ATP, IMP, and glycogen in cod muscle at onset and during development of rigor mortis depend on the sampling location

Variation in glycogen, ATP, and IMP contents within individual cod muscles were studied in ice stored fish during the progress of rigor mortis. Rigor index was determined before muscle samples for chemical analyzes were taken at 16 different positions on the fish. During development of rigor, the contents of glycogen and ATP decreased differently in relation to rigor index depending on sampling location. Although fish were considered to be in strong rigor according to the rigor index method, parts of the muscle were not in rigor as high ATP concentrations were found in dorsal and tail muscle.
ATP and glycogen content related to gaping in pre-rigor cod (Gadus morhua) frozen in blocks at sea

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Cappeln, G. (Intern), Jessen, F. (Intern)
Pages: 49-62
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Aquatic Food Product Technology
Volume: 10
ISSN (Print): 1049-8850
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.386 SJR 0.309 CiteScore 0.64
Web of Science (2017): Impact factor 0.682
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Degradation of ATP and glycogen in cod (Gadus morhua) muscle during freezing

Changes in ATP, IMP, lactate and glycogen contents in the muscle of cod were followed during freezing at temperatures of -20°C and -45°C. ATP degradation was accompanied by a corresponding increase in IMP content. Simultaneous measurement of temperature showed that at both freezing rates, the greatest decrease in ATP content was observed when the temperature reached -0.8°C. Glycolysis occurred during freezing of cod as indicated by an increase in lactate content. The changes found in all measured metabolites were more pronounced when freezing was performed at a slow rate compared to a fast rate due to the thermal arrest time at about 0.8°C.

General information
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Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Cappeln, G. (Intern), Jessen, F. (Intern)
Pages: 555-567
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
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Volume: 25
Issue number: 6
ISSN (Print): 0145-8884
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.692 SJR 0.414 CiteScore 1.44
Web of Science (2017): Impact factor 1.552
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.397 SNIP 0.574 CiteScore 1.09
Web of Science (2016): Impact factor 1
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.428 SNIP 0.593 CiteScore 1.13
Web of Science (2015): Impact factor 0.832
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.408 SNIP 0.56 CiteScore 0.9
Web of Science (2014): Impact factor 0.741
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.436 SNIP 0.635 CiteScore 1.03
Web of Science (2013): Impact factor 0.853
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.435 SNIP 0.71 CiteScore 0.89
Web of Science (2012): Impact factor 0.756
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.445 SNIP 0.504 CiteScore 0.92
Web of Science (2011): Impact factor 0.815
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.494 SNIP 0.755
Web of Science (2010): Impact factor 0.625
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.627 SNIP 0.774
BFI (2008): BFI-level 1
Glycolysis was shown to occur during freezing of cod by a decrease in glycogen and an increase in lactate. In addition, the ATP content decreased during freezing. Synthesis of ATP was measured as degradation of glycogen. During storage at -9 and -12 degrees C it was found that degradation of ATP was faster than synthesis of ATP. This was leading to the presence of glycogen even at low ATP concentrations. The ATP and glycogen degradation rates and lactate formation rate reached an optimum (both in small samples as well as in whole fish) when stored at -9 degrees C compared to -12 degrees C. Evidence of ATP synthesis at 0 degrees C during thawing was obtained in samples as well as in whole fish. Reduction or elimination of thaw rigor effects (shrinkage and drip loss) during a period of frozen storage were examined. When thawing at 5 degrees C, fillets stored at -9 degrees C showed significantly less shrinkage than fillets stored at -40 degrees C. In addition, pre-rigor fillets (-40 degrees C) showed significantly the smallest drip loss compared with fillets stored at -9 degrees C. (C) 2001 Academic Press.
Synthesis and hydrolysis of ATP in frozen fish

General information
State: Published
Organisations: National Institute of Aquatic Resources
Authors: Cappeln, G. (Intern)
Number of pages: 133
Publication date: 2000

Synthesis and degradation of adenosine triphosphate in cod (Gadus morhua) at subzero temperatures
This study has demonstrated that the extraction step is very important when analysing ATP and its degradation products. An important factor is whether the sample is fresh, frozen or thawed when homogenised since thawing of the sample will lead to rapid loss of ATP. During frozen storage it was found that ATP in cod (Gadus morhua) was stable at -40 degrees C in small samples for at least 12 weeks. At -20 degrees C it was found that ATP content increases initially and thereafter falls. It was demonstrated that degradation of ATP in small samples occurs faster at 0 degrees C than at -2 and -5 degrees C. Furthermore, it was found that in whole cod ATP could be synthesised at a significant rate at -7 degrees C. (C) 1999 Society of Chemical Industry.
Synthesis and degradation of adenosine triphosphate in cod (Gadus morhua) at subzero temperatures

General information
State: Published
Organisations: National Institute of Aquatic Resources
Authors: Cappeln, G. (Intern), Nielsen, J. (Ekstern), Jessen, F. (Ekstern)
Pages: 1099-1104
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
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Volume: 79
ISSN (Print): 0022-5142
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BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SJR 0.822 SNIP 1.276 CiteScore 2.49
Web of Science (2017): Impact factor 2.379
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.48 SJR 0.906 SNIP 1.244
Web of Science (2016): Impact factor 2.463
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.809 SNIP 1.088 CiteScore 2.11
Web of Science (2015): Impact factor 2.076
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.814 SNIP 1.153 CiteScore 2.1
Web of Science (2014): Impact factor 1.714
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.852 SNIP 1.235 CiteScore 2.22
Web of Science (2013): Impact factor 1.879
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.869 SNIP 1.132 CiteScore 1.9
Web of Science (2012): Impact factor 1.759
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.762 SNIP 1.006 CiteScore 1.61
Web of Science (2011): Impact factor 1.436
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.785 SNIP 0.894
Web of Science (2010): Impact factor 1.36
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.872 SNIP 1.055
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.739 SNIP 0.841
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.738 SNIP 1.144
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.712 SNIP 0.966
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.57 SNIP 0.881
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.64 SNIP 0.935
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.799 SNIP 1.156
Scopus rating (2002): SJR 0.826 SNIP 1.159
Scopus rating (2001): SJR 0.781 SNIP 0.985
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.741 SNIP 1.052
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.842 SNIP 1.325
Original language: English
Source: orbit
Source-ID: 175074
Publication: Research - peer-review › Journal article – Annual report year: 1999

Projects:

**Syntese og hydrolyse af ATP i frossen fisk**

Department of Systems Biology
Period: 01/01/1995 → 24/07/2000
Number of participants: 3
Phd Student:
Cappeln, Gertrud (Intern)
Supervisor:
Jensen, Flemming (Intern)
Main Supervisor:
Adler-Nissen, Jens (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Sektorministerium, Stip-SU
Project: PhD

Thaw-rigor
The metabolic processes related to rigor mortis in fish during freezing, frozen storage and thawing can be related to quality deterioration. In this project these processes are studied in dependence of time and temperature. A special interest is on the relation between thaw-rigor and quality deterioration during processing of fish. The project shall determine the extent and importance of gaping as a result of thaw-rigor and investigate the potential for thaw-rigor in frozen industrial cod blocks. Based on these results an optimized thawing procedure will be developed in order to increase quality and yield of thawed raw material.

National Institute of Aquatic Resources

Thorfisk A/S
Period: 01/01/1995 → 31/03/1999
Number of participants: 2
Project participant:
Cappeln, Gertrud (Intern)
Project Manager, organisational:
Jessen, Flemming (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 1,700,000.00 Danish Kroner
Project