



# POTENTIAL BENEFITS OF GLYCINE, PROLINE AND HYDROXYPROLINE ON GROWTH AND FLESH QUALITY OF SONGPU MIRROR CARP, *CYPRINUS SPECULARIS* SONGPU

Hua Zhu\*, Rong Zhang, Xiaowen Wang, Lili Liu, and Huijuan Li

Fisheries Research Institute,  
Beijing Academy of Agriculture and Forestry Sciences  
Beijing, China 100068  
zhuhua@bjfishery.com

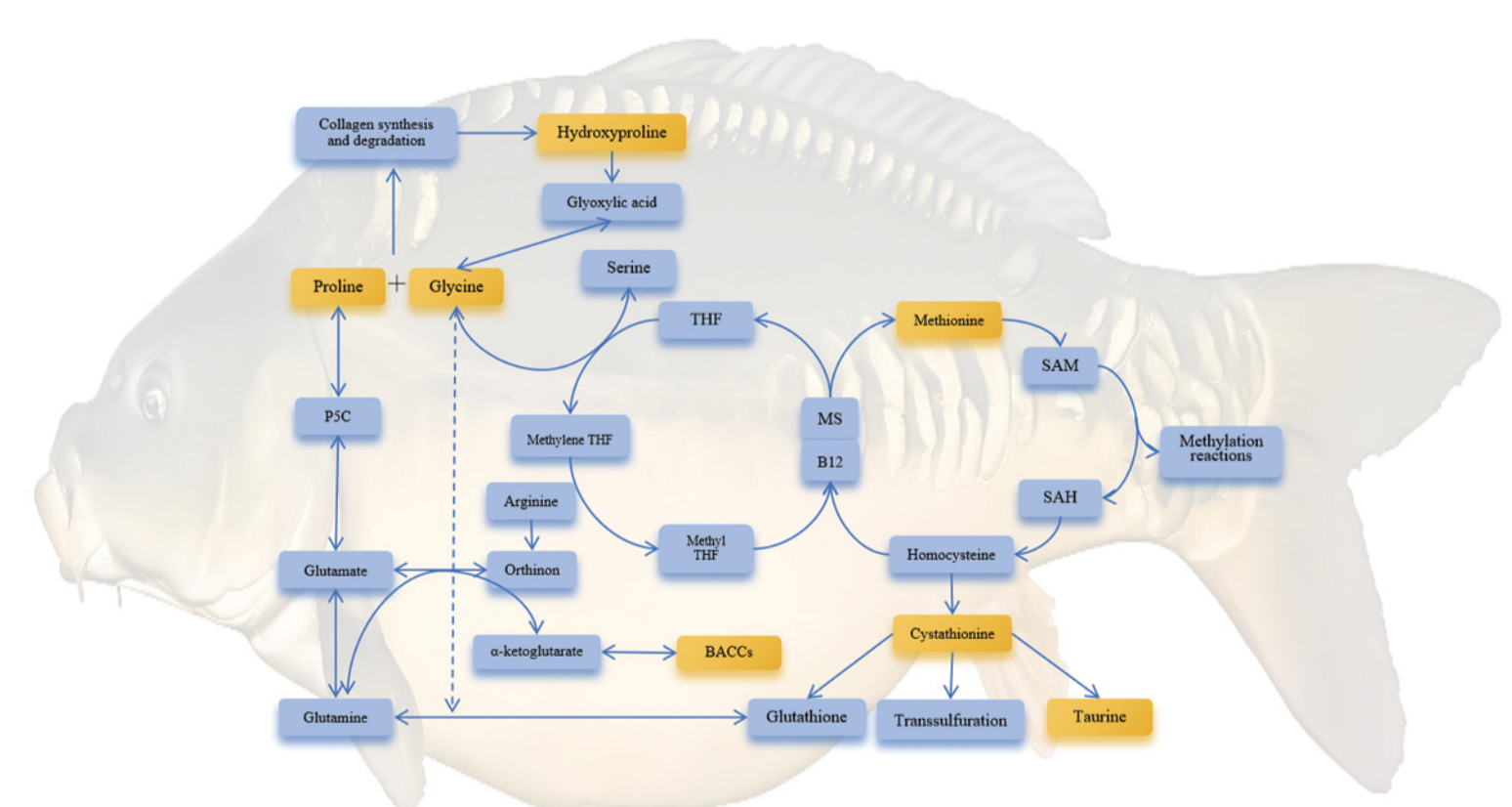
Songpu mirror carp (*Cyprinus specularis* Songpu), a variety of common carp, is recognized for its notable attributes in growth rate, feed efficiency, and disease resistance. This investigation aims to explore the potential benefits of glycine, proline, and hydroxyproline in songpu mirror carp, seeking to improve feed formulations. Such advancements are crucial for elevating aquaculture yields and enhancing product quality, thereby aligning with the escalating global demand for fish as a sustainable protein source.

This study aimed to assess the impact of dietary supplementation with glycine, proline, and hydroxyproline on the growth and flesh quality of Songpu mirror carp. A total of 240 fish were allocated to one control and three treatment groups, each receiving diet supplemented with 5 g/kg of either glycine, proline, or hydroxyproline. The findings indicated that while there were no significant differences observed in weight gain or feed conversion rates among the groups, notable changes in serum growth hormone and insulin-like growth factor-1 levels were evident, particularly in the groups supplemented with glycine and hydroxyproline. Dietary proline increased the muscle crude protein, whereas hydroxyproline notably enhanced muscle moisture and reduced drip loss, thereby suggesting improvements in flesh quality. Proteomics analysis revealed differential expression of proteins with clear separations among treatment groups. Targeted amino acid quantification highlighted changes in taurine, methionine, leucine, and glutamic acid, correlating with shifts in protein

expression profiles. In summary, our findings suggest that dietary supplementation with these amino acids has beneficial effects on modulating growth hormone release and improving flesh quality in Songpu mirror carp, highlighting potential implications for aquaculture nutrition.



**FIGURE 1.**  
Protein-protein interaction network



**FIGURE 2.**  
Amino acids metabolism pathways.