

Expert's Opinion

Fish Oil from Alaska Pollock as Healthy Nutrition Ingredient for Crabsticks

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I. Introduction

Fish oil has played a significant role in healthy nutrition. Leading manufacturers of crabstick in the United States have used fish oil (primarily from menhaden) as omega-3 oil resource and make “heart healthy” claims. This testing was conducted to measure the effect of refined oil from Alaska pollock in crabstick at 1 or 3% on texture, color, and sensory values.

II. Preparation of Surimi Paste for Crabstick

	Control	F1	F3
Surimi	45	45	45
Salt	2	2	2
Water/Ice	41.5	40.5	38.5
Fish oil	0	1	3
Starch	6	6	6
NP3	2.5	2.5	2.5
Sorbitol, L	3	3	3
	100	100	100

As shown above, three sample recipes were prepared: control, F1 (1% fish oil) and F3 (3% fish oil). NP3 (potato extract) was used as egg white replacer. American Seafood's A grade Alaska pollock surimi was used. Chopping was done using Codex method. Surimi seafood paste was cooked in sausage tubes in 90°C for 30 min or ohmically to 90°C in 30 seconds. Using the remaining paste, crabsticks were prepared manually as shown below:



CON

F1

F3

III. Texture

Surimi seafood paste was cooked in two different heating systems: 1) Slow heating: 90C water bath which is a typical cooking method for surimi evaluation and 2) Fast heating: ohmic heating that mimics the commercial crabstick cooking.

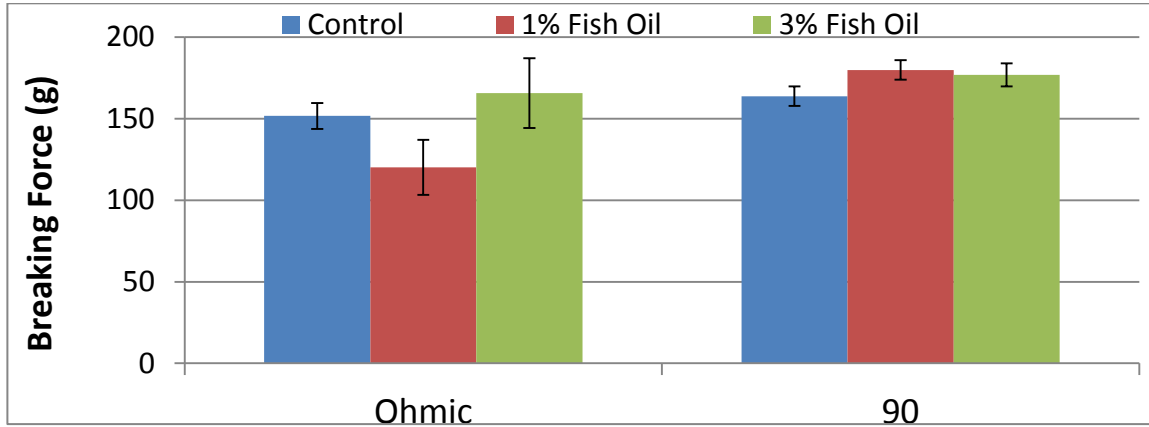


Figure 1 Gel strength (hardness) of crabsticks containing 0-3% pollock oil at two different heating systems.

As shown above, there is no change in gel hardness when 1-3% oil was added to replace water. This is also confirmed by our previous study: vegetable oil can replace water by 1:1 up to 6% without affecting the texture properties of surimi gel (Park, 2014. *Surimi and Surimi Seafood*, 3rd edition. Boca Raton, FL: CRC Press).

