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Significance of phytate in human nutrition, methods of phytic acid/phytate determination and contents of phytic acid and other inositol phosphates in foods

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Phytate, the salt of phytic acid (*myo*-inositol-1,2,3,4,5,6-hexacis dihydrogen phosphate), is one of the most fascinating bioactive compounds and widely distributed in foods made from plant seeds. Due to its unique molecular structure phytic acid shows high affinity to polyvalent cations. Under special dietary conditions phytate interferes in the intestinal absorption of minerals and trace elements which may result in deficiencies of these elements. On the other hand the high metal affinity is also the basis of beneficial properties such as the antioxidative and anticalcification property of phytate and most probable also of its anticancer activity. Thus, phytate shows unique properties with contradictory consequences for humans (Schlemmer, U. *et al.*(2009).*Mol.Nutr.Food Res.*53, S330-375). To determine the phytate/phytic acid contents in foods, various methods have been applied. Most of them, however, are unspecific ones which do not discriminate between phytic acid and other inositol phosphates. Thus, specific analysis of total inositol phosphates present in foods, inclusive their stereo isomers, is indispensable. Problems of the specific determination of inositol phosphates in various foods will be discussed and criteria for a specific, sensitive, reliable and simple determination established. Earlier reviews showed extreme high variation of the phytic acid/phytate contents in the same food which partly are due to the different analytical methods applied. To obtain reliable data on the phytic acid consumption in humans, 200 phytate containing foods were purchased from the market in Karlsruhe (Germany) and analysed for their total inositol phosphates (InsP_2–InsP_6) by a specific and simple HPLC-method (slightly modified to Schlemmer, U.*et al.*(2001). *Arch.Anim.Nutr.55,* 255-280). The results show the first time total inositol phosphates of all relevant foods, determined by only one specific method, and allow to calculate reliably the intake of phytic acid and other inositol phosphates in different population groups.

Keywords: Phytic acid, phytate, analysis, food contents, intake.

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Facts

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› All stakeholders in food and health including scientists, regulators and industry representatives should attend

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