

PALATABILITY ASSESSMENT OF A GELATIN BASED DIET THROUGH THE USE OF FIRST BITE AND TOTAL VOLUME MEASUREMENTS IN ATLANTIC BOTTLENOSE DOLPHINS (*TURSIOPS TRUNCATUS*)

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ABSTRACT

It is well established that a variety of organic and inorganic compounds, including soluble sugars, polysaccharides, amino acids and potential toxins are all subject to nutritional chemoreception, and as consequence may induce behavior in biologic organisms (Lindemann, 2001). These behaviors may be quite different even among closely related species and can be specific to individual nutritional requirements. The exact stimulus for feed intake in marine mammals is only vaguely understood and most likely includes multiple sensory events. Our research has focused on the taste sensory systems of the Atlantic Bottlenose Dolphin, *Tursiops truncatus*.

The typical taste categories for vertebrates are salt, sweet, acid (sour), bitter, and umami. When assessed independently, each taste category is associated with a specific protein receptor typically located in the epithelium of the oral cavity. Salt taste for example, is coupled with an amiloride-sensitive epithelial sodium channel, which serves as a guide for the physiological integration of salt and other various minerals (Lindemann, 2001; Chandrashekar et al., 2006). In contrast, umami has been reported to act as a dominant taste parameter specific to foods containing the amino acid L-glutamate and is believed to aid in the regulation of peptide intake (Lindemann, 2001). Utilizing human taste thresholds specific to molar concentration as a starting point (Hladik, 2006), each of these parameters were assessed at multiple times greater than baseline using gelatin as a carrier, with exact quantities presented four times per feeding event to n=5 healthy adult Atlantic Bottlenose Dolphins. Each concentration specific to each taste parameter was fed to each animal at five day increments with total consumption recorded for each feeding event. The quantity of feed refusals per feeding event was also determined.

Palatability tests used in this research include both First Bite and Total Volume methodologies. First Bite represents the animal's first impression of a particular food. Total Volume determines the ability of a dietary component to maintain an animal's interest. Since novel diets can fluctuate in their first bite results this analytical technique is suggested to give a more accurate representation of an animal's like or dislike of a particular feed ingredient. In order to test all five taste categories, the following substances were used to represent each classification: sodium chloride, sucrose, citric acid, quinine sulfate, and L-glutamate. Research focused on the determination of chemoreceptive events that aid the dolphin in prey selection could allow for the development of food supplements that facilitate the feeding of sick, geriatric or inappetent individuals maintained in captivity.

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