

Morphometric analysis of the skin wound healing process on gilthead seabream (*Sparus aurata*) fed silk nanoparticles

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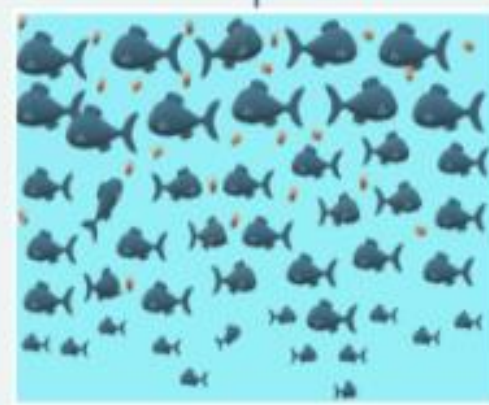
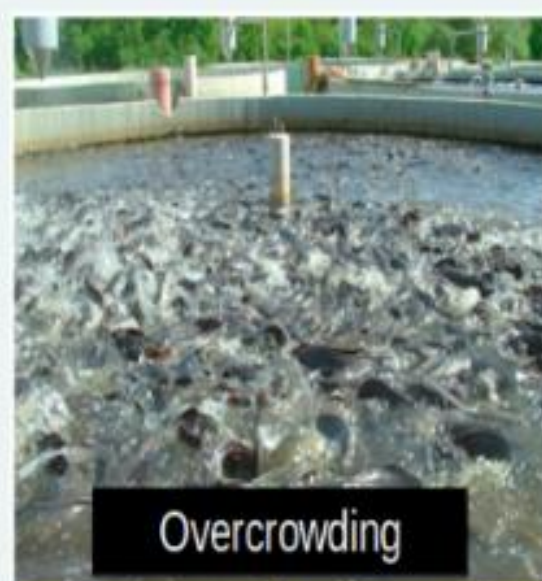
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INTRODUCTION

Current aquaculture
↓
Semi-intensive
↓
Increase production



APPLICATIONS:
- Cooking
- Industry
- Medicine



BIO-PROPERTIES:

