

# Effects of salinity on Haematological biochemistry and structure of liver tissue in young Chum Salmon (*Oncorhynchus keta* Walbaum)

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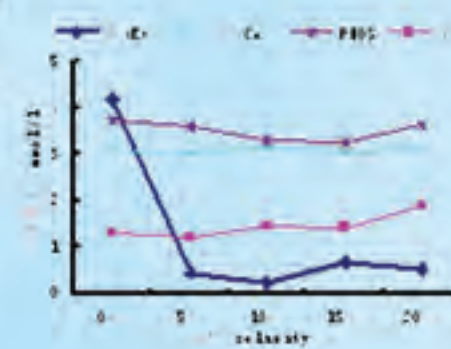
Studies were conducted on haematological biochemistry and structure of liver tissue in young chum salmon (*Oncorhynchus keta* Walbaum) (body weight: 26.57±6.32g, total length:14.44±1.05cm). Five different salinities were set which were 0, 5,10,15 and 20 respectively, and fish in freshwater served as control. The acute salinity experiments lasted for 130 days, and there were triplicates in each treatment.

The change of metal elements and inorganic ions at the experimental groups in 10 days (mg/L)

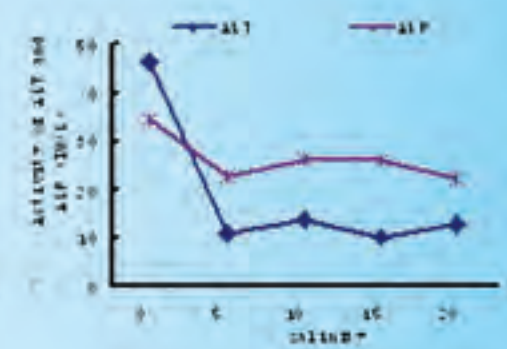
S ‰	Fe		Mn		Na		K		Ca		Mg		Cl		Ca <sup>2+</sup>	
	1d	10d	1d	10d	1d	10d	1d	10d	1d	10d	1d	10d	1d	10d	1d	10d
0	<0.03	<0.03	0.015	0.011	105	108	16.8	18.6	260.2	307.1	48.1	51.4	4905	5285	1348.3	201.4
5	<0.03	<0.03	0.062	0.044	1153	1100	49.1	39.6	303.0	415.9	138.0	140.0	3800	3965	1166.7	443.08
10	<0.03	0.034	0.032	0.026	2352	2298	83.7	99.6	411.3	461.8	276.0	266.0	5510	7688	1952.7	322.28
15	<0.03	<0.03	0.117	0.043	3245	3446	127.3	136.3	508.1	543.2	396.0	394.0	10571	11532	1166.7	281.96
20	<0.03	0.034	0.042	0.025	4573	5074	174.7	171.9	586.1	620.0	557.0	522.0	12380	13454	1813.2	281.96

The results showed that osmolality and the content of serum Na<sup>+</sup>, Cl<sup>-</sup> are basically the same trend, with increased salinity and increased, osmolality and the content of Na<sup>+</sup> in the salinity of the 15,20 group were significant difference with other treatment groups (P<0.05), the content of serum Cl<sup>-</sup> was significantly different between the freshwater group and salinity 15, 20 group (P<0.05); the content of serum magnesium (Mg<sup>2+</sup>) at salinity 20 was significantly higher than salinity 0 and 5 (P<0.05); the content of serum potassium (K<sup>+</sup>) between different salinities and freshwater was significant difference (P<0.05); Effect of salinity on serum glucose was comparatively significant, the content of blood glucose was the highest at salinity 10, it was significant difference between salinity 10 and salinity 5,20 significantly (P<0.05).

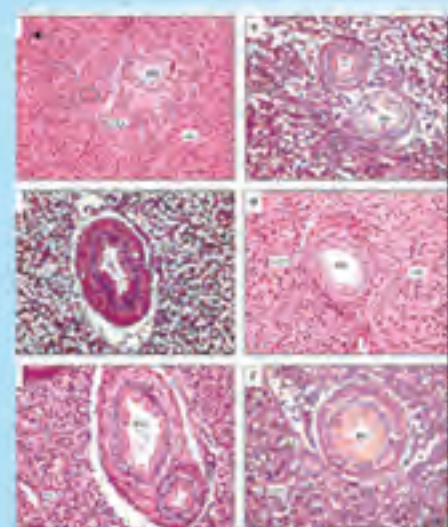
The impact on blood lipid was smaller, with the exception of total bile acids, other lipid indicators were no significant differences (P>0.05); the content of serum total protein (TP), albumin (ALB), globulin (GLB) was overall downward trend with an increase in salinity, the total serum protein and globulin content in the freshwater group was significantly higher than the salinity of 15 and 20 group (P<0.05); the alanine aminotransferase (ALT) and alkaline phosphatase (ALP) activity in fresh water was significantly higher than the other salinity groups (P<0.05), aspartate aminotransferase (AST) was significant difference between salinity 0 and 15 (P<0.05); the impact of salinity on liver of young chum salmon was great, in the low salinity, some liver cells were breakdown, liver tissue was serious vacuolization.



The results of serum osmotic pressure and electrolytes under salinity levels in chum salmon.



The relation of change of salinity to the content of serum protein and the activity of enzymes in salmon.



BD: bile duct; LSA: Liver small artery; LCC: liver cell cord; IV: interlobular vein; HL: hepatic lobule; LC: liver cell.  
1. salinity for 0, ×20 (Bar=100 μm), \* showing liver cell great vacuole, karyon great atrophy and dissolve;  
2. salinity for 5, ×20 (Bar=100 μm);  
3. salinity for 10, ×20 (Bar=100 μm);  
4. salinity for 15, ×20 (Bar=100 μm);  
5, 6. salinity for 20, 5 ×20 (Bar=100 μm).

Structure changes of liver in young chum salmon

**Key words:** young chum salmon; salinity; biochemical indicators; histology