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Effect of extruded linseed, vitamin E and polyphenols pig dietary supplementation on microbial growth of meat during refrigerated storage / Scutaru, Corina; Belmonte, ANNA MARIA; Mezzetti, Francesco; Gigliano, Silvia; Bellelli, Massimo; Fava, Patrizia; LO FIEGO, Domenico Pietro. - In: ITALIAN JOURNAL OF ANIMAL SCIENCE. - ISSN 1828-051X. - 16:Supplement 1(2017), pp. 2011-2011. (Intervento presentato al convegno ASPA 22nd CONGRESS tenutosi a Perugia nel 13-16 june 2017).

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12/10/2024 06:44

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Effect of extruded linseed, vitamin E and polyphenols pig dietary supplementation on microbial growth of meat during refrigerated storage

Journal:	*Italian Journal of Animal Science*
Manuscript ID	TJAS-2017-0415.R2
Manuscript Type:	Abstract Submission
Date Submitted by the Author:	n/a
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Abstract:

Meat is an important source of essential nutrients for human, it is a source of lipids, protein and vitamins but it is a highly perishable product. The shelf-life of meat depends on several factors such as storage condition, processing, packaging and distribution that can cause evident spoilage. Microbial contamination is influenced by the condition of animals prior to slaughter, slaughterhouse practices, extent of handling and subsequent storage. Temperature is the main factor used to decrease growth of spoilage bacteria on meat. The aim of this work was to study the effect of vitamin E (VE) and polyphenols (P) dietary supplementation on microbial growth of pork coming from pig fed with 5% extruded linseed from about 80 kg live weight till to slaughtering (144.7±7.2 Kg).

Twenty-four Large White pigs were fed with four different diets: control group (C) a basal barley/soybean based diet (VE 10 ppm and selenium 0.1 ppm); L group, 5% extruded linseed with VE 10 ppm and selenium 0.1 ppm; LE group, 5% extruded linseed with 200 ppm VE and 0.3 ppm selenium; LP group, 5% extruded linseed with 800 ppm of total P added by grapes (10.45% of P) and oregano (25% of P) extract (2.87g and 2g per Kg feed, respectively), VE 10 ppm and selenium 0.1 ppm.

At 24h post mortem (p.m), longissimus dorsi muscle was sliced and packed under modified atmosphere (35% CO_2, 65% O_2) and stored at 2±1°C in darkness for 4, 6, 8 and 12 days. Starting from six loins for each treatment group, two homogenized sub-samples, each consisting of chops from three different loins, were created. Each sampling was replicated twice.

Samples (10g) were homogenized in 90 ml of sterile physiological solution in a stomacher. Mesophilic aerobic bacteria and enterobacteriaceae were quantified by plating onto appropriate media. At 24h p.m, the microbial load was similar in L (50 CFU/g), LE (75 CFU/g), and LP (60 CFU/g) groups, but lower compared with C (875 CFU/g) group. At the end of storage time, the microbial loads for L, LE and LP groups were about 103 CFU/g, without significant differences among them. Instead, the final value for C group was about 104 CFU/g. The results show that dietary polyphenols, vitamin E and linseeds supplementation might increase the shelf-life of pork meat packaged under modified atmosphere. However, taking into consideration the microbial load evolution, groups L and LP showed a less pronounced increase of the viable count during the entire storage period.

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Effect of extruded linseed, vitamin E and polyphenols pig dietary supplementation on microbial growth of meat during refrigerated storage

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Acknowledgements

The research was funded by POR FESR Emilia Romagna 2014-2020 (PG/2015/730542-
"Innovare la filiera suina mediante la valorizzazione di sottoprodotti vegetali e l'impiego di avanzate tecnologie "omiche" e di processo, per la produzione sostenibile di carne e salumi ad impatto positivo sulla salute".

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