**High-phytate/low-calcium diet is a risk factor for crystal nephropathies, renal phosphate wasting, and bone loss**

**Supplement File 5**. Biochemical and structural properties of mammalin, gut microbial, and bacterial phytases.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Source | Phylum | Class | Optimum pH  | Active site | Crystal structure | Substrate | Effects of Ca2+ | Effects of EDTA | Signal sequences | ER retention signal (KDEL) |
| Mammalian |  | MINPP-1 | 2.0-5.0 | Basic (+) | α/β | Ca2+-free phytate | - | + | Yes | Yes |
| Bacteria  | Anaerobic | Firmicutes | None | None | None | None | None | None | None | None | None |
| Bacteriodetes | HAP | 2.0-5.0 | Basic (+) | α/β | Ca2+-free phytate | - | + | Yes | No |
| βProteobacter | HAP | 2.0-5.0 | Basic (+) | α/β | Ca2+-free phytate | - | + | Yes | No |
| Actinobacteria | HAP | 2.0-5.0 | Basic (+) | α/β | Ca2+-free phytate | - | + | Yes | No |
| Aerobic | Firmicutes | BPP | 5.0-8.0 | Acidic (-) | β-propeller | Ca2+-phytate | + | - | Yes | No |
| Bacteriodetes | BPP | 5.0-8.0 | Acidic (-) | β-propeller | Ca2+-phytate | + | - | Yes | No |
| βProteobacter | BPP | 5.0-8.0 | Acidic (-) | β-propeller | Ca2+-phytate | + | - | Yes | No |
| Actinobacteria | BPP | 5.0-8.0 | Acidic (-) | β-propeller | Ca2+-phytate | + | - | Yes | No |

MINPP1, mammalian inositol polyphosphate phosphatase, HAP, histidine acid phosphatase, BPP, β-propeller phytase