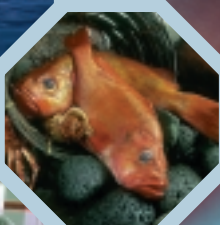




ANNUAL REPORT 1998



Editor: Anna Elísabet Ólafsdóttir

Design and layout: Auglýsingastofan Einn, tveir og þrír

Photography: Ragnar Th. Sigurðsson

Translation: Bogi Arnar Finnbogason

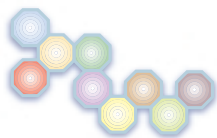
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Icelandic Fisheries Laboratories

Annual Report for 1998

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From catch to consumers

There was a considerable increase in the activities of the Icelandic Fisheries Laboratories (Rf) in 1998 and the institute expanded its operations in all divisions. Revenue increased and topped ISK 300 million for the very first time. Now only one króna out of every three comes directly from the State Budget. This fact alone calls for a reassessment of the role and the activities of Rf.

Rf's strategy planning came therefore at a good time when it was presented in November in a ceremony at the National Gallery of Iceland. The guests were addressed by Þorsteinn Pálsson, Minister of Fisheries, and Páll Kr. Pálsson, Managing Director of the New Business Venture Fund.

Rf's strategy planning clearly lays out the role and main areas of interest for Rf over the next few years. It states that the role of Rf is to conduct research, carry out analyses and tests, offer consultation, disseminate information and be in charge of education for the fishing industry, the food industry and related fields. Rf sees itself playing a major role in its field in the future and aims to take an active part in all the changes foreseeable in the industry. Rf aims to increase the efficiency of research and

development work and increase competitiveness of our customers, an area where we see great potential.

The projects run by the R&D Division span the area "from catch to consumers". The range of available equipment increased dramatically this year and between ISK 25-30 million were invested in new technology. The institute participated actively in several Nordic and European Union research projects as well as in projects with Icelandic companies.

In the Analytical Services Division the emphasis was placed on increasing service at our branches and finding new ways to improve the service. Three new analyses were accredited during the year.

There was a great increase in publishing and the running of courses this year with an average of two courses a month. The importance of Rf as an educational institution is becoming ever more apparent. Rf's staff play a major role in teaching food science at the University of Iceland, the University of Akureyri, the United Nations Fisheries' Training Programme, the Fish Processing School of Iceland and several other schools.

However, despite the growth and prosperity of last year there are clouds on the horizon. Rf sees great potential in increasing efficiency and effectiveness in its research activities in Iceland by integrating them with related fields. Also, Rf sees great possibilities in continuing its participation in projects outside the capital. Rf's strength lies in the skills of its staff and working procedures, providing the flexibility necessary to tackle the constant changes in the business environment.

Our task ahead is to meet the targets set out in Rf's strategic planning. We are committed to making Rf an even better centre of practical expertise for the fishing and food industries and to provide first class service for our numerous customers.

Hjørleifur Einarsson, Director

Summary of Rf's strategic planning



In 1998, strategic planning was formulated within the Icelandic Fisheries Laboratories. This was a very ambitious work and the outcome was a strategy spanning Rf's activities for the next five years. The strategic plan was presented in a special document and was introduced to a large audience at its launch at the National Gallery of Iceland. The invitations which were sent out received deserved acclaim as Rf cleverly drew attention to the fact that the work it does is worth every single penny.

The strategic planning document contains clear information on:

- The main role of Rf
- Rf's vision of the future
- Interested parties in Rf
- Main areas of Rf's strategy planning

According to this strategic plan, the main role of the Icelandic Fisheries Laboratories is to act as a research and service institute for the fish-

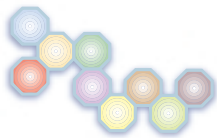
ing industry, the food industries and related fields. Rf does this by conducting research, carrying out analyses and tests and by offering consultation in its area of expertise. In this way, Rf helps to boost prosperity and provide a basis for increasing export revenue from seafood products, improving the competitiveness and profitability of food companies as well as promoting the sustainable utilization of resources.

Rf places great importance on the systematic dissemination of the information constantly being acquired through its research. This is achieved by using a variety of media, from academic reports and research articles (often in peer reviewed journals) to general consumer-oriented newspaper articles, courses and regularly up-dated homepages.

