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RESEARCH INITIATIVE
QUARTERLY PROGRESS REPORT FOR WORK
DONE UNDER RESEARCH AGREEMENT

INSTITUTION: University of Georgia

PROJECT TITLE: **Functionality of Peanut Ingredients in Production of Peanut
Pancake Instant Mix**

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FINAL REPORT:

Pancakes are popular breakfast food items in various parts of the world with different regional names. Partially defatted peanut flours have high protein content (high lysine levels) and retain the characteristic peanut flavor in the residual fat (12 – 28%). The protein quality of peanut flour is better than most cereal grains. The overall objective of this study was to develop a “Peanut Pancake Instant Mix” by replacing certain percentage of all purpose wheat flour with partially defatted peanut flour.

A general recipe for pancakes preparation was chosen as the starting point to prepare peanut pancake containing 0, 10, 20, 30% levels of “12% fat light roasted” peanut flour with 0% as the control sample. After several attempts to find right composition at 20%, 30% levels with 6.8% baking powder, good quality pancakes were made. In the second stage of formulation, pancakes were prepared from all dried ingredients using “12% fat medium roasted” peanut flour. Good combinations in terms of taste, color, texture, appearance were found at 20, 30, and 40% levels with 2.5% baking powder and 1% baking soda with appropriate composition of other ingredients like sugar, salt, egg powder, non-fat dry milk, oil and water.

Physical-chemical properties of peanut pancakes made from both 12% and 28% fat peanut flour at 20%, 30%, 40% and 50% substitution of wheat flour were determined. Pancake made with 100% wheat flour was used as the control. Peanut pancakes contain 30% low fat peanut flour (12% fat) and 40% regular fat peanut flour (28% fat) had similar bulk density as the control (Table 1). Pancakes made from 12% fat peanut flour all had higher viscosity than the control while pancakes made from 28% fat peanut flour all had lower viscosity than the control (Table 1).

Color parameters in terms of lightness (L*), chroma, hue angle, and color difference (ΔE) are presented in Table 2. Peanut pancakes were darker (lower in L* value) than the control and L* values decreased with increasing amount of peanut flour in the formulation and increasing percentage of peanut flour fat content. Chroma and Hue angle followed the same pattern as the L* values (Table 2). Hue Angle decreased from 69.1 to 64.53 and 64.1 for

pancakes containing 50% peanut flour with 12% and 28% fat, respectively. This indicated that pancakes are becoming darker brown in color. Total color difference between pancakes and reference tile ($L^*=58.73$, $a^*=10.72$, $b^*=12.59$) ranged from 19.72 to 24.46 and the differences were not significant.

Table 1. Bulk density and viscosity of peanut pancakes made with different amount of peanut flour.

Peanut fat Content (%)	Amount of Peanut Flour (%)	Bulk density (g/ml)	Viscosity@20rpm (cP)
	0	0.5019	4675
12	20	0.6549	5375
12	30	0.5287	5756
12	40	0.4118	5938
12	50	0.4605	5604
28	20	0.4405	4095
28	30	0.4768	4244
28	40	0.5078	3564
28	50	0.5924	3387

Table 2. Color parameters of peanut pancakes made with different amount of peanut flour*.

Peanut fat Content (%)	Amount of Peanut Flour (%)	L^*	a^*	b^*	Chroma	Hue angle	Color difference ΔE
	0	51.64	13.07	34.33	36.73	69.10	22.98
12	20	48.05	13.99	31.53	34.49	66.03	21.98
12	30	45.72	12.73	27.28	30.10	64.95	19.72
12	40	43.34	13.24	26.24	29.39	63.20	20.72
12	50	43.75	13.54	28.50	31.55	64.53	22.03
28	20	44.03	11.53	28.96	31.17	68.27	22.01
28	30	43.87	12.10	27.91	30.42	66.50	21.38
28	40	40.92	11.70	24.41	27.06	64.32	24.46
28	50	39.62	12.39	25.60	28.44	64.10	23.15

Reference tile $L^*=58.73$, $a^*=10.72$, $b^*=12.59$

Chemical compositions of peanut pancake are presented in Table 3. In general, moisture content increased with increasing peanut flour (Table 3). However, there were only about 2% difference the most than the control. Protein and fat contents increased with increasing peanut flour. Pancakes made from 12% fat peanut flour shown higher protein and lower fat values than pancakes made from 28% fat peanut flour. Ash content also increased

with increasing peanut flour. However, there was no different on ash content between pancakes made from either 12% or 28% fat peanut flour. All peanut pancakes had significant higher protein content than the control. Peanut pancakes made from 12% fat peanut flour at 50% substitution had 174% more protein than the control (Table 3).

Table 3. Composition of peanut pancakes made with different amount of peanut flour.

Peanut fat Content (%)	Amount of Peanut Flour (%)	Moisture (%)	Ash (%)	Protein (%)	Fat (%)	Carbohydrates (%)
	0	47.68	1.70	5.58	3.01	42.03
12	20	47.96	2.06	9.87	3.80	36.31
12	30	48.23	2.24	11.87	4.21	33.45
12	40	48.60	2.47	13.70	4.52	30.71
12	50	50.13	2.50	15.30	4.67	27.40
28	20	45.94	2.18	9.38	5.31	37.19
28	30	47.40	2.19	10.74	5.88	33.79
28	40	48.15	2.43	12.07	7.26	30.09
28	50	48.63	2.60	13.98	7.92	26.87

Results from this study demonstrated that good quality pancakes can be made with flour containing up to 50% peanut flour. Peanut pancakes made from 12% fat peanut flour at 50% substitution had 174% more protein than the 100% wheat flour control.