ABSTRACT
SPECIALITY AN1MAL FEED MANUFACTURING:
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For purposes of this talk, I will consider " specialty" feeds to be any animal diets other than the traditional agricultural (swine, poultry, cattle) or pet food (dog or cat) markets. This encompasses a broad range of terrestrial and aquatic animals, including birds, mammals, fish, crustaceans, and insects-each species with its own particular nutritional requirements.

We begin the development of any animal diet by trying to define these requirements. Some species have been thoroughly studied and their nutritional needs are well documented. For lesser known animals, however, this information is frequently non-existent or very limited. In these cases we must start by looking at the requirements of similar species, and the composition of the animal's natural diet. From this information we extrapolate, using our best scientific judgment and experience, to determine the animal's most likely basic requirements.

Once these basic requirements are established, the nutritionist can begin to formulate the proper diet. Since we are trying to match a finished feed profile of more than 20 nutrients (protein, fat, fiber, ash, water, energy , several amino acids, minerals, and vitamins), and each ingredient has its own "fingerprint" of these same nutrients, balancing a formula of a dozen or more ingredients becomes a dauntingly complex task. Fortunately, today's nutritionist can rely upon computerized feed formulation programs which automatically calculate the best way to blend the available ingredients into a feed that contains the desired levels of all nutrients as specified by the nutritionist.

With the basic composition of the feed established on paper, we must turn our attention to the physical presentation of the feed. Eating habits and environment dictate the physical characteristics required. Shrimp need a water stable, sinking pellet due to their slow, nibbling style of eating, while stability is not important to fish like trout, which gulp their food quickly. Land animals have a variety of requirements of their own, including feed size, texture, shape, taste, and smell. While the formulation of the feed can have an effect, it is left largely to the manufacturing process to control most of these factors.

Pelleting and extrusion are two of the most commonly used manufacturing techniques for specialty feeds extrusion is a higher temperature, moisture, and pressure process, which counts on the cooking and gelatinization of starches to form feed into the desired shape. Pelleting marks at lower temperatures and moisture, and relies more on compaction to form feed into pellets, although of starches is still an important factor. Typically, extrusion is the choice for feeds which need to float in water, or which must have special shape and texture. Pelleting is normally chosen for aquatic feeds and for overall economy. Either process increases the digestibility of the raw ingredient mix, and can be an effective manufacturing method, depending on the desired characteristics

As specialty feed manufacturers, it is our job to understand the final needs of the animal, then choose the formulation and manufacturing process which best meet these needs.