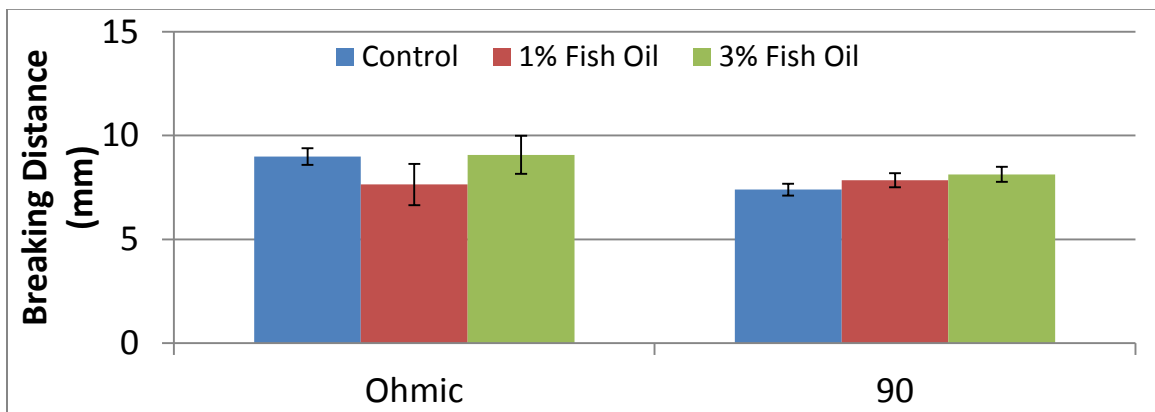


Figure 2 Gel deformability (cohesiveness) of crabsticks containing 0-3% pollock oil at two different heating systems.

Like in Figure 1, gel breaking distance was not affected by the addition of pollock oil.

IV. Gel Color

The whiteness of surimi seafood gels was not affected by the addition of pollock oil at 1-3% (Figure 2). As for details, L* (lightness) and b* value (yellowness) of gels with 1% pollock oil showed out of the

range, instead of being between two values of control and 3%, possibly due to an experimental error (?).

