Freshwater Atlantic salmon Salmo salar and rainbow trout Oncorhynchus mykiss responded similarly to increase in water flow (exercise), reduction in holding tank water level (stress), or 30 min chasing with water level reduction (stress and exercise). Stress generally resulted in elevated plasma cortisol, above the control. Fish responded to stress and exercise combined, with elevated lactate and [H+] which was sometimes associated with elevated plasma cortisol. These changes were combined with a depletion of the muscle adenylate pool. Post-mortem, this resulted in an increase in the rate of onset of rigor, and a higher and sometimes sustained muscle proton load. Both species produced predominantly inosine as opposed to hypoxanthine, for up to 72 h of ice storage. This study shows that the physiological disruption in Atlantic salmon and rainbow trout caused by simulated harvest conditions of stress and exercise, results in mostly transient changes in post-mortem muscle biochemistry. These changes lead to an earlier onset and resolution of rigor, and lower post-mortem muscle pH in comparison to the control. (C) 1999 The Fisheries Society of the British Isles.