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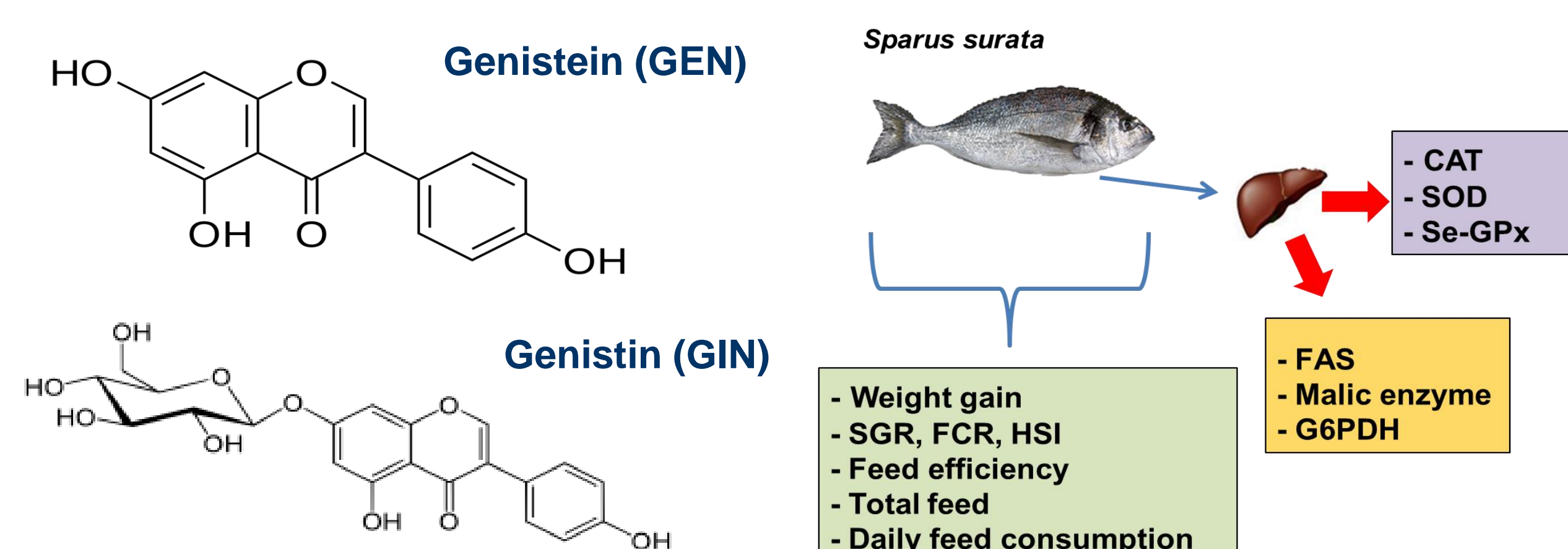
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INTRODUCTION

Nowadays, soybean meal (SBM) or soy protein concentrate (SPC) are the most used plant-based protein source ingredients in commercial fish feeds as alternative to partially replacement of fish meal-based diets in carnivorous fish such as the gilthead seabream *S. aurata*. Both SBM and SPC components contain phytoestrogens such as isoflavones the most abundant of which are the aglycone genistein (GEN) and its β -glycoside conjugate genistin (GIN). The glycoside (GIN) is in greater amounts than the aglycone GEN in SBM and SPC. Research evidence suggests that the biological activity of soy phytoestrogens does not depend upon the glycoside form. In mammals, for example, hydrolysis of the glycoside is necessary for their absorption and activity in the organism [1, 2]. Studies in fish with exogenous (synthetic) genistein-enriched diets have shown variable metabolic effects on fish, depending on the genistein dose administered [3,4]. Besides, there is good evidence that exogenous supplemented genistein in the diet affects lipids metabolism as well as fish overall growth rate, produces estrogenic effects and alters fish antioxidant ability [3,4,5]. This study aims to estimate the impact of GEN and GIN present in SBM and SPC ingredients on the growth performance & on the antioxidant and lipogenic mechanisms (enzymes activities) of gilthead seabream *S. aurata* via feeding on SBM-based & SPC-based diets by applying specific and indicative biomarkers.

MATERIALS & METHODS

- GEN & GIN were quantitatively determined in the methanolic extracts of SBM and SPC ingredients by a spectrophotometric method [6].
- Three isoproteinic (49.75% \pm 0.44%) and isolipidic (17% \pm 0.13%) diets were formulated: a soy-free (Control), a 20% SBM (D-SBM) & a 20% SPC (D-SPC).
- Three groups of *S. aurata* with an average initial weight of 27 g reared in a RAS system were fed on the diets in triplicate groups for 2 months.
- Growth performance indicators and specific & indicative biomarkers of antioxidant & lipogenic enzymes were determined in liver.



RESULTS & DISCUSSION

GEN and GIN content was significantly higher in SBM (~621 μ g/g) than in SPC (~1.6 μ g/g) ingredients. The lower content in SPC could be attributed either to lower content or to the extraction method used. Growth indicators are shown in table 1. The antioxidant and lipogenic biomarkers are indicated in fig. 1 & 2, respectively.

