



OptiPhos® outperforms Quantum® Blue on pH activity range and speed of phytic acid hydrolysis

Trial description

1 Set-up

- **Location:** DIADEM, Russia
- **Trial period:** March/April 2014

2 Treatments

- OptiPhos® and Quantum® Blue *in vitro* research on pH profile and kinetics.

3 Measured parameters

- **Activity assay:** phytase activity was measured using phytate as substrate in Glycine-HCl buffers at pH 2.0, 2.5, 3.0, 3.5, 4.0 and 4.5 during 10 min. (according to ISO 30024:2009).
- **Kinetics (Michaelis Menten Kinetics):** different parameters for phytase activity were determined in Glycine-HCl buffer at pH levels of 2, 2.5, 3, 3.5, 4 and 4.5 after which Vmax and Kcat were calculated. Vmax represents the maximum speed rate of P release from phytate, at maximum (saturating) substrate concentrations. Kcat is the turnover number, which is the maximum number of substrate (phytate) molecules converted per enzyme molecule per second.

Results

- OptiPhos® shows a much higher activity at different pH levels than Quantum® Blue (Fig. 1) which indicates that OptiPhos® is performing better under more acidic conditions.
- The Kcat value of OptiPhos® is also higher at all pH levels, in particular at lower pH. On average, the Kcat value of OptiPhos® was 893 per sec. vs 645 per sec for Quantum® Blue (+28 %, Fig. 2).
- The Vmax value ($\mu\text{mol P/min per mg enzyme}$) of OptiPhos® was higher at most pH levels, in particular at lower pH. On average over all pH levels, the Vmax value of OptiPhos® was 1045 vs 886 for Quantum® Blue (+15 %, Fig. 3).

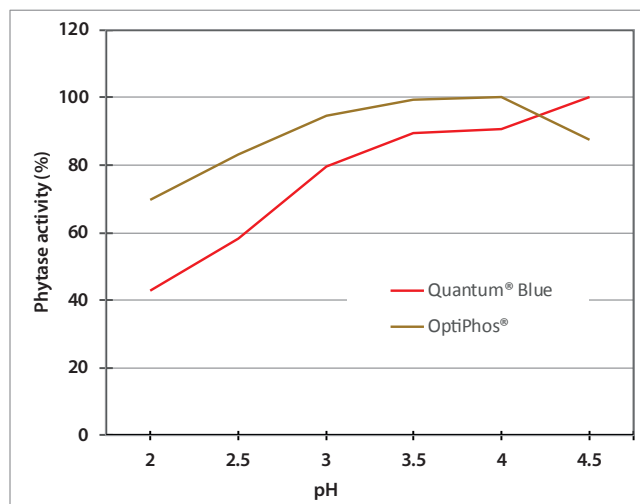


Fig. 1: relative phytase activity at different pH levels after incubation during 10 minutes

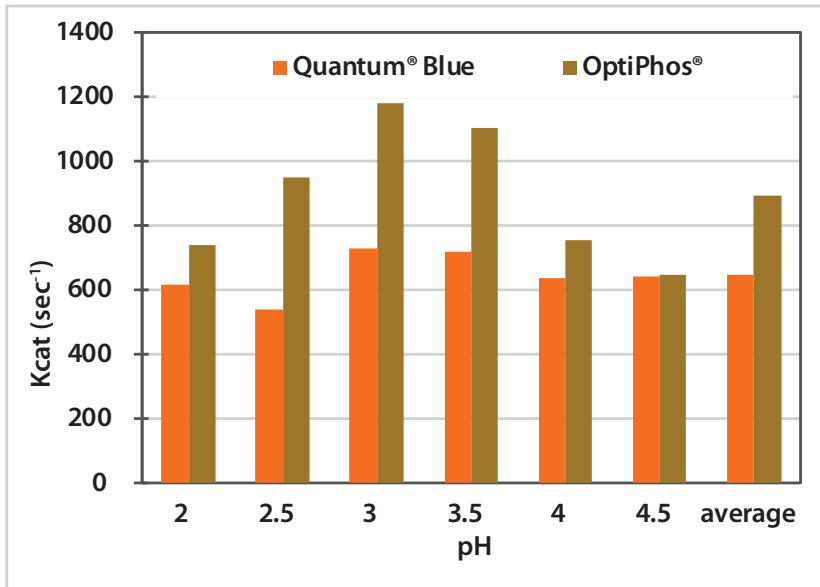


Fig. 2: the Kcat value of OptiPhos® and Quantum® Blue at different pH levels

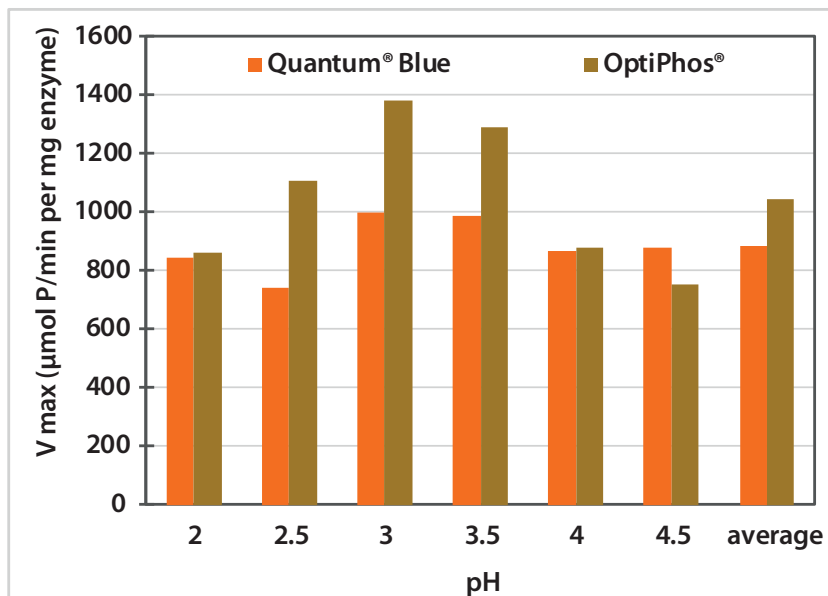


Fig. 3: the Vmax value of OptiPhos® and Quantum® Blue at different pH levels

Conclusions

- OptiPhos® has a much broader pH activity range with high phytase activity than Quantum® Blue.
- OptiPhos® works faster in breaking down phytic acid at in vivo relevant pH levels.