

Consumer liking of ready-to-eat meals enriched with omega-3

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Table 1. Type of meals produced with and without omega-3 oil

Name	Meal
WS	Fish in white sauce
FC	Fish cakes
Cu	Fish in curry
Br	Fish with broccoli
VC	Vegetable cakes
LS	Fish in lobster sauce

Table 2. Average liking (scale 1-9) of meals with (+) and without (-) omega 3 in week 1 and week 4.

Group	WS	FC	Cu	Br	VC ¹	LS ^{1,2}
+ week 1	7,3	6,9	7,2	7,0	7,2	7,6
- week 1	7,9	7,3	6,7	7,7	7,8	6,7
+ week 4	6,8	7,1	6,6	6,7	6,7	6,1
- week 4	7,8	7,2	6,2	7,7	7,1	5,9

¹ Significantly ($p < 0,05$) different liking of dish without omega in week 1 and 4

² Significantly ($p < 0,05$) different liking of dish with omega in week 1 and 4

Table 3. Correlation (r) between interest to buy the product and parameters asked during consumption of enriched (+) and conventional (-) meals

Parameter	VS+	Br+	VS-	Br-
Liking	0,85	0,76	0,61	0,69
Taste	0,80	0,68	0,73	0,78
Bored	0,82	0,75	0,64	0,76
Again in 1 week	0,75	0,75	0,56	0,78
Again in 2 weeks	0,86	0,88	0,66	0,83
Again in 1 month	0,89	0,94	0,77	0,83

