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USING PINEAPPLE BASED MARINADE FOR SOUS-VIDE MEAT PRODUCTS

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MAGYAR AGRÁR- ÉS ÉLETTUDOMÁNYI EGYETEM ÉLELMISZERTUDOMÁNYI ÉS TECHNOLÓGIAI INTÉZET

Pineapple, in addition to its beneficial effect on meat quality parameters, also has a beneficial effect on human health. It has a significant content of bromelain, a cysteine endopeptidase belonging to the group of hydrolases, is thus able to break down meat proteins into smaller units through its protein-degrading activity, causing a change in the structure of the meat. Sous-vide cooking is a 'low temperature long time' type of heat treatment resulting in a meat product with special sensory properties. With the experimental design of a central complex rotation arrangement (CCD) we were able to study the interaction of the two variables (marinating time and pineapple) juice concentration). Several quality parameters were measured (color, water holding capacity (WHC), weight loss, dry matter content, texture, and thermo-analytical measurement of proteins by DSC).



Pork Chop 1' x 1'

Experimental design of a central complex rotation arrangement (CCD)



Variable	Fact.	-1,414 2	-1	0	1	1,414 2
Time of marination (min)	X1	14	60	180	300	350
Conc. of marinade (%)	X2	14,64	25	50	75	85,35

	Real factor values				
Tests	Time of marination (min)	Concentration of pineapple in the marinade (%)			
1	10	50			
2	60	25			
3	60	75			
4	180	14,64			
5	180	50			
6	180	50			
7	180	50			
8	180	85,35			
9	300	25			
10	300	75			
11	350	50			





Based on the results of the factorial experimental design, it can be stated that the marinating time and the concentration of the applied marinating solution have a strongly significant effect (p < 0.001) on the weight, dry matter content and color (all L*, a*, b* parameters) of cooking water and water retention (p < 0.01), time and concentration have a significant effect on pH at p < 0.05, but the combined effect of the two is not significant. The complex effect of time and concentration on the results of the texture measurement did not have a significant effect at p < 0.05 either. The results obtained for each parameter of meat quality are correlated. Based on the 3D models the pH decreases, the cooking loss increases and the water holding capacity becomes worse. The lower pH causes drip loss, thus increasing the dry matter content, and lightening the meat color. Thus, for the color parameters, the brightness factor (L*) increases, while the reddish hue (a*) of the samples decreases and the yellowish hue begins to dominate (b*). Thermograms of DSC measurements of the samples confirm that protein degradation occurs, which is more intense for samples marinated for a longer period and at higher concentrations. As the concentration of the solutions increases and the time progresses, the recorded curve becomes more and more close to the baseline. The peaks of myosin, connective tissue proteins, and actin are flatter at higher concentrations and prolonged marinating, suggesting that the protease-active enzyme bromelain disintegrates the proteins into smaller pieces, and that the pineapple juice may have an acidic denaturing effect. Most properties are strongly influenced by the time of marinating and the concentration of the marinating solution and their combined effect.

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