



Protein changes in shell and epidermis of shrimp (*Pandalus borealis*) after maturation on ice or in salt

Gringer, Nina; Thi Dang, Tem; Olsen, Karsten; Bøknæs, Niels; Schlippe-Steffensen, Kaino; Orlie, Vibeke; Jessen, Flemming

Publication date:
2016

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Gringer, N., Thi Dang, T., Olsen, K., Bøknæs, N., Schlippe-Steffensen, K., Orlie, V., & Jessen, F. (2016). *Protein changes in shell and epidermis of shrimp (Pandalus borealis) after maturation on ice or in salt*. Poster session presented at 46th conference of the West European Fish Technologists' Association (46th WEFTA), Split, Croatia.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Protein changes in shell and epidermis of shrimp (*Pandalus borealis*) after maturation on ice or in salt

Nina Gringer¹, Tem Thi Dang², Karsten Olsen², Niels Bøknæs³, Kaino Schlippé-Steffensen⁴, Vibeke Orlien² & Flemming Jessen¹,

¹Technical University of Denmark, DK-2800 Kgs. Lyngby, Denmark (fjes@food.dtu.dk)

²University of Copenhagen, DK-1958 Frederiksberg C, Denmark

³Royal Greenland A/S, DK-9230 Svenstrup J, Denmark

⁴Launis A/S, DK-9982 Aalbæk, Denmark



Background

Mechanical peeling of boiled cold-water shrimps requires a preceding maturation period, a procedure that at the same time leads to reduced quality.

It is hypothesized that during maturation the protein profile (the proteome) of the epidermis layer and the shell of the shrimp is changed, mainly due to proteolytic activity and altered protein solubility, and that some of these changes facilitate the shell loosening that is required for mechanical peeling. These aspects are studied in the collaborative project TECHSHELL

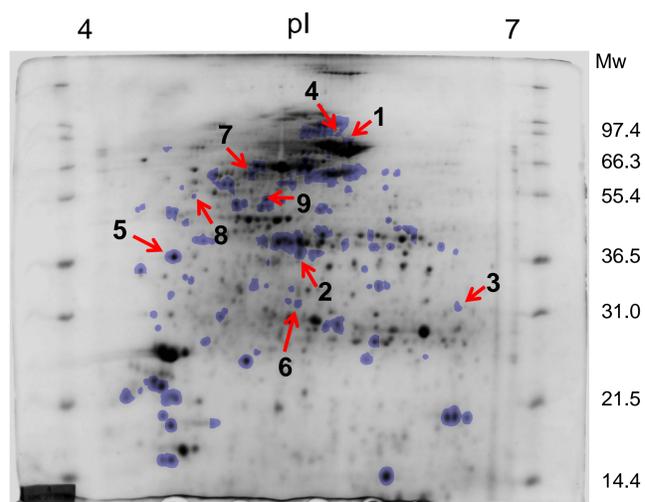
Aim & Approach

To investigate the impact of maturation on the proteome of shrimp epidermis and shell.

Non-matured, frozen shrimps (n=20) and shrimps that were matured using two different procedures: ice maturation for 4 days (n=20) or maturation in 2% salt brine for 40-44 h (n=20) were compared. Proteins from shell and epidermis were profiled by 2D-gel based proteome analysis and proteins of interest were identified by tandem mass spectrometry.

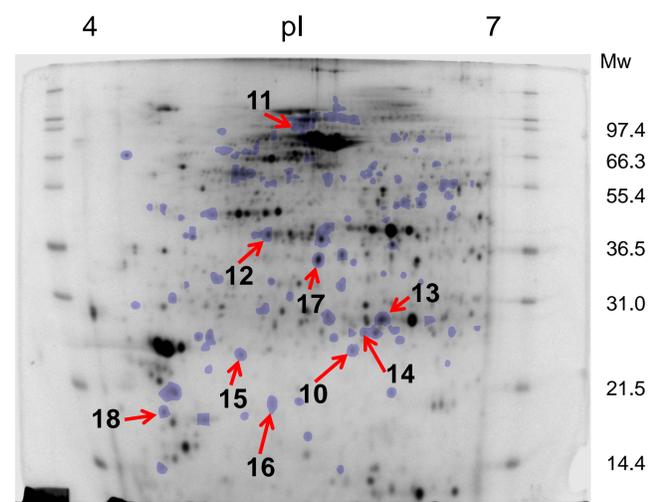
Results

136 protein spots in the epidermis and 120 protein spots in the shell differed ($p < 0.01$) in spot volume comparing the three experimental groups. A low false discovery rate ($q = 0.037$) indicates < 4 spots to be false positives.



Epidermis

Of the 136 highlighted spots (blue), 49 increase and 42 decrease during maturation on ice or in salt. The remaining 45 spots change differently in ice and salt.



Shell

Of the 120 highlighted spots (blue), 58 increase and 50 decrease during maturation on ice or in salt. The remaining 12 spots change differently in ice and salt.

Spot no.	Protein name	Change direction
1	Hemocyanin subunit 1	↓
2	Alpha tubulin Fragment	↓
3	70 kDa heat shock protein form 2	↓
4	Myosin S1 heavy chain Fragment	↑
5	Tropomyosin	↓
6	Skeletal muscle actin 6 Fragment	↑
7	Myosin heavy chain Fragment	↓
8	Alpha actinin Fragment	↑
9	Hemocyanin subunit 1	↓

Spot no.	Protein name	Change direction
10	CYP302 Fragment OS	↓
11	Myosin heavy chain Fragment	↑
12	Skeletal muscle actin 6 Fragment	↑
13	Arginine kinase 1	↑
14	Myosin heavy chain Fragment	↑
15	Sarcoplasmic calcium binding protein	↑
16	Skeletal muscle actin 6 Fragment	↑
17	Arginine kinase 1	↑
18	Sarcoplasmic calcium binding protein	↑

Conclusion: Maturation caused marked changes in the epidermis and shell proteome