

# POSTBIOTICS AND THEIR APPLICATIONS IN AQUACULTURE

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Probiotics in the intestine produce "Postbiotics", which are by-products of the fermentation process. In other words, postbiotics are produced as a result of probiotics feeding on prebiotics (Fig 1). They are essentially probiotic "waste."

Normally, waste products do not appear to be very useful to us. Surprisingly, they are responsible for a number of important health-promoting functions in human and animal health. Organic acids, bacteriocins, carbonic substances and enzymes are examples of postbiotics. They are produced naturally by the existence of microorganisms in our intestines, but they can also be added directly through various therapeutic processes. Most of the positive effects that are attributed to probiotics are because of postbiotics, according to latest report.

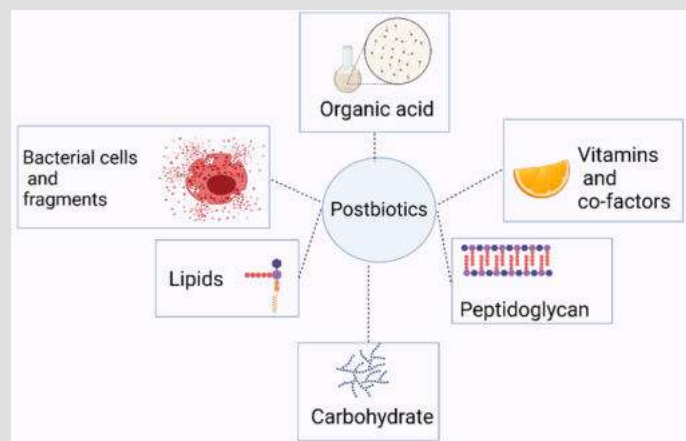


Fig1. Overview of postbiotics that could have health promoting effects via different metabolic pathways

## POSTBIOTICS IN AQUACULTURE

As aquaculture is evolving at a rapid pace, infectious disease outbreaks are also becoming more common. Antibiotic treatment leads to the development of antibiotic-resistant pathogens, necessitating immediate search for other treatment options. Among the various proposed alternatives, postbiotic was one of the strategies to be investigated. It may be useful in the aquaculture industry because of its benefits in the agriculture industry.

## ADVANTAGES OF POSTBIOTICS

Postbiotics have several advantages over probiotics and prebiotics, including availability in their pure form, ease of production and storage, the availability of a production process for industrial-scale-up, a specific mechanism of action, better accessibility of Microbes Associated Molecular Pattern (MAMP) during recognition and interaction with Pattern Recognition Receptors (PRR), and a greater likelihood of eliciting only targeted responses via specific ligand-receptor interactions.

Probiotic cultures are generally produced at the industrial scale using conventional batch fermentation with suspended cells. Similarly, Postbiotics are also produced. Hence it can be cost effective to produce them, just like the production of Probiotics, on an industrial scale.

Advantages of postbiotics over live probiotics in aquaculture industry Postbiotics can be used over probiotics, due to the easy availability of storage, and can maintain stability in the production process and because certain probiotics might cause adverse reactions. Live probiotics, on the other hand, have been reported to be affected by various host-specific factors in the gastrointestinal tract (GIT), which subsequently activate several bacterial genes for the degradation and production of various nutrients via various metabolic pathways (Fig 2). To address such issues, postbiotic components are likely to be beneficial and promising alternative supplements.

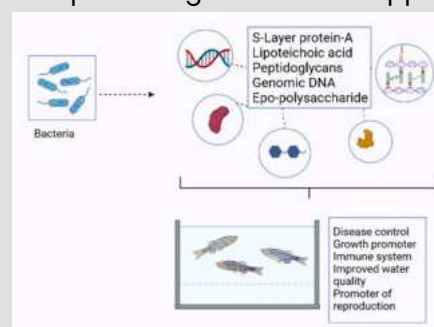


Fig 2. Different types of postbiotics for controlling fish diseases by promoting fish immunity, water quality, reproduction and health.