from once per week to every day in small amounts. In gluten free applications, the addition of pulse flours can boost protein, fibre, and iron to provide a healthier gluten free alternative.

Promotion of these results to institutional food service outlets such as university or corporate cafeterias, plus incentives to improve nutrition, could change the way healthier foods are incorporated on a daily basis. Chefs in these industrial kitchens often have an eye to taste, efficiency, and costs. Purees and flours offer efficient ways to boost pulse

consumption, but the incentive to boost pulses has to be there. More research and the promotion of completed research related to daily pulse consumption benefits may provide chefs and the owners of large institutions with the information but incentives to change may have to come from health policies or provincial incentives to improve institutional meals. A market study delving into food service practices and decision-making may provide further insights into how to increase pulse consumption within this $1.7 billion food service industry. With recipes and consumer research to discuss with industry as a result of this project, the next steps would be to discuss barriers and motivations for changing recipes to include pulses.

PART 5: COMMUNICATION

Red River College is in a position to use its social outreach avenues to promote the research and results through the blogs, newsletters and faculty meetings. The increased knowledge with the chef instructors will be disseminated to a new generation of chefs. An example of the social outreach can be found on the RRC blog here. In addition to the local press, the college had an opportunity to promote this work in Macleans magazine (here).

The Canadian Agriculture and Food Museum has requested recipes for their promotion of food and food research across Canada - in particular pulses as a part of International Year of Pulses.

Participation at the Research Chef Association in 2015 and 2016 showcased pulse flours and recipes with Best Cooking Pulses.

APPENDIX

Table 1: Summary of Sensory Evaluation Scores

	Cupcakes	Perogies	Power Balls
Aroma	6.98	7.24	7.16
Texture	7.56	7.79	7.06
Flavour	7.72	7.7	7.19

Table 2: Nutritional Analysis Summary

Product	Version	Calories	Fat (g)	Carb (g)	Fibre (g)	Protein (g)	Iron (%)
Spinach Linguine, raw	Original	280	4.5	49	2	10	25
100 g serving	New (Pulse)	280	4.5	47	5	12	30
Squash Soup*	Original	180	13	12	1	4	10
178 g serving	New (Pulse)	250	19	18	4	5	15
Garlic Roman Flatbread	Original	90	3	15	1	2	6
40 g serving	New (Pulse)	100	4.5	14	2	3	6
Chicken Pot Pie with Pinto Pie Crust	Original	1080	73	61	4	41	25
564 g serving**	New (Pulse)	1080	73	60	6	44	30
Gluten Free Shortbread w/Baker's Jam	Original	140	8	18	0	0.5	0
30 g serving	New (Pulse)	140	8	17	1	1	2
Smoked Gouda Perogies	Original	330	12	45	2	8	20
166 g serving	New (Pulse)	350	11	50	5	12	25
Gluten Free Soda Crackers w/ Fresh Thyme	Original	170	6	26	1	2	2
57 g serving	New (Pulse)	170	6	25	3	4	6
Almond Flavored Chocolate Espresso Cake	Original	510	18	80	2	7	15
182 g serving	New (Pulse)	510	18	79	3	8	15
Orange and Navy Bean Crème Brulee	Original	460	41	21	0	4	2
138 g serving	New (Pulse)	420	32	28	2	6	8
Power Balls	Peanut Butter	180	11	16	3	6	8
37 g serving	Pinto Bean	110	4.5	16	3	3	6

*The new recipe was based on an original recipe but was not modified with the intention of comparing the two for nutritional analysis.

**This is the size of a typical restaurant sized serving (worth noting for frequent restaurant diners).