

Fish Feed Technology

PhD. student

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- 1- Introduction: Chemical composition and ingredients.
- 2- Feed categories 2

1- Pellet Binders

commonly used binders include bentonite, lignin sulfonate, and hemicellulose extract, none of which provides nutrients to the diet.

1- Bentonite is a naturally occurring clay consisting mainly of aluminum silicate has, Both sodium and calcium bentonite may be added to dry, compressed fish feeds at no more than 2% to act as a binding agent and also as a lubricant, increasing pellet mill production rates and pellet mill die life . Some bentonites also bind aflatoxin, carrying it through the gut without harming the fish

Pellet Binders

2- Lignin sulfonate is a product of the wood pulping industry. It aids in pellet binding, reduces fines, permits the addition of more steam during the manufacture of compressed pellets.

3- Hemicellulose extract is by-product of pressed wood manufacture. It is less commonly used than lignin sulfonate.

A- Nutritive binders include

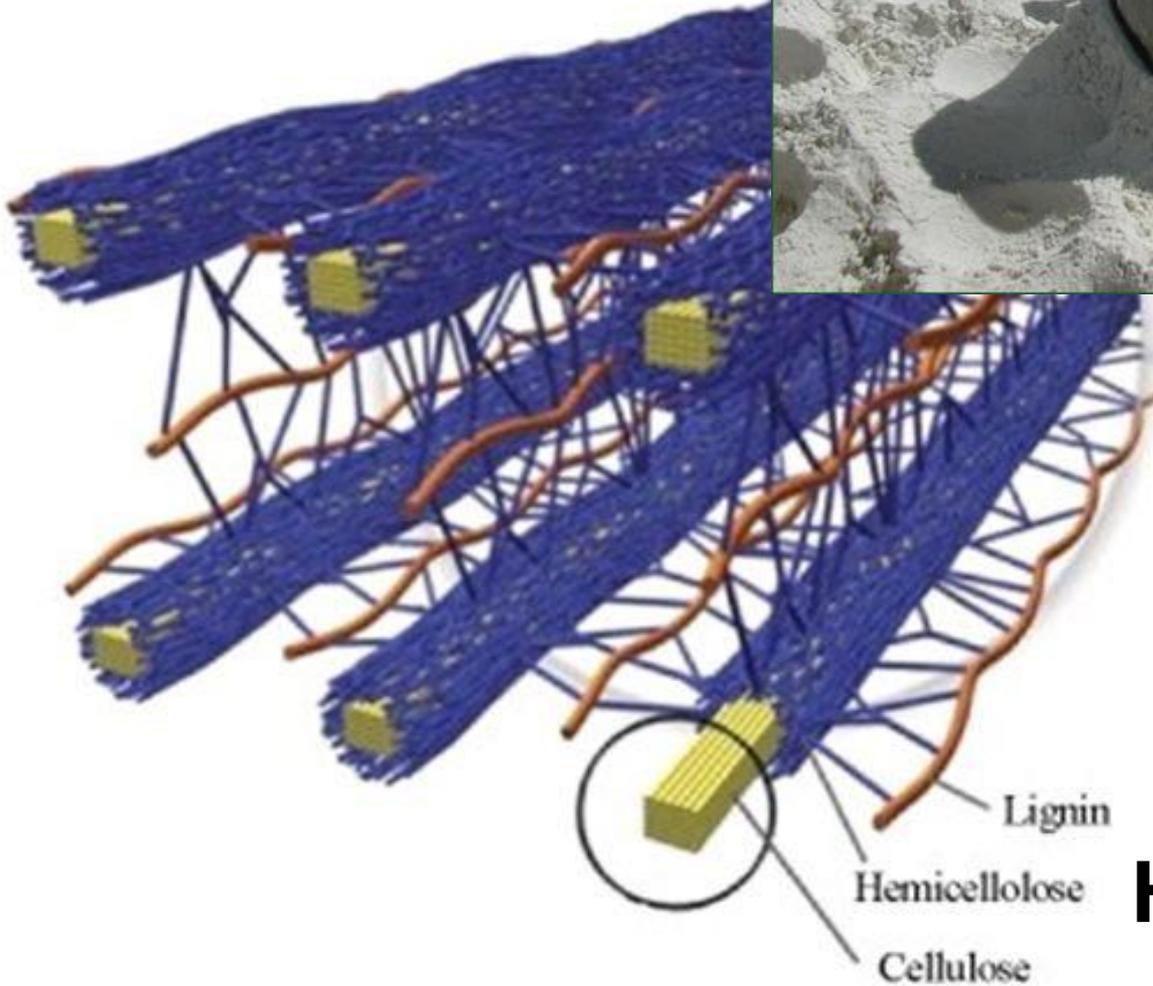
oat groats, vital wheat gluten, finely milled wheat bran, cottonseed meal, gelatin, and pregelatinized starches.

B- Nonnutritive binders include,

carboxymethylcellulose, alginates, agar, and various gums.

Collagen have been evaluated as binders but are not commonly used .

bentonite



Lignin
Hemicellulose

2- Carotenoid Supplements

A great deal has been written about the addition of carotenoid pigments to fish diets to color flesh and/or eggs . Over 300 pigments are found in various plants and animals, with xanthophylls and carotenoids being the most important classes of carotenoid pigments that add color to fish. For the most part, xanthophylls are found in plants, such as corn, and carotenoid pigments in crustaceans and fish.

3-Therapeutants and Nonspecific Immune Stimulants

Therapeutants are added to fish feeds to **treat, cure, mitigate, or prevent disease. A number of drugs are effective against fish diseases, although in the **United States**, the **only** ones approved for use with fish feed are **sulfamethazine, terramycin (oxytetracycline), and furox**.**

In Europe, oxalinic acid is used in feeds as an antimicrobial drug. As with livestock feeds, medicated fish feeds have specific labeling requirements, including a warning to **withdraw for a proscribed length of time before the fish are marketed.**

3-Therapeutants and Nonspecific Immune Stimulants

Nonspecific immune stimulants, sometimes referred to as nutraceuticals, are another story. They are unregulated feed additives that are intended to enhance the health and well-being of farm and companion animals.

In fish, the focus on nutraceuticals lies in making the fish less susceptible to infectious disease.

The most common supplements are β -glucans, which are fragments of the cell walls of yeast and fungi.

4- Probiotics

Probiotics are live, microbial feed supplements that are thought to stimulate animal and, possibly, fish growth by affecting the microbial flora population in the gut of the animal.

Probiotics may be a single species of microorganisms or a mixture of species. The concept behind their use is that the species of microorganisms present in the supplement colonizes the gut and outcompetes detrimental species of microorganisms, thus limiting their numbers and allowing the animal (fish) to avoid wasting metabolic energy fighting the effects of detrimental microorganisms. Obviously, probiotics must be added to feeds after pelleting.