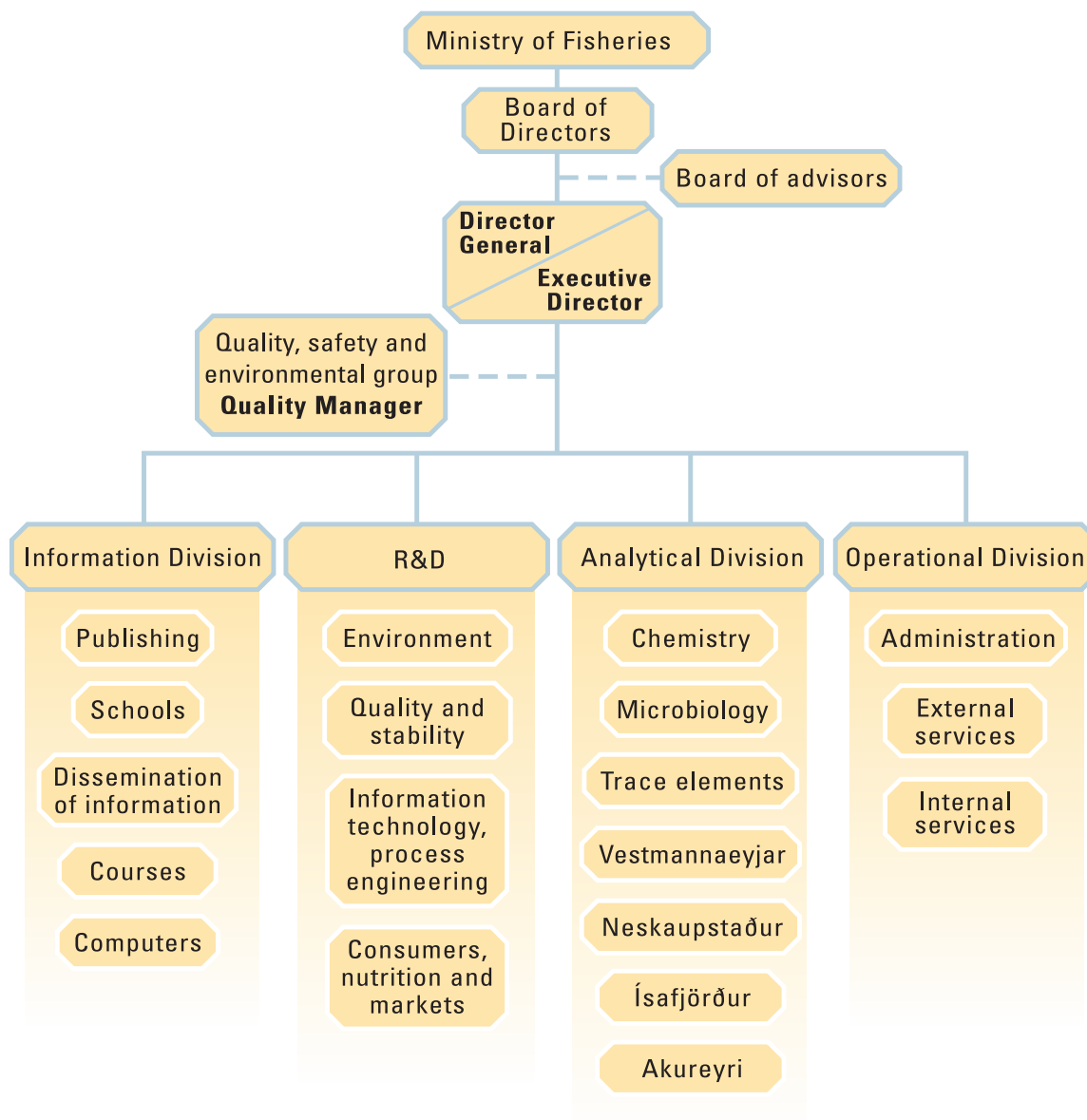
Rf's wide-ranging co-operation with a number of educational institutes puts it in a leading position in this field. Rf provides the best available experts in various fields as teachers in a number of schools.

Rf strives to be the leader in the fields of research, analyses, consulting and education in food production in Iceland, especially within the fishing industry, Rf's area of expertise. Rf also aims to be a major force in environmental issues.

Rf has the ambition to employ highly-qualified personnel, with regard to education, work experience, initiative, and readiness to co-operate. These factors go to make this a highly sought after place of employment with excellent facilities, opportunities for further education, promotion and competitive working conditions.



Rf's Organizational Chart



Analytical Services Division

The role of the Analytical Services Division includes:

- providing specialized, quality and rapid service for research and industry,
- achieving progress in the most efficient way possible,
- ensuring that its service clears its expenses and is competitive.

In 1998, while service continued in the traditional manner, greater emphasis was placed on service at Rf's branches so that Rf could better meet the wishes of its customers outside the Reykjavík area. The busiest time for analyses is usually February-April and July-August, the period in between being rather even in its workload. In autumn there is sometimes a quiet period in service, and the plan is to occupy this time with analyses which may be used to assemble data both for Rf and its customers.

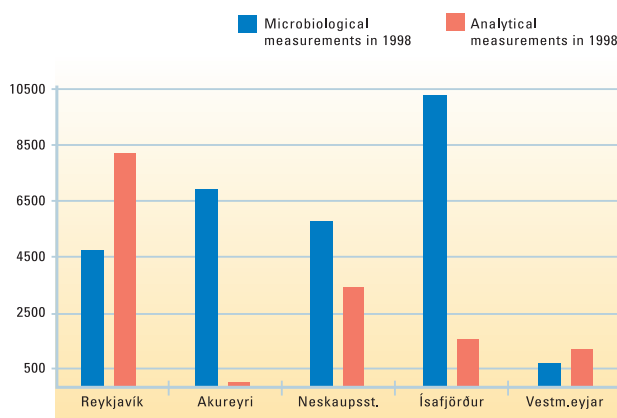


with liquid analysis were adopted. Analyses on rot-inducing amines (histamine, cadaverine, tyrosine, putrescine) are especially used in the production of fish meal to measure the quality of the raw material for processing.

Changes are being made to the premises of Rf's branches in Ísafjörður and Neskaupstaður.

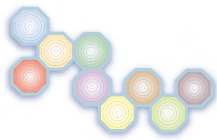
Excellent premises, which take requirements on accreditation, healthy and pleasant working conditions into consideration, help us to further improve the service to our customers. It is hoped that 1999 will see the accreditation of our branches, continuing the work done in Reykjavík in 1997.

In recent years, Rf has been using the accounting program Navision Financials which encompasses all the projects being worked on at Rf, the registration of the hours worked by employees and the issuing of invoices. In December 1998, work was started on linking the receiving of samples, the issuing of results and the issuing of invoices into one process. This work will be completed in early 1999. The new system allocates a specific number to each sample received by Rf, making it easier to keep track of its progress from the time it arrives to the time when the analysis is completed and the customer has received the results. The system has to ensure the traceability demanded by accreditation and at the same time the opportunity is given to facilitate the compiling of results for individual customers. In future this could be a component of Rf's data bank.



The Analytical Services Division operates in seven groups: chemistry, microbiology and trace element laboratory and the branches in Akureyri, Ísafjörður, Vestmannaeyjar and Neskaupstaður. Priority is given to organization, increasing profit and changing the emphasis in the analyses. These teams work to re-evaluate the rate of charges, improve efficiency in the analyses with new equipment, transfer analyses from place to place and at the same time consider the need for new methods to conduct such analyses.

In 1998, two new methods for carrying out analyses on rot-inducing amines and free amino acids



Research and Development Division

The activities of the R&D Division increased significantly from 1997, the total turnover coming to ISK 170 million. The acquisition of new technology played a major role in the activities of the division, and investments were made in equipment for identification of microorganisms, gas chromatography/mass spectrometry for research on volatile compounds (aromas), brine freezing and refrigeration/freezing simulators. The division was involved in about 60 projects in 1998. Many of the projects were international with funding from the European Union (13) or Nordic funds (11). Many projects were also financed partly by grants from the Icelandic Research Council (RANNÍS) (30). The projects were carried out in four project groups.

Environment

The goal of the projects in this group is to increase knowledge in the field of environmental issues, safety and health. The main research projects in this field were on monitoring of the marine ecosystem, sewage dispersion and dissolution, air pollution and environmental issues concerning the fish meal industry, cleaner production technology and life cycle assessment.

Research was also carried out on pathogens in fish and meat and microflora in farm-raised halibut.

Quality and stability

The majority of the division's projects fell into this group. Its role is to increase knowledge on the changes that food undergoes from the procuring of the raw material through the production process and the influence this has on quality and stability. Sensory evaluation projects were prominent in this group in 1998. There was an Icelandic project on the computerization of sensory evaluation for shrimp processing and a European project on the computerization of sensory evaluation for demersal fish processing. Both these projects are being worked on with co-operation between companies and institutions, both domestic and foreign. Other European projects being tackled within this group are the quality and safety of smoked fish, Maillard-browning of food, a lamb research project and research on volatile compounds with gas sensors (electronic nose) and gas chromatography. Research on the stability of food was prominent, such as on frozen cod, pâté and herring products, vinegar-pickled herring and a project investigating the stability of capelin meal.

Information, processing and measurement technology

The role of this group is to strengthen the field of information, processing and measurement technology, with defined research projects and procedures at the forefront. Two European projects come under this group: Firstly, a project aiming at the development of technology to remove the meat from tuna fish heads and, secondly, the use of capelin for human consumption. Both these projects are carried out with the co-operation of Icelandic and overseas companies and institutes. Research was also carried out together with Icelandic companies on the processing of fish at sea as raw material for further processing. A project on traceability was also underway. During the year, emphasis was placed on initiating research on the influence of fishing gear and handling on the quality of fish products.



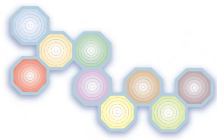
The consumers and the market

The role of this group is to conduct research to support product development and the marketing of food. A further role is to increase knowledge of the markets and the views of consumers with the aim of increasing the value and variety of products from Icelandic food companies, and at the same time to show the special position occupied by Icelandic food products, thus reinforcing their positive image. The main areas of research carried out in 1998 were the "Sous Vide" processing of food, a European project on quality labelling of fish and a Nordic project on food packaging.

Dissemination of the results

In 1998, the results of these projects were mainly presented in Rf reports.

Ten articles were published in scientific journals/books/conference papers in which employees from the division were chief writers or co-writers. One book "Methods to determine the freshness of fish in research and industry", partly edited by Rf's employees, was published. The book was a conference proceedings and appeared after the concluding meeting of the project "Evaluation of fish freshness." In addition to this, employees from this division presented their research projects at Icelandic and overseas conferences and presentations.



Information Division

Last year, the Information Division participated in Rf's strategic planning process where strategy was laid out for the next five years. Rf aims to take an active role in increasing educational work, both at home and abroad. Rf also plans to set up a data bank containing information about the fishing industry from which businessmen and academics can obtain vital information concerning most aspects of this industry and food processing.

There will also be a concerted effort to collect, process and disseminate information related to the activities of Rf.

In 1998 Rf received a grant from the Icelandic Research Council (RANNÍS) to produce teaching material for seamen in a multimedia format; the project has been under preparation for some time. This project is being tackled together with Gagarin ehf. which is responsible for the multimedia design. By creating this teaching disc, Rf is realising one of its major ambitions, i.e. to make readily available the knowledge it has acquired.

Publishing

General publications from Rf are normally in the form of reports describing the results of projects. These reports may either be open and accessible by everybody or are classified and therefore confidential for several months or even years. During the year, 23 reports were published, 15 of which were classified.

Rf regularly publishes Rf's Advisory Notes, booklets about specific topics presented in a straightforward manner.

Three times a year, Rf publishes a newsletter covering the main activities of Rf at the time.

The most prominent publication of the year was the results of Rf's strategic planning. This project was concluded in the autumn with the publication of a special strategic planning document.

Courses

Courses have become an established part of the activities of the Information Division. For the

first few years, the courses were mainly open or general but in recent years there has been a great increase in demand by companies for courses specially designed for their employees. This has proved most successful as it means that issues relating to each specific company can be given special attention.

There was a great increase in the number of courses held during the year with a total of 27 courses being held for hundreds of participants. There were 15 general courses and 12 specially-designed company courses.

Co-operation with educational institutions

Co-operation with educational institutions is an important part of the Information Division's activities. During the year, this co-operation was re-evaluated and significantly increased. A formal agreement was concluded between Rf and several educational institutions on Rf providing people to teach within the schools. This co-operation creates a valuable link between industry and the schools. By virtue of this co-operation, the schools obtain access to the knowledge and experience shared by the employees of Rf and also to their facilities. At Rf, many Master's students have completed their theses under the supervision of its specialists.

Home Page

Work on Rf's home page has been in full swing and new information is continually being added. The aim is that the web provides a thorough survey of the Rf's activities, e.g. the service on offer and projects in progress. A special website was opened during the year for the project "QimIt," a European project in which a computerized system is being developed for assessing the freshness of fish. The website can be found on: <http://qimit.rfisk.is>

Rf's e-mailing list has also grown. Once a month it presents various up-to-date issues concerning food processing, offering an excellent way to keep abreast of developments of events concerning Rf.

Operations Division

There was a significant increase in the turnover of Rf in 1998. The total revenue for 1998 was approximately ISK 304 million, compared with ISK 246 million for the previous year. This constitutes an increase of some 20%. The state contribution for the year was ISK 107 million, 35% of the total revenue.

Rf's total annual expenditure came to approximately ISK 307 million, compared with approximately ISK 260 million for the previous year, an increase of 18%. The biggest rise was in wage expenditure which increased by about 22%. This can mostly be explained by an increase in wage-related expenditure owing to the pension commitments of government institutions during the year.

Thus, expenditure exceeded revenue by approximately ISK 4 million, 1.3% of turnover, in 1998.

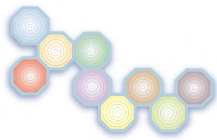
In spite of these figures, positive results were achieved in many areas and work will continue

to improve operations. Rf's project accounting system is fast approaching the goals it was set. The system developed by Rf will be implemented in 1999 by most institutions linked to the Joint Office of the Industry Research Institutes.

Last year, work was commenced in accordance with a new system of employee dialogue. This system, adopted by Rf, was developed in co-operation with staff and is adapted to the activities of Rf.

One of its purposes is to ensure that the skills of the employees correspond to the job requirements made of Rf and to the objectives of Rf. The system is also designed to ensure that what the employees are paid matches their ability and to ensure that each employee develops and thrives in his/her work. The system should also ensure equality in the workplace. The success of this work is already in evidence.

	1998	1997	Change
Revenue	in thous. ISK	in thous. ISK	
Own revenues	195,970	146,011	34%
State Contribution	107,825	100,277	8%
Total revenue	303,795	246,288	23%
Expenditure			
Wage expenditure	188,488	154,581	22%
Various operating	91,617	86,677	6%
Purchase of assets	27,736	19,071	45%
Total expenditure	307,841	260,329	18%
Operating Performance	-4,046	-14,041	
Percentage of turnover	- 1.3%	- 5.7%	



Branch Activities

Akureyri

Akureyri has an Analytical Services Division and an R&D Division, employing a total of six people. Two work in the Analytical Services Division and four in the R&D Division. A new project manager for the Analytical Services, Jenný Dögg Björgvinsdóttir, began work this year.

About 2,200 samples were tested in the Analytical Services Division this year, in-company analyses playing a greater role than ever before. The branch worked on getting accreditation for the most common analyses and the task is expected to be completed during 1999.

A variety of projects were worked upon during the year in the R&D Division. The main ones were:

Integrated storage techniques looking at the effect of oxygen scavengers, ethanol vapour and modified atmosphere packaging on the quality and shelf life of fresh fish, as separate factors and together. It is hoped that this technique can replace or be added to the storage techniques used for fresh fish today. The project was run jointly by Rf in Akureyri and the Akureyri Trawler Operating Company. A grant for the project was obtained from the Icelandic Research Council (RANNÍS).

Microflora in farm-raised halibut larvae in Iceland. This is a three-year project in collaboration with the Eyjafjörður Fish Hatchery Ltd. (Fiskey hf.) with a grant from the Icelandic Research Council (RANNÍS). The aim of the project is to map and try to control the composition of microflora in halibut fry during initial feeding. High bacteria levels are considered one of the main causes of fry fatality, but the fry need to be fed with live fodder (zooplankton) in the first weeks/months of life.

A project on the Maillard reaction. This is a large European project (FAIR) which began in 1996 and concerns Maillard-browning in food products. Thirteen research teams from seven

different countries are working on the project. Maillard-browning takes place when protein or amino acids combine with sugar in a sequence of complex chemical reactions. This usually happens in foods which are being heated. Some of these substances are considered carcinogenic.

Ísafjörður

1998 was a very good year for operations in Rf's Ísafjörður branch. Revenue increased from 1997 to 1998 by approximately ISK 1.5 million which must be considered an excellent result because 1997 was thought of as being the best year to date. The total number of analyses was 10,284, performed on 3,594 samples, mostly samples of shrimp products, both frozen and preserved. About 70% of the samples were shrimps, the others fish, water and seawater.

The number of staff remained the same at three employees. One person was employed over the summer on a temporary basis which meant that the branch did not have to close for the summer. This arrangement proved popular among Rf's customers.

The employees of the branch participated in one research project during the year, a project about *Listeria* in the food-processing industry. In the project an attempt is made to isolate *Listeria* from the processing environment and then, if applicable, to trace the origins of the *Listeria* strains.

Last year, a statement of intent was issued concerning the activities of a development centre affiliated to Rf. Tenders were invited in December and work was due to commence in January 1999. The development centre will be a place where various institutions in Ísafjörður will work together.

Neskaupstaður

As in previous years, the main activities of Rf's Neskaupstaður branch were service analyses, 90% of which was service to the fish meal industry of eastern Iceland. Eight fish meal factories, producing 60-70% of Iceland's fish meal, are located in the service area covered by the branch.

In 1998, the number of samples was somewhat less than in 1997; this can be explained by the fact that the capelin fishing season did not start until 20th February and lasted no longer than usual. However, the most successful blue whiting fishing season in history ensured that service analyses were in actual fact not fewer than usual. Samples also came from freezer plants, shrimp processing plants and other fish processing factories in eastern Iceland. The service analyses were nearly equally divided between chemical analyses and microbiological analyses.

A new employee was hired during the year, bringing the total to three, each in a full-time position.

Work on new premises at Mýrargata 10 was commenced during the year. The premises are rented from Eastern District Higher Secondary Vocational School and they are to be occupied in early 1999. This will mean a great improvement in working facilities for the employees, because ever since its founding in 1977, the branch has been located in the fish meal factory of the Síldarvinnslan in Neskaupstaður.

Vestmannaeyjar

1998 was an excellent year for Rf's branch in Vestmannaeyjar and there was a slight increase in turnover and the number of samples handled. The activities of the branch are, however, somewhat dependent on fluctuations in fishing and pelagic fish processing. Nevertheless, 1998

was a good year for the fish-oil-extracting industry while the freezing industry suffered. There was a significant increase in the number of samples brought to the branch in 1998 compared with the previous year, with the greatest difference being in the number of microbiological analyses. During the year 709 samples were received by the chemical laboratory and 685 samples by the microbiological laboratory.

Along with the all the other bodies linked to the Research Centre, the branch helped with the preparations for the return of the killer whale Keiko in September. The quality of the seawater in Klettsvík was researched and this research has since been followed up. The quality of the fish used to feed Keiko has also been tested.

There have been a few changes of personnel in the branch. An employee working 50% time in the microbiological laboratory quit, was replaced by another in a full-time position. The workload of the other employees was also increased to the effect that there were 3.25 full-time positions at the turn of the year.

Autumn saw the start of preparations for the establishment of a product development laboratory which is scheduled to open in spring 1999. It will carry out work on the development of new products and working procedures in co-operation with the food industry in southern Iceland. It is hoped that it will be possible to work on product development of more than just fish, e.g. meat and other food products. A product development laboratory such as this also creates the potential for collaboration with universities in the field of food science, e.g. by having students complete their final dissertations in co-operation with the branch and the food industry in the area.



Publishing and educational activities



Rf reports – Rf reports contain the results of projects worked on at Rf. Twenty-three reports were published during the year, each selling for ISK 1,500. Subscribing to the reports gives you a 15% discount.

Rf Advisory Notes – These publish concentrated information on a variety of issues important for the fishing industry. Four to six new Advisory Notes booklets are published each year, costing ISK 900, or ISK 650 to subscribers.

Rf News – The newsletter is published three times a year. It reports on the main developments at Rf, announcing reports to be published, forthcoming courses, etc. Subscription is free of charge.

Courses – A booklet containing a term timetable and descriptions of the courses on offer is published twice a year. Subscription is free of charge. Rf offers a variety of courses which are either held at Rf or at the relevant company.

Courses which have been held up to now include: Freezing seafood products. Drying fish products. Calibration of scales, thermometers and pH indicators. Saltfish processing. Handling of fish on board ships. Sensory evaluation. Chemical analyses for the fish meal industry. General course for the fish meal industry. Hygiene and cleaning. Healthy seafood products. Smoke-curing of food. Transportation and storage of frozen food. Transportation and storage of fresh fish. Shrimp processