

## Instant noodles with high protein level and source of prebiotic fiber

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### Abstract

Instant noodles are elaborated with wheat flour and submitted to cooking in steam and then dehydrated by frying. The aim of this study was to evaluate the replacement of wheat flour by soy protein hydrolyzate (0 to 20g/100g) and fructooligosaccharides (0 to 10g/100g) in instant noodles through a central composite design. The dependent variables analyzed were the fat absorption and instrumental color ( $L^*a^*b^*$ ) after frying and the firmness, weigh gain, solid loss and fat loss after rehydration. The results showed that it is possible to incorporate 10g/100g of soy protein hydrolyzate and 5g/100g of fructooligosaccharides, resulting in a final product with a statistical desirability of 0.682.

*Key words: fructooligosaccharides, soy protein, desirability.*

### Introduction

The dilution of strong wheat flour (WF) for the production of instant noodles (IN) is needed in order to obtain an end product with high quality. This goal can be reached by the addition of ingredients which health benefits, such as proteins and prebiotic fibers. The aim of this work was to elaborate IN (by frying) with partial replacement of WF by soy protein hydrolyzate (SPH) and fructooligosaccharides (FOS) through a central composite design with 2 independent variables, where:  $x_1 = \text{SPH}$  (0 to 20g/100g) e  $x_2 = \text{FOS}$  (0 to 10g/100g). A sample with only WF was used as a standard-STD. The dependent variables related to the process after frying (fat absorption-FA and instrumental color –  $L^*a^*b^*$ ) and for the technological characteristics after rehydration (firmness, weigh gain-WG, solid loss-SL, fat loss-FL), was considered significant when  $F_{\text{calc}} > F_{\text{tab}}$ ,  $R^2 \geq 0.80$  and  $P \leq 0.10$ .

### Results and Discussion

The FA was not influenced by the use of SPH and FOS, with values between 19.86 and 24.10%, similar to STD (20.79%). The instrumental color ( $L^*=51.02$  to 63.66,  $a^*=4.24$  to 12.92 and  $b^*=22.23$  to 31.14) was statistically affected, where  $L^*$  was greater with higher levels of FOS and SPH up to 10%, and  $a^*$  and  $b^*$  were greater with higher levels of SPH and lower levels of FOS. The samples obtained in the trials showed a greater tendency to yellowness as the STD ( $L^*=60.74$ ,  $a^*=3.66$ ,  $b^*=20.53$ ). Thus, the  $\Delta E$  presented values between 3.39 and 16.86, who's the difference in color was higher with the increase in SPH and the decrease in FOS, probably due the SPH color (more yellowness as WF) and the *Maillard* reaction over the frying

process. The WG showed values between 271 to 311%, with some values above the STD (294%), when used the higher levels of FOS and SPH near to the central point (10%). The SL was lower when used SPH and FOS concentration near to the central point, with values similar to STD (12.22%). Outside this area, the SL reached values up to 17.54%. The firmness was also influenced by the use of SPH and FOS, with values between 0.874 and 1.245N. The lower levels of SPH and FOS resulted in firmness for the trials similar to the STD (1.182N). The FL was higher (8.09 to 31.01%) with the increase in the levels of SPH and FOS, reaching values above the STD (20.01%). When comparing trials values with the STD, can be verified through the statistic method used, with a desirability of 0.682, that the used of 10% SPH and 5% FOS) can be obtained IN with 1.07N firmness, 299% WG, 12.03% SL, and 19.22% FL.

### Conclusions

This study showed that it is feasible the addition of ingredients with health benefits, such as SPH and FOS, to obtain IN, whose the main difference was the higher intense yellow hue produced by these ingredients.

### Acknowledgement

The authors are grateful to CNPq, Capes, for providing the scholarships, and to Moinho Paulista and HT Nutri, for providing the wheat flour and the soy protein hydrolyzate, respectively.

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