

**Plant feed additives as natural alternatives to synthetic antioxidant vitamins in organic livestock***F. Righi<sup>1</sup>, R. Pitino<sup>1</sup>, M. Simoni<sup>1</sup>, C.L. Manuelian<sup>2</sup>, M. De Marchi<sup>2</sup> and E. Tsiplakou<sup>3</sup>*

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The restrictive regulation on synthetic molecules use, the development of organic livestock production and the consumers' demand for more 'natural', 'eco-friendly' and 'sustainable' products is rising the interest for the use of plant feed additives (PFAs) as natural sources of antioxidant in animal nutrition. The PFAs include aromatic plants essential oils, extracts and residues and by-products from plant processing. After a systematic review of the studies comparing PFAs antioxidant effects with synthetic antioxidant vitamins, a total of 46 peer-reviewed articles published in the last 20 years (2000-2020), were discussed. The literature on the use of plant feed additives denotes a general variability of the experimental protocols used to test their activity as antioxidant or in general their impact on animal performance and metabolism. The PFAs have been proven as an effective nutritional tool to counteract animals' oxidative stress with positive impact also on animal productivity and efficiency. The PFAs can partially or completely substitute antioxidant synthetic vitamins (the latter administered at doses between 150 mg/kg and 500 mg/kg) in animal rations, sometimes modifying important physiological functions. In some cases, they express a synergistic effect with the synthetic antioxidants. It is crucial to take in consideration the issues related to the absorption and metabolism of these additives, as well as their interaction with gut microbiota. Some form- and dose-dependent negative effect on growth performances have been observed, so further studies are needed to clarify these side effects for practical application. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774340.

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**Session 51****Theatre 6****Revision of vitamin E recommendations for ruminants in organic agriculture***H. Steinshamn<sup>1</sup> and F. Leiber<sup>2</sup>*

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Vitamin E is essential, and supplementation on top of the native tocopherol contents in feed components is often needed to meet the animal's requirement. The recommended supplementation for ruminants may, however, be overestimated, especially in forage-based feeding systems where grazing or grass-clover silages are the basal feed with low to moderate concentrate levels in the diet (<40% of the DM intake). In such feeding regimes, which are frequent in organic animal husbandry, transfer rates for tocopherol may be higher than assumed in standard literature. We have done a systematic literature review, and critically evaluated the relationship between basal feed type and quality, forage to concentrate ratio, stage in animal production cycle, indicators of animal health and animal vitamin E status. Based on this information, we reassess dietary vitamin E requirements for cattle in organic systems. Subsequently, the revised recommendations are related to typical diet compositions of organically managed ruminants across Europe, and necessary additive supplementation levels will be estimated. The results will be presented as the basis for specific recommendations for the vitamin E supply in organic forage-based cattle husbandry. Funded by EU H2020 No 773431 – RELACS.