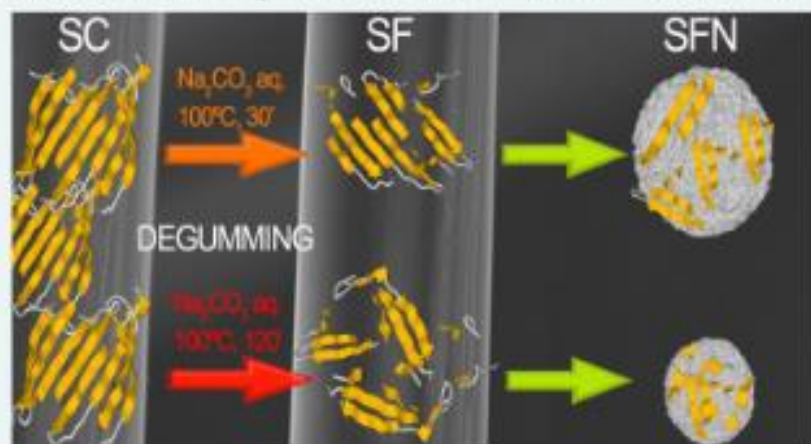
Tissue regeneration engineering

- ▲ Biocompatibility
- ▲ Biodegradability
- ▼ Immunogenicity

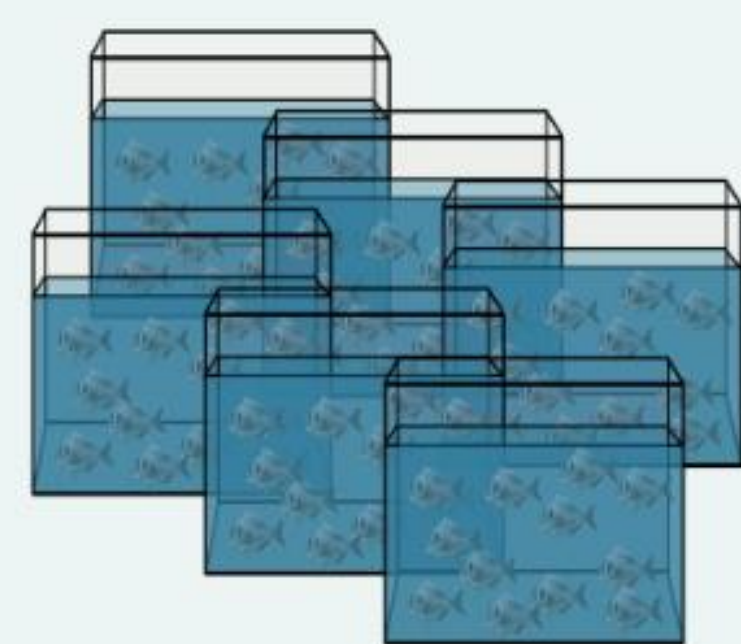
MATERIALS & METHODS



Silk Nanoparticles Production



SC Silk coccons
SF Silk fibroine
SFN Silk Fibroine nanoparticles



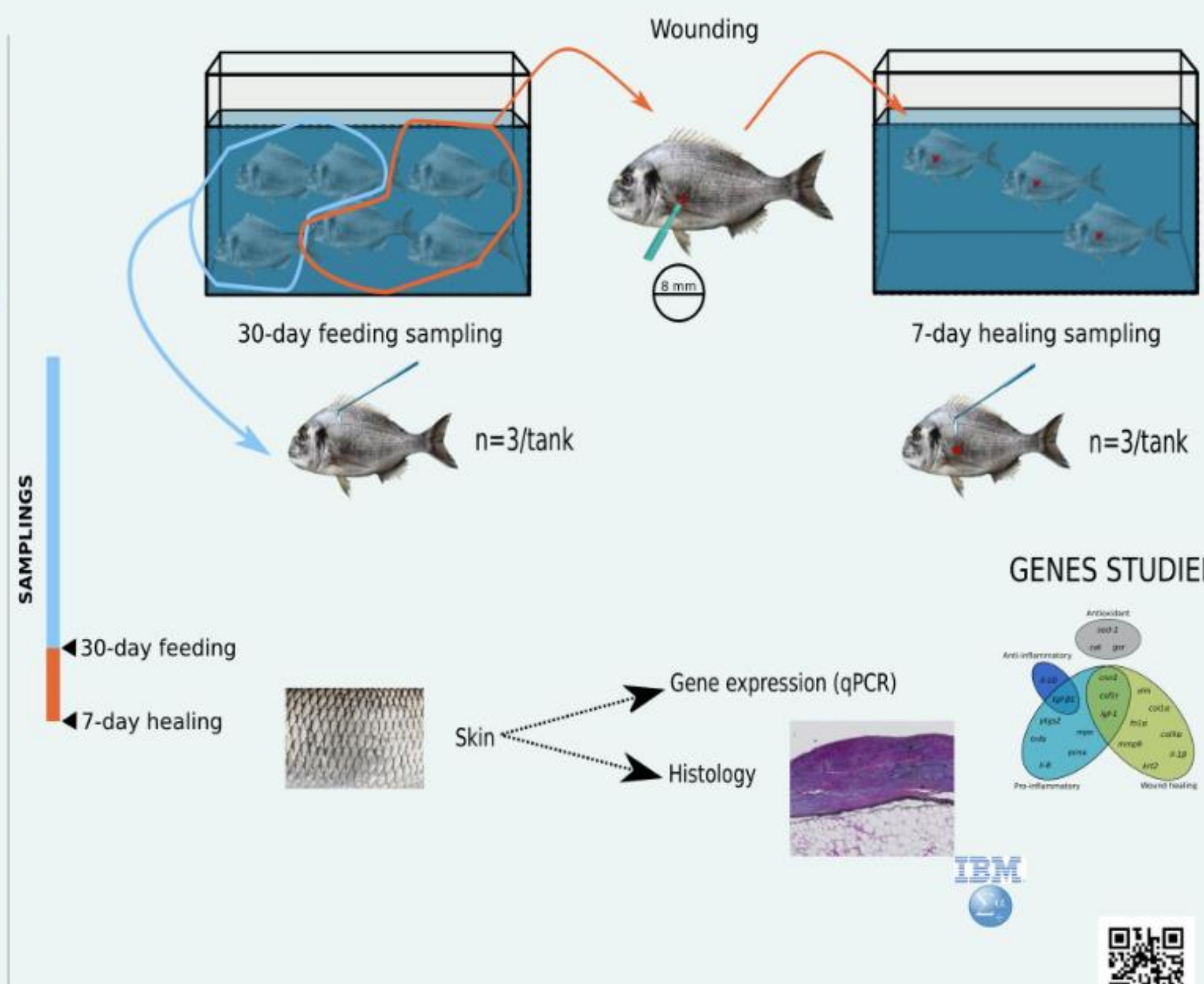
Gilthead seabream
n=6 (duplicate)
70 ± 12 g

3 EXPERIMENTAL DIETS

0 mg of sn/ Kg of feed; **CONTROL**
50 mg of sn/ Kg of feed; **SN1**
100 mg of sn/ Kg of feed; **SN2**

2 EXPERIMENTAL GROUPS

30-day feeding
7-day healing



RESULTS

Figure 3.

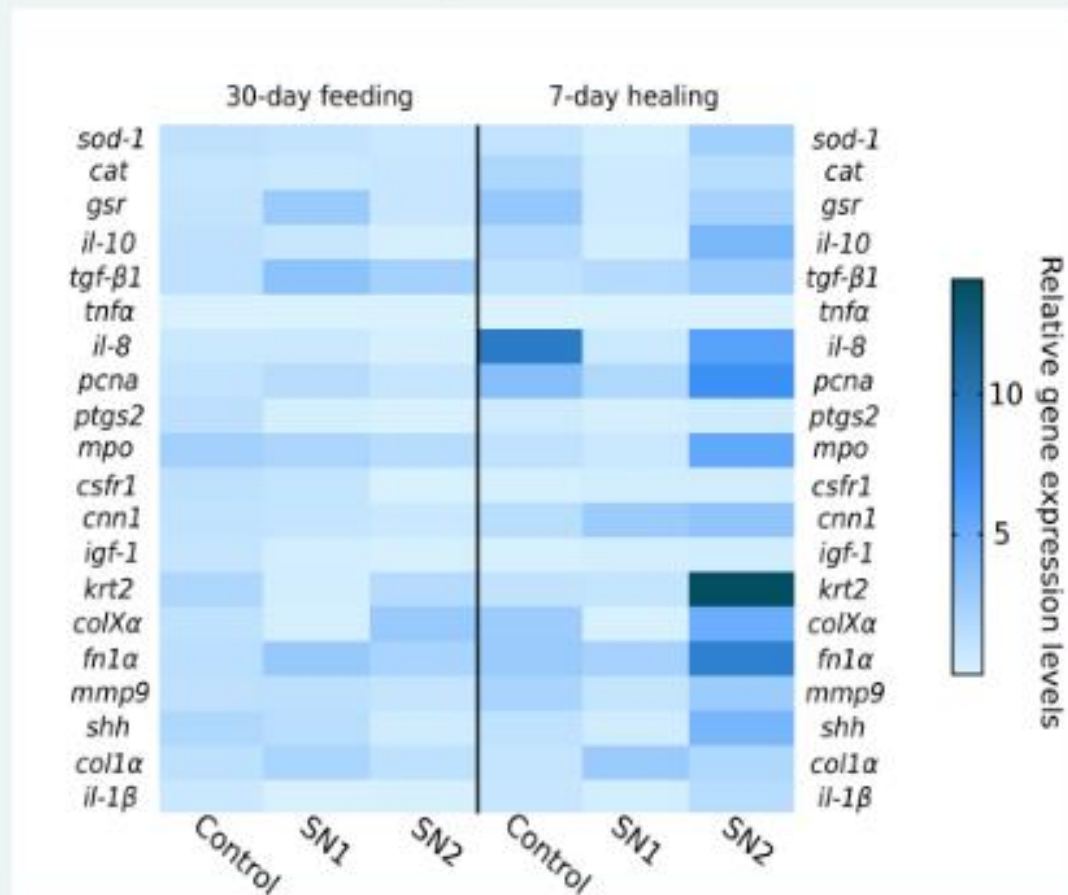
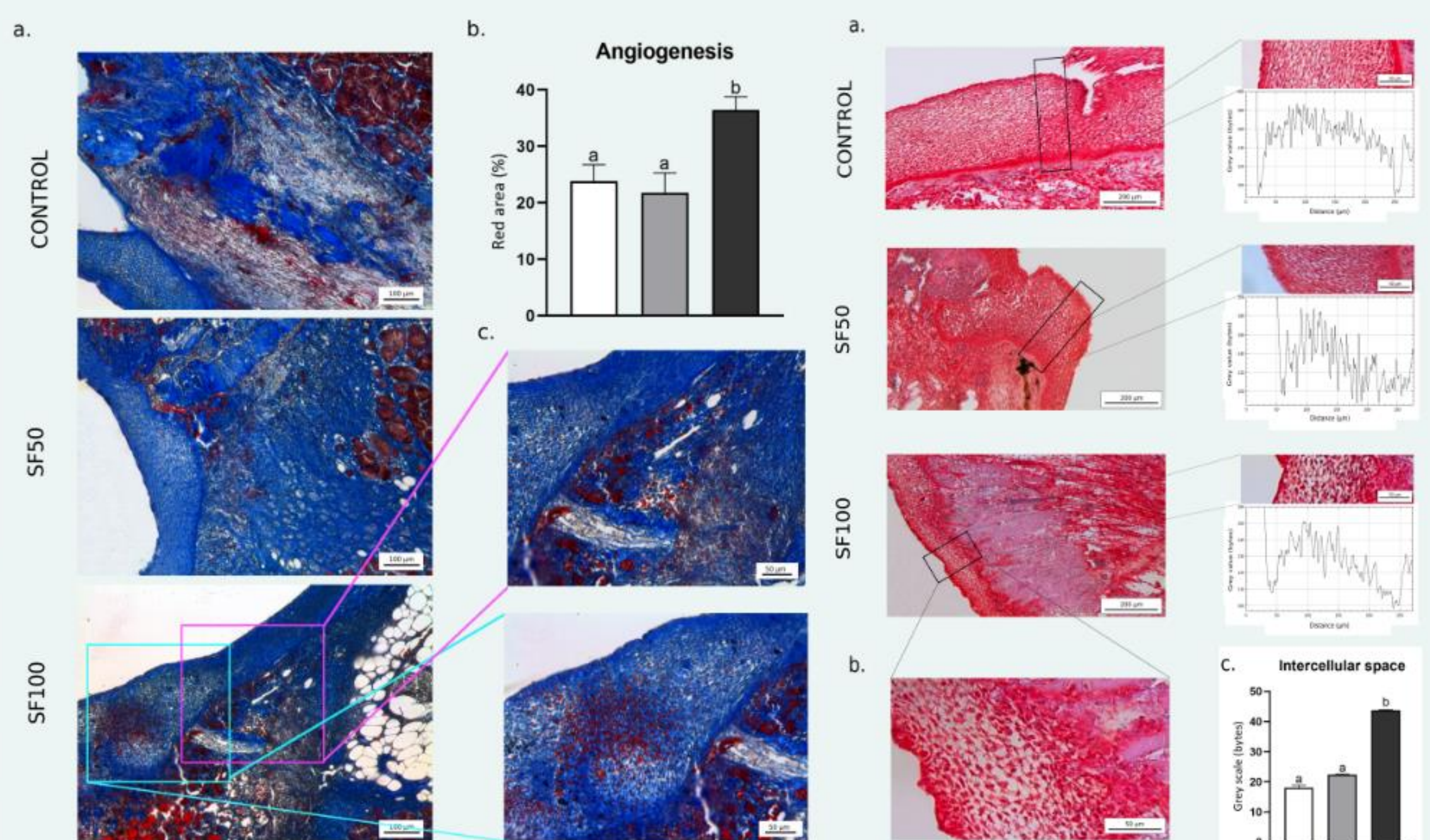


