

8<sup>th</sup> International Conference on

# Food Safety and Regulatory Measures

June 11-12, 2018 | Barcelona, Spain

## Interactions of vegetable oils rich in lauric acid (C12:0) with oxacillin towards *Staphylococcus aureus*

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**Statement of the Problem:** Combining antibiotics with other antibacterials have currently been one of the solutions tested for decreasing the antibiotic resistance in many emerging bacteria, including foodborne pathogens. The example of intense antibacterial resistance is methicillin-resistant *Staphylococcus aureus* (MRSA), being considered a high priority pathogen.

**Aim:** The aim of our study was to evaluate the effect of vegetable oils rich in lauric acid (C12:0) with oxacillin towards various strains of *S. aureus*.

**Methodology & Theoretical Orientation:** Analysis of possible interactions of lauric acid and oxacillin was performed on ten strains of (multi)drug resistant or sensitive *S. aureus*. Combinatory effect of *A. aculeatum*, *C. nucifera* and *E. guineensis* oils (natural source of lauric acid) with oxacillin was tested against two strains of *S. aureus*. At first, single-drug minimum inhibitory concentrations were determined by microdilution method (Minimum Inhibitory Concentration, MIC). Following combinatory effect was tested by the checkerboard method (Fractional Inhibitory Concentration, FIC). The determination of distinctive MIC of oxacillin, palm oils and lauric acid, as well as their combinatory effect evaluation by FICs, was performed in 96-well microtiter plates in three independent experiments, each performed in triplicate.

**Findings:** Lauric acid was active against all tested strains of *S. aureus* (MIC = 256 µg/mL); the MICs of oxacillin were 0.5 – 682 µg/mL, depending on the strain and its resistance. Very interesting finding was done in the combinatory effect testing, where the combination of lauric acid with oxacillin caused antagonism (FIC<sub>4</sub>). This effect was observed in all tested bacterial strains.

**Conclusion & Significance:** To our knowledge, this is the first observed antagonistic effect of lauric acid with oxacillin in *S. aureus*. From our perspective, consumption of C12:0 rich oils, such as coconut or palm oil, can lead to the complications in staphylococcal infection treatment with oxacillin.

### Recent Publications:

1. Skrivanova E, Van Immerseel F, Hovorkova P and Kokoska L (2016) *In vitro* selective growth-inhibitory effect of 8-hydroxyquinoline on *Clostridium perfringens* versus bifidobacteria in a medium containing chicken ileal digesta. PLOS One DOI: 10.1371/journal.pone.0167638.
2. Skrivan M, Marounek M, Englmaierova M and Skrivanova E (2016) Effect of increasing doses of marigold (*Tagetes erecta*) flower extract on eggs carotenoid content, color and oxidative stability. Journal of Animal and Feed Sciences 25(1):58-64.
3. Skrivan M, Englmaierova M, Skrivanova E and Bubancova I (2015) Increase in lutein and zeaxanthin content in the eggs of hens fed marigold flower extract. Czech Journal of Animal Science 60(3):89-96.
4. Hovorkova P and Skrivanova E (2015) Use of caprylic acid in broiler chickens: effect on *Campylobacter jejuni*. Foodborne Pathogens and Disease 12(8):712-718.
5. Skrivan M, Marounek M, Englmaierova M and Skrivanova E (2012) Influence of dietary vitamin C and selenium, alone and in combination, on the composition and oxidative stability of meat of broilers. Food Chemistry 130(3):660-664.

### Biography

Eva Skrivanova is a Microbiologist and Nutritionist at the Institute of Animal Science in Prague and Czech University of Life Sciences in Prague, Czech Republic. Her expertise is evaluation of antibacterial effect of various plant extracts, their combinations with antibiotics, both *in vitro* and *in vivo*, using animal models. Furthermore, her projects aim to study nutritional impact of antioxidants and enzymes as the feed additives in food animals and their effect of oxidative stability of animal products.

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