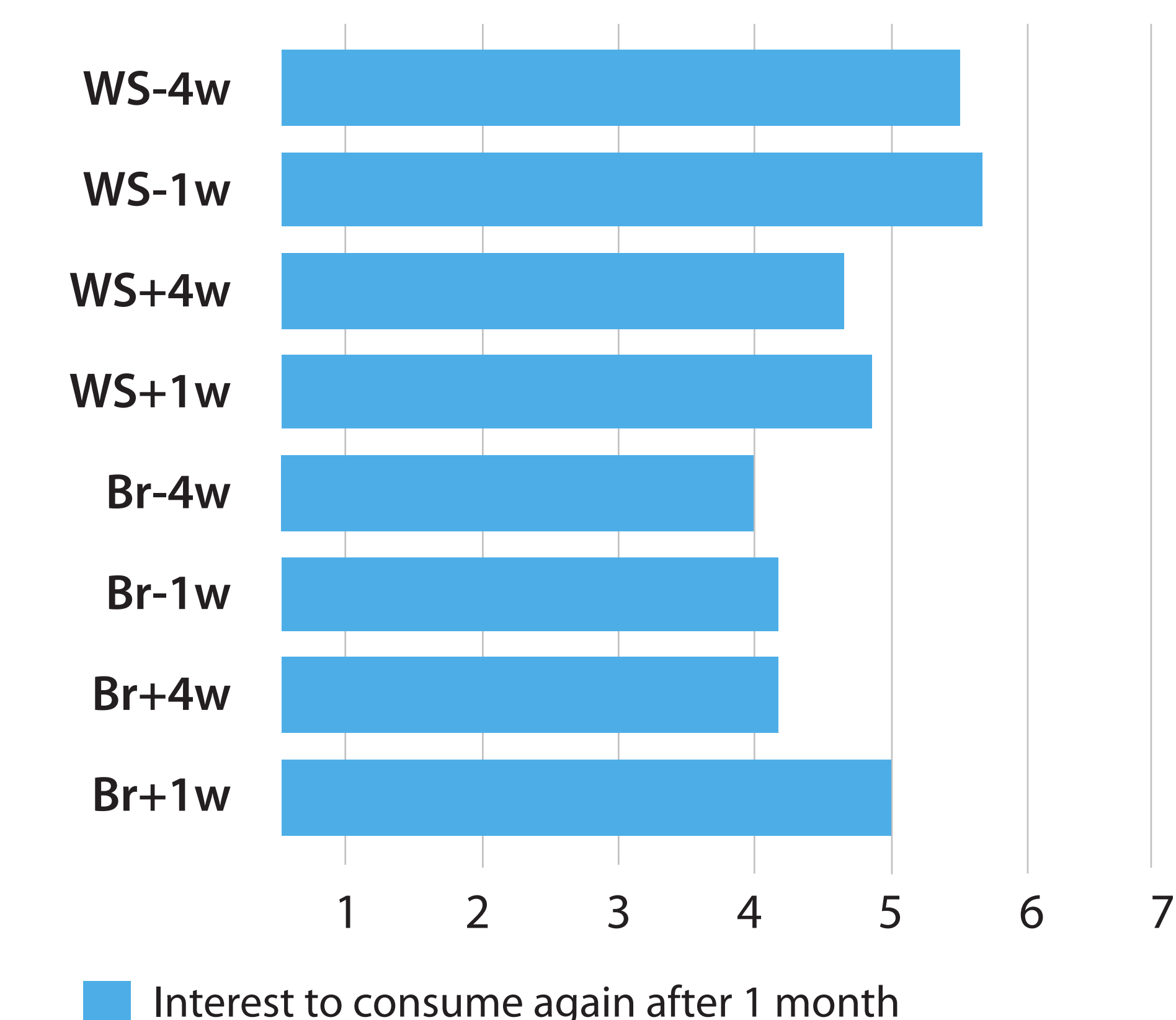


Figure 1. Interest in repeated consumption of two of the six types of meals with (+) and without (-) omega-3 in week 1 (1w) and week 4 (4w) (1 = not at all, 7 = very much)

Introduction

Functional foods can provide nutrition or health benefits beyond basic nutrition. Consumers increasingly search for food products with known bioactivity achieved either by natural or by added ingredients as means to improve their health or prevent diseases. The positive health effects of omega-3 fatty acids are well known and various research have shown protective effects e.g. against cardiovascular diseases. Using such bioactive ingredients in ready to eat meals can therefore be beneficial for the consumers. However, consumers are not willing to sacrifice taste to realise the nutritional benefits.

The aim of the study was to study consumer experience and liking of six ready to eat meals enriched with omega-3 oil in comparison to conventional meals during repeated consumption over four weeks.

Materials and methods

Products. The product development and production of meals was done in co-operation with a producer of omega-3 oil and a producer of ready-to-heat meals (Table 1). The meals were different in ingredient composition, flavor complexity and intensity and texture.

Sensory evaluation. The products were evaluated by 10 trained panelists using descriptive analysis. Samples were coded with 3 random digits and evaluated in duplicate.

Consumer study. Participants (N = 99, age ≥ 50 years) received the six meals every week over a four week period for home consumption. Of the 77 completing the survey, 50 subjects received regular meals and 27 subjects comparable meals enriched with omega-3 oil. Prior to the study, the subjects answered a questionnaire about fish consumption, purchase habits, intake of supplements and use of product information. In the first and fourth week the participants answered various questions about liking on a 9-point likert scale, quantity consumed, satiety and intention to buy.



Results

The six meals were different in ingredient composition, flavor complexity and intensity and texture. Omega-3 fatty acids are prone to oxidation which can have a negative impact on the sensory quality of foods, not the least foods that are heated before consumption, as increased temperature may facilitate oxidation. The results from the sensory evaluation showed some odour and flavor related to the oil enrichment of the Br+ and FC+, but not the other four omega 3 enriched meals (data not shown). Sensory characteristics related to oxidation such as rancid or cold storage odour and flavour were not detected in the meals.

Generally, both the enriched and conventional meals were well liked (table 2). The liking of the meals was not reduced with repeated consumption except for VC and LS where liking was lower after four weeks of consumption. However, other studies have shown decrease in liking with repeated consumption (Zandstra, De Graaf, Mela, et al., 2000; Zandstra, de Graaf, & van Trijp, 2000; Zandstra et al., 2004).

Figure 1 shows interest in consuming two of the enriched and conventional meals again in near future after one and four weeks of consumption. Overall, the interest of consuming this type of meals again (after 1 month) was similar for enriched and conventional meals, but the results differed for the different types of meals (Figure 1). The interest was in some cases significantly lower when the participants had consumed the meals four weeks in a row.

Interest to buy the product was very correlated with overall liking, taste and interest in consuming the product again (Table 3).

The results indicated that enrichment with omega-3 is a realistic option, but the enrichment is more appropriate in certain meals, depending on other ingredients in the recipe.

The results are being used as the basis for the EU FP7 SME project EnRichMar (enrichmar.eu) with the main goal of increasing the value of convenience food by enriching seafood, cereal and dairy products with bioactive compounds; powder of fish oil and seaweed extracts originating from underutilized marine based raw materials with confirmed bioavailability.

References

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