Figure 3. Heat map of the relative expression level of the genes studied for the three diets in the different groups. The expression of three antioxidant genes [superoxide dismutase 1 (*sod*), catalase (*cat*) & glutathione-disulfide reductase (*gsr*), seven genes involved in inflammation [transforming growth factor beta (*tgf-β1*), prostaglandin-endoperoxide synthase 2 (*ptgs2*), tumor necrosis factor alpha (*tnfa*), interleukin 8 (*il-8*), interleukin 10 (*il-10*), interleukin 1 beta (*il-1β*), myeloperoxidase (*mpo*) & colony stimulating factor 1 receptor (*csf1r*)] and eight genes involved in tissue regeneration [insulin like growth factor 1 (*igf-1*), proliferating cell nuclear antigen (*pcna*), collagen type X alpha 1 chain (*col1a*), matrix metalloproteinase 9 (*mmp9*), keratin 2 (*krt2*), sonic hedgehog signaling molecule (*shh*), cellular communication network factor 1 (*ccn1*), fibronectin 1 alpha (*fn1a*) & collagen type 1 alpha 1 chain (*col1a1*).



CONCLUSIONS

The concentrations of silk nanoparticles used as a dietary supplement do not appear to have any effect on the systemic immunity of gilthead seabream.

- The expression of genes related to inflammation and tissue regeneration was increased in fish fed the highest dosage of silk nanoparticles tested. However, in this fish group not clear evidence of better wound healing at 7 days post-wounding was observed when comparing with the group fed the control diet.

- Higher concentrations of dietary nanoparticles seem to increase favoring the process of angiogenesis as well as intercellular spacing, understood as cell migration.

AKNOWLEDGEMENTS

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