This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°816172

SKIN BACTERIOME AND ITS RESISTANCE TO ANTIBIOTICS IN FREE RANGE PIGS

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Introduction

- swine cutaneous microbiome is used as a skin model, for various test (Bush et al., 1986)
- skin bacteriome and its antibiotic resistance depends on habitat conditions (McIntyre et al., 2016; Nowland et al., 2019)
- its unique to each individual, but related to the growing system (Curtis et al., 1975)

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Introduction

- in free range systems swine contact its closely related with all environment factors
- close interaction human-pig in low input small farms => high human exposure to zoonotic disease (Silvana Popescu, 2013)
- environment continuous disruptions lead to skin bacteriome changes and high antibiotic resistance profile (McIntyre et al., 2016)

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Aims

- study of pigs raised in low input small farms, to establish cutaneous microflora and its antibiotic resistance

Fig. 1. Various raising conditions on free-range farms

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Material and methods

- research conducted on mixed breed pigs, grown in free range farms
- samples collected with swabs from skin surface and processed by classic microbiological methods (cultivation on simple broth and nutrient agar, colony isolation and biochemical identification – Remel RapID^{TM} test kits)
- antimicrobial resistance to gentamicin, streptomycin, oxitetracycline, tylosin, amoxacillin-clavulanic acid, marbofloxacin, tulatromycin, cefotaxime and doxycycline, using Kirby Bauer method
- calculation of MAR index

Fig. 2. Simple broth

Fig. 3. Nutrient agar

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Results

- identification of strains from *Staphylococcus (sciuri and warnerii)*, *Shigella spp.*, *Kytococcus (sedentarius)*, *Salmonella spp.* and *Citrobacter (freundii)*, using RapID test, after cultivation and cultural characterization on simple broth and nutritive agar

ERIC Web *Identification Report*

RapID Staph Plu Laura S

Run Date: 6/18/2018
Facility: USAMV Cluj-Napoca
Microcode: 073264
Reference No:

System Tests												
	-ADH	00%	+SUC	98%	+aGLU	56%	-GUR	16%	-PYR	03%	-LEU	21%
	-ODC	00%	+MANO	93%	+BGLU	99%	+NAGA	98%	+ARG	00%	-LGLY	03%
	-LIP	03%	+PO4	95%	-ONPG	00%	-URE	02%	+ALA	04%	+NIT	98%

QUESTIONABLE MICROCODE - Unreliable Probabilities

Choice	Probability	Bioscore	Contraindications
S. sciuri	> 99.9%	1/90814	ARG [0] ALA [4]

Fig. 4. Identification report of a *Staphylococcus sciuri* colony

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Results

- most resistant strain tested was *S. warnerii*
- high MAR index in 50% of tested strains (0.33)
- the most effective antiobiotic is cefotaxime, while oxytetracicline is less effective (its high usage can increase the emergence of antibiotic resistant colonies

Antibiotic / Sample	CN	TUL	CTX	DO	S	AMC	MAR	T	TY	MAR Index
Shigella	18 mm	24 mm	21 mm	20 mm	19 mm	R	24 mm	R	R	0,33
K. sedintarius	22 mm	29 mm	21 mm	23 mm	22 mm	8 mm	21 mm	R	R	0,22
S. sciuri	17 mm + CR	16 mm	18 mm	31 mm	16 mm + CR	24 mm	19 mm	28 mm	18 mm	0,22
S. warneri	18 mm + CR	10 mm + CR	17 mm	16 mm	21 mm	19 mm	21 mm	R	17 mm	0,33
	2CR	1CR	sens	sens	1CR	1R	sens	3R	2R	

Fig. 5. Antibiotic inhibition diameter and MAR index, for tested strains

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Conclusion

- presence of ubiquitous and pathogenic antibiotic resistant strains
- caution regard growing conditions in low input farms and therapy, to avoid pathogenicity expression of bacterial strains, present in skin bacteriome

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Thank you, for your attention!