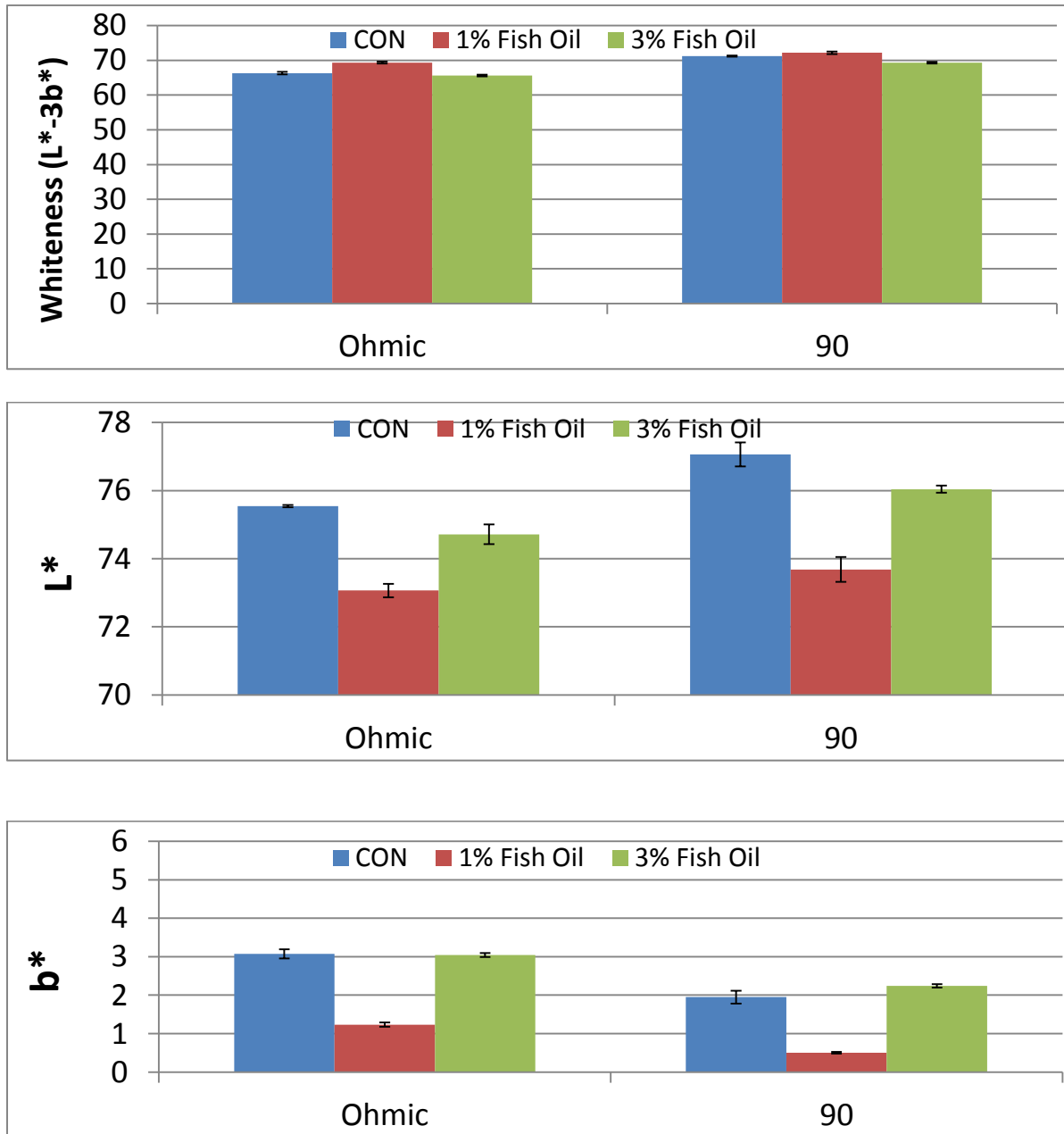


Figure 3 Gel colors of crabsticks containing 0-3% pollock oil at two different heating systems.

V. Sensory Evaluation

Crabsticks were manually prepared for sensory evaluation as shown in Page #1. Fish note/off odor, texture, and overall liking were asked at 1-5 scale as shown in the sensory sheet at the end of this report.

Among three crabstick samples, 6 members of our panel found no significant difference in all categories. In fact crabsticks prepared with 1 or 3% pollock oil were ranked slightly better than the control sample for fishy odor, texture, and overall liking (Table 1).

CON	Crabstick containing 0% pollock oil						AVERAGE	ST DEV
FISHY	5	5	3	5	5	4	4.5	<i>0.84</i>
TEXTURE	4	5	3	5	4	3	4.0	<i>0.89</i>
OVERALL	4	5	3	5	5	4	4.3	<i>0.82</i>
F1	Crabstick containing 1% pollock oil							
FISHY	5	5	3	5	5	5	4.7	<i>0.82</i>
TEXTURE	4	5	3	5	4	3	4.0	<i>0.89</i>
OVERALL	4	5	3	5	5	5	4.5	<i>0.84</i>
F3	Crabstick containing 3% pollock oil							
FISHY	5	5	3	5	5	5	4.7	<i>0.82</i>
TEXTURE	4	5	3	5	4	4	4.2	<i>0.75</i>
OVERALL	5	5	3	5	5	4	4.5	<i>0.84</i>

Table 1 – Sensory evaluation results of three crabstick samples

VI. Conclusion

Refined fish oil from Alaska pollock performed well in the crabstick formula demonstrating no affect the texture and color. In fact the sensory panel revealed no negative fish odor at 3% level. Without exhibiting any negative signs of sensory and texture quality, this pollock oil can be successfully used for healthy nutrition as a source for omega-3 oil.

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For further questions, contact Prof. Jae Park (OSU Surimi School) at surimiman1@yahoo.com.

Surimi Crabstick Sensory Ballot

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Directions: Evaluate the sample. Circle the number that corresponds to your degree of accepting/objecting the sample.

Fishy note/off flavor

1	2	3	4	5
Objectionable		Slightly Acceptable		Acceptable

Texture

1	2	3	4	5
MushySoft		Moderate		Firm/Hard

Overall Liking

1	2	3	4	5
Objectionable		Slightly Acceptable		Acceptable