

Leiber NuTaste® - increasing attractability and palatability of shrimp feeds

Shrimp depend on chemosensory systems to identify, locate and ingest feed. Water-soluble components leaching from the administered feed are therefore crucial to activate the shrimp's chemosensory systems, and thus facilitate feed location and ingestion. This experiment compared the effects of selected brewers' yeast extracts on attractability and palatability in whiteleg shrimp (*Litopenaeus vannamei*). It was hypothesized that these products supplemented to a basal diet contain specific water-soluble components that strongly activate the chemosensory system, and consequently increase the attractability (feed identification and location) and/or the palatability of the diet (feed ingestion). Yeast extracts however differ in composition and water solubility/leaching properties due to differing manufacturing processes.

Experimental design

The test was conducted with shrimp (*L. vannamei*) of 10-15g body weight. Following acclimatization, 100 shrimp were stocked in the experimental, round 7m² tank containing saltwater (22ppt) and remained there until the end of the experiment. Water temperature was constant at 26°C ± 1°C. Biofloc technology was used to control water quality. Water temperature, oxygen, salinity and pH were recorded daily, total ammonia and nitrite weekly. Adequate aeration was provided, a weekly partial water exchange ensured sufficient visibility to observe the shrimp.

The test diets were pelleted (pellet size 2mm). A nutritionally balanced and commercially relevant basal diet fulfilling the nutritional requirements of shrimp was prepared as control diet (Table 1; 35.5% protein, 6.1% lipids, 2.1% fiber, 8.4% ash). The following brewers' yeast extracts were blended into the feed mix prior to pelleting:

Diet C:	Control
Diet X:	Control + 0.2% NuTaste® function XSR
Diet S:	Control + 1.0% NuTaste® profile S
Diet XS:	Control + 0.2% NuTaste® function XSR + 0.2% NuTaste® profile S
Diet B:	Control + 1.0% NuTaste® profile B

Table 1: Composition of the basal diet

Ingredient	Inclusion rate (%)
Wheat flour	37.5
Soybean meal	21.0
Chilean fish meal 65% CP	10.0
Corn gluten	8.0
Wheat Gluten	5.0
Canola	5.0
Haemoglobin powder	4.0
Mono CaP	3.0
Soybean lecithin	2.0
Fish oil	2.0
Vitamin premix	1.0
Mineral premix	1.0
NaCl	0.5

All diets were compared against each other simultaneously with free choice of the animals for diet selection. Feeding trays with round plastic squares underneath were placed on the outer perimeter of the tank in equal distance to each other. It was ensured that diets were randomly allocated to the trays and not placed on the same trays in consecutive feedings in order to avoid potential artefacts by feed/tray location. Aeration was stopped 5 minutes before feeding. 5g of each diet were placed in the feeding trays.



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To assess attractability of the diets the number of shrimp were counted after 5, 15 and 30 minutes, shrimp being in the tray and on the area of the plastic square were considered as feeding on the respective diet. After, the remaining feed was collected in order to calculate feed intake as a measure of palatability. This test was repeated 40 times in total with feedings scheduled in the morning and evening.

Increase of attractability by 37% and palatability by 38%

Brewers' yeast extracts are rich in native nutrients such as proteins, peptides, (free) amino acids and nucleotides. In addition to nutritive and metabolic functions they also have significant palatability enhancing effects. The differing production processes however influence the properties and functionalities of the individual products (mainly by contents and ratio of above mentioned nutrients to each other). Hence, each product of the **NuTaste® profile orange** is characterized by a unique taste profile, whereas the **NuTaste® function XSR** has a neutral/no own taste profile, but a strong umami and taste-boosting effect.

On average all products tested attracted more shrimp than the control diet. Supplementation of 1% **NuTaste® profile S** however induced by far the most prominent effect (37% increase over control; Fig. 2 a). It also led to a continuously rising attractability over time (Fig. 2 b), indicating that its leaching components have the highest attracting effect for shrimp. In order to avoid feed waste and water spoilage it is crucial in modern shrimp farming that animals recognize and locate their feed within a short time, especially in cloudy pond environments. Present findings clearly demonstrate the potent impact of **NuTaste® profile S** in this regard.

Also in terms of palatability, i.e. the actual feed intake of shrimp, all products tested had a very beneficial effect (Fig. 3). The highest feed intake was observed with the combination of each 0.2% **NuTaste® profile S** and **NuTaste® function XSR** (38% increase over control), closely followed by 1% **NuTaste® profile S** alone. The reduced 0.2% dosage of **NuTaste® profile S** when combined with **NuTaste® function XSR** illustrates the potent taste-boosting effect of **NuTaste® function XSR**. The relative difference of the tested products over the control diet is indicated above the bars in Fig. 3.

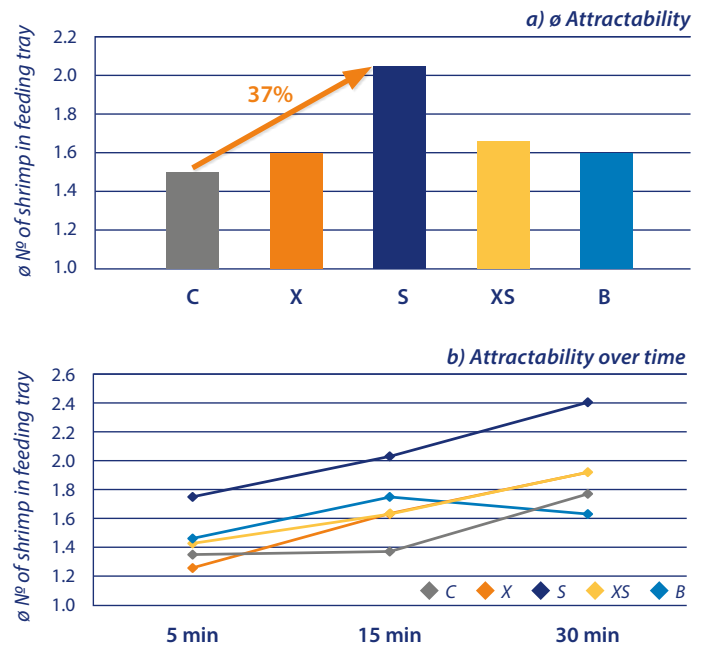


Figure 2: Effect of yeast extract supplemented diets on attractability for shrimp. a) Average number of shrimp over 40 feedings and over all time points. b) Average number of shrimp over 40 feedings per time point.

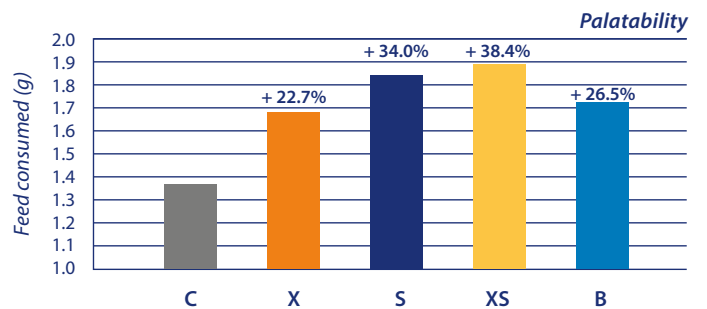


Figure 3: Effect of yeast extracts on average feed intake (g) per feeding. Relative difference of tested products over the control diet is indicated above the bars.

Conclusions:



NuTaste® profile S attracted 37% more shrimp to the feed



NuTaste® profile S also revealed an increasing attractability over time



Combining NuTaste® profile S and NuTaste® function XSR at reduced dosages led to 38% higher feed intake

