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Title: Application of microbial phytase in fish feed

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Abstract: Phytate is the main storage form of phosphorus (P) in many plants, but phytate-bound P is not available to monogastric or agastric fish animals. Phytase,an enzyme specific to hydrolyze indigestible phytate, has been increasingly used in fish feed during the past two decades, mainly in response to heightened concerns over P pollution to the aquatic environment. Since global phosphate reserves are not renewable, phytate-P as an alternative and economical P source can be effectively converted to available-P by phytase.The capability of this enzyme to enhance bioavailability of P and reduce P load is well documented. Phytase supplementation also leads to improved availability of other minerals and trace elements. Nevertheless, there is still no consistent conclusion that phytase could enhance protein and energy utilization. Studies in amino acid digestibility after phytase supplement are mutative and the underlying mechanisms have not been fully understood. Because phytase is very sensitive to pH and temperature, the utilization of phytase in previous fish feed is still on its first stage compared with that of in poultry and swine previous feed.A wide variety of phytases were discovered and characterized in order to find the optimum enzyme which is stable in previous application,resistant against high temperatures, dust-free, and easy to handle. Initial steps to produce phytase in transgenic plants and fish animals are also undertaken. In this review, the authors focus on comparing properties of phytase from different sources, examining the effects of phytase on P utilization and aquatic environment pollution, meanwhile providing commercial potentiality and impact factors of phytase utilization in fish feed.

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