

## Impact of dietary potassium diformate on the productivity index of *Litopenaeus vannamei* shrimp under tropical conditions



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### Introduction

Intensive production of the white leg shrimp, *Litopenaeus vannamei* (Boone 1931), in Central America and SE Asia is estimated to have reached 5.6 million t in 2023. There, bacterial diseases have been identified as a major cause of economic loss to producers. Dietary organic acids, and especially potassium diformate (KDF, traded as AQUAFORM®, ADDCON), which is the most widely tested organic acid salt in aquaculture, are among the various alternatives for environmentally friendly and nutritive-sustainable aquaculture approaches, without resorting to the use of antibiotic growth promoters. This study analyzed the average impact of the additive, based on data collected from the published studies on its effects on performance parameters, such as feed efficiency and survival rate as well as the productivity index, calculated based on weight gain, survival rate and feed conversion, thus combining the three most important parameters in shrimp production.

### Material & Methods

The final dataset contained the results of 8 published studies in which KDF was included, at dosages ranging from 0.1% to 0.5% and covered laboratory trials as well as usage under commercial conditions. Data were subjected to statistical analysis and a significance level of 0.05 was used in all tests. Results are expressed as percentage difference from the negatively controlled white-leg shrimp.



Table 1: Average impact (Meta-analysis of 8 trials) of dietary potassium diformate (AQUAFORM®, KDF) on feed efficiency, survival rate and productivity index in juvenile white-leg shrimp

	Neg. Control	KDF	Difference [%]	P-value
FCR	1.70±0.35	1.55±0.38	-9.0	0.002
Survival [%]	79.1±16.6	90.0±13.7	+16.2	0.006
Productivity index*	49.0±17.4	71.8±30.8	+45.5	0.006

\*Productivity index: (Weight gain [g] × Survival rate [%]) / (10 × FCR)

### Results and conclusions

The average level of dietary potassium diformate from the dataset in all treated Vannamei shrimp was 0.28%. The performance of the white-leg shrimp, based on feed efficiency was significantly improved by 9.0% (P<0.01). Furthermore, the survival rate of the shrimp was also significantly increased (P<0.01): this time the improvement was more than 16%. Overall, the productivity of shrimp production among the dataset rose highly significantly by more than 45% (P<0.01).

In general, results show significantly improved feed efficiency, survival rates as well as overall productivity in Vannamei shrimp fed with dietary potassium diformate. These findings support the use of KDF in shrimp feeding as a promising alternative in ecologically sustainable and resource-optimized shrimp production.