Prebiotics

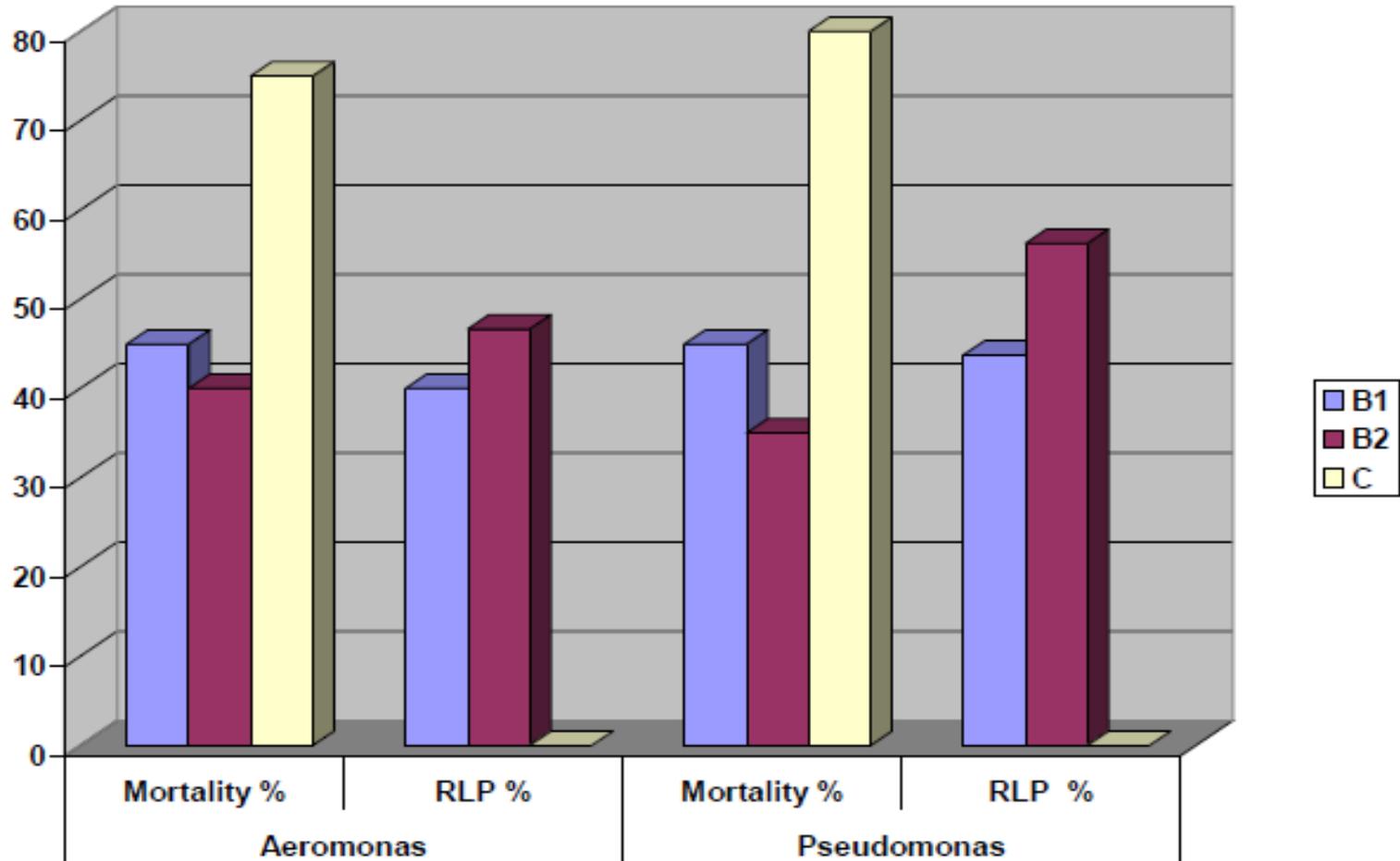
Definition of a prebiotic

Prebiotics are non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon.

There are 3 criteria to be classified as a prebiotic:

- Resistance to gastric acidity, hydrolysis by digestive enzymes and gastrointestinal absorption
- Fermentation by intestinal flora
- Selective stimulation of the growth and/or the activity of intestinal bacteria associated with health

Probiotics



Graph 1. Mortality and relative Level of protection (RLP) among experimented Nile tilapia after challenges with *Aeromonas hydrophila* and *Pseudomonas fluorescens*.

- يوجد اتجاه لاستخدام كلا من prebiotics مع probiotics بطريقة متوازنة والغذاء الذي يحتوي على كلاهما يسمى Synbiotics

General concept

Probiotics

Living bacteria
in the diet

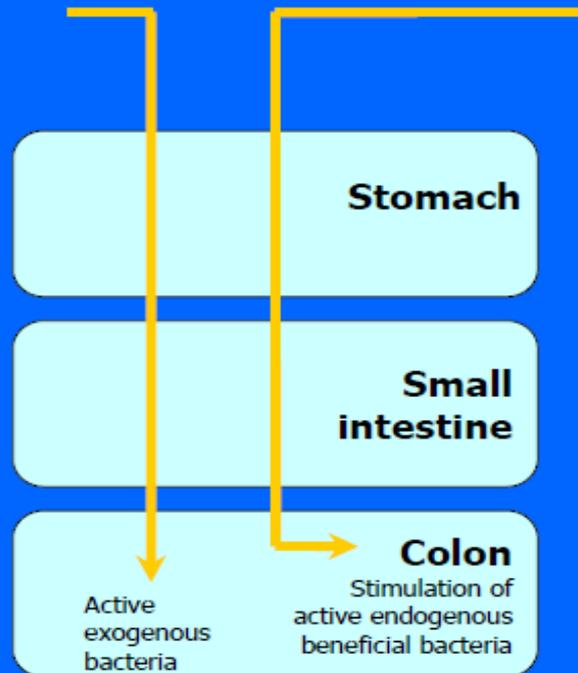


% survival?



Adhesion?
Activity?

Synbiotics?



Prebiotics

Oligofructose or
inulin in the diet



Total transfer to
the colon