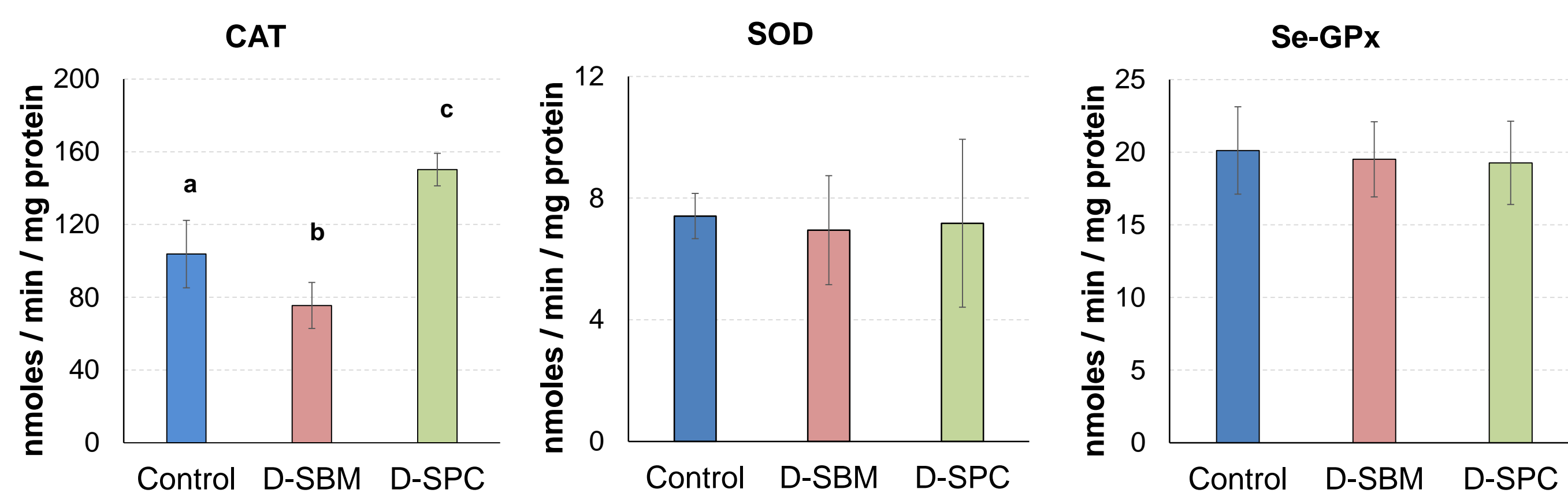


Fig. 1. Antioxidant enzymes activities (small letters differ at $p < 0.05$ level)

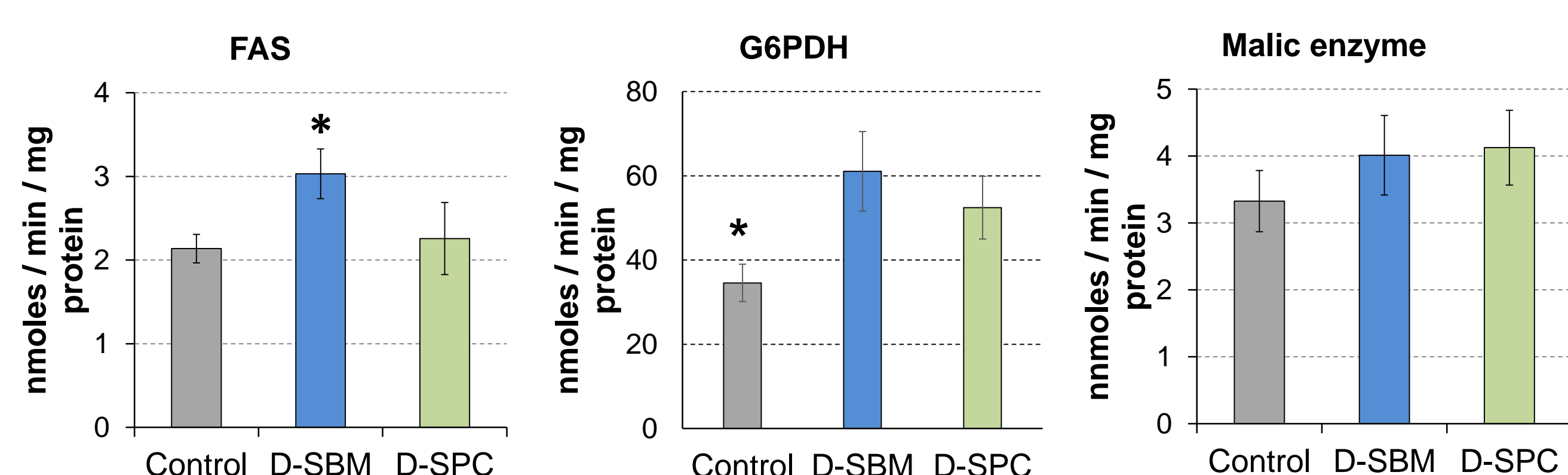


Fig. 2. Lipogenic enzymes activities (asterisks differ at $p < 0.05$ level)

Table 1. Growth indicators of *Sparus aurata*

	Control	D-SBM	D-SPC
Weight gain (g)	93.8 \pm 2.1 a	101.8 \pm 2.0 b	97.6 \pm 2.3 a
FCR	1.11 \pm 0.07	1.10 \pm 0.04	1.09 \pm 0.03
SGR (%)	2.31 \pm 0.03 a	2.41 \pm 0.02 b	2.36 \pm 0.03 b
DFC (daily feed consumption)	2.2 \pm 0.2	2.2 \pm 0.1	2.2 \pm 0.1
Feed Efficiency	0.90 \pm 0.00	0.91 \pm 0.04	0.91 \pm 0.03
Total feed (g)	3,120 \pm 257	3,317 \pm 116	3,201 \pm 172
HSI	1.5 \pm 0.1 ab	1.7 \pm 0.2 a	1.3 \pm 0.1 b

Conclusions

Findings suggest that soy-based diets with elevated dietary genistein & genistin content such as SBM-based diet could significantly increase weight gain and enhance lipogenesis in *S. aurata*. However, SBM-based diet could lead to noticeably dysfunction in eliminating ROS production, while SPC-based diet could improve antioxidant capability.

ACKNOWLEDGEMENT

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