UTILIZATION OF PROSUR PRS-PHR AS A PHOSPHATE REPLACER IN INJECTED AND TUMBLED MARINATED CHICKEN

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I. INTRODUCTION

Marinated poultry products, especially chicken breasts are preferred by consumers for increased juiciness and tenderness (1). However, consumers are looking for more transparency in marinated products and are interested in more natural, clean label poultry meat products (2). This study was conducted to determine the effectiveness of a phosphate replacer consisting of yeast and citrus extracts (Natural flavour PRS PHR; Prosur, Naperville, IL) for improving meat quality compared to ingredients used in typical poultry marinades.

II. MATERIALS AND METHODS

Broiler breast fillets (n=180; 15 per replication * 2 replications * 3 ingredient treatments * 2 states: fresh, frozen-thawed; n=72 panelists for sensory) were marinated using injection with a 20% target pump immediately followed by vacuum tumbling. Treatments consisted of marinade formulas containing 0.75% NaCl (based on final product formulation) and one of the following: 0.5% sodium phosphate (CONTROL), 0.5% sodium phosphate + 0.5% PHR (PHOS PHR), or 0.5% Natural flavor PRS PHR (PHR). Fillets were either assessed fresh or after frozen storage and thawing. Fillet pH, color (L*), % pickup, % purge (holding overnight after marination), % cook loss, Meullenet Owens Razor Shear force (MORSF) (3), and consumer sensory analysis (fresh state, CONT PHOS vs PHR) were determined. Data was subjected to analysis of variance where ingredient treatment and fresh/frozen state served as main effects.

III. RESULTS AND DISCUSSION

The PHR and PHOS PHR treatments had greater marinade pickup ($P<0.05$) than the control ($P>0.05$) (Table 1). Post-marination, pH was higher ($P<0.05$) in PHOS PHR treatments compared to phosphates and PHR alone, which were not significantly different. As expected, freezing and thawing had an impact on purge (%) with higher overall purge compared to fresh products. Post marination purge (%) was not different ($P>0.05$) in fresh product marinated with PHR, PHOS PHR or CONTROL. However, in frozen and thawed breast fillets, CONTROL and PHR were not significantly different ($P>0.05$) from each other but were significantly different from PHOS PHR which had a lower marination purge (%) overall. Following cooking, cook loss (%) was measured as an indicator or water holding capacity. In fresh fillets, CONTROL (21.95%) had a higher ($P<0.05$) cook loss compared to PHR alone (17.94%). In frozen and thawed fillets, PHR alone was not significantly different ($P>0.05$) from the CONTROL marinated fillets while the PHOS PHR treatment had the lowest cook loss. Yield improvement was highest in the PHR and PHOS PHR which were significantly higher ($P<0.05$) than the CONTROL treatment alone. The overall cook % yield results indicate the PHR and PHOS PHR treatments were significantly higher ($P<0.05$) indicating better water holding capacity than the CONTROL in the fresh fillets. In frozen and thawed fillets, the PHOS PHR was higher ($P<0.05$) compared to the CONTROL and PHR alone which were not different ($P>0.05$). The PHR marinated fillets had the lowest ($p< 0.05$) MORSF tenderness value, indicated more tender meat compared to the CONTROL and the PHOS PHR treated fillets. All MORSF mean values were below 7 N indicating very tender meat (4,5).

Consumer sensory analysis of the CONTROL and PHR marinated fillets indicated no significant differences (P>0.05) in overall liking, overall flavor liking, and overall texture liking. PHR had higher hedonic scores (P<0.05), indicating more likeness. Most consumers considered PHR and CONTROL as just about right for tenderness. The results suggest that the use of PHR as a phosphate replacer in inject and tumble chicken marinades in fresh or frozen and thawed products can be used by processors and consumers desiring clean label marinated products.

IV. CONCLUSION

Yeast and citrus extract PRS-PHR is an alternative to replace phosphates in injected and tumbled chicken breast and can improve some quality parameters like pick up and yield. However, the combination between phosphate and PRS-PHR shows the best performance in all parameters noting a synergistic effect.

Table 1. Meat quality and consumer sensory attributes for broiler breast fillets marinated with or without citrus/yeast extracts.

	Treatment[1]						
	CONT PHOS		PHOS PHR		PHR		
Attribute	Fresh[2]	Frozen[2]	Fresh	Frozen	Fresh	Frozen	Pooled SEM
Marination Pickup (%)	13.0^{cd}	12.7^{d}	15.2^{ab}	14.3^{bcd}	16.5^{a}	14.5^{bc}	0.39
pH[3]	6.01^{b}	6.02^{b}	6.27^{a}	6.23^{a}	6.03^{b}	6.03^{b}	0.03
Purge (%)	0.16^{c}	2.30^{a}	0.35^{c}	1.24^{b}	0.52^{c}	1.84^{a}	0.14
Cook Loss (%)	22.0^{ab}	21.0^{ab}	19.5^{bc}	17.2^{c}	17.9^{c}	22.9^{a}	0.76
Yield Improvement (%)[4]	12.5^{b}	9.9^{c}	14.4^{a}	12.6^{b}	15.7^{a}	12.0^{b}	0.42
Overall cook yield (%)[5]	87.8^{b}	86.8^{b}	92.1^{a}	93.2^{a}	94.9^{a}	86.4^{b}	0.94
MORSF (N)	5.59^{ab}	6.21^{a}	5.25^{b}	5.82^{ab}	4.09^{c}	5.34^{ab}	0.23
Sensory[6]							
Overall Liking	6.96		--		7.13		0.17
Flavor Liking	7		--		7.11		0.20
Texture Liking	6.79		--		6.99		0.17

[1]CONT PHOS – control with salt and phosphate; PHOS PHR – control plus PHR; PHR – salt and PHR; n = 30 per mean
[2]Fresh- fillets never frozen; Frozen – fillets stored frozen after marination and thawed before cooking
[3]pH of breast fillet following marination
[4]Yield improvement was calculated as percent change from initial weight to final weight before cooking
[5]Overall cook yield was calculated as cooked weight as a percentage of initial weight.
[6]n = 72 per mean representing consumer panelists; CONT PHOS and PHR were assessed.
Means within row with no common superscript differ (P<0.05)

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