

## **Bio-rational or bio-logical: different concept, different impact**

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“Rational” from Latin ratio, ‘reason’ literally is a synonym to “logical” from Greek logos, ‘reason’, but contrary to the universal sense of ‘reason’ modern parlance tends to restrict the meaning of ‘rational’ to the calculated most efficient way to achieve a goal. In this mind, the term “bio-rational” has been proposed to define bio-agents with specific action against harmful organisms, but limited or no effect on non-target organisms. Recently the interest to commercialize bio-agents as “bio-pesticides” or “bio-fertilizers” has been growing. However, an increasingly stringent legislation in the EU concerning the registration of agents that are regulated under the plant protection or fertilizer law led to a far-reaching loss of products from the market. According to Regulation (EC) No 1107/2009, agents having general or specific action against harmful organisms are “plant protection products”, which may not be registered as fertilizing products. For many bio-agents, such microbial strains, nevertheless, direct mobilization of mineral nutrients, stimulation of root growth, interactions with other helpful microbes, as well as general or specific action against pathogens are among the multifaceted modes of action how they can promote plant growth. A legal restriction to register these agents only as plant protection products would disregard many of their other beneficial traits that could be reasonably used in biological fertilization strategies for sustainable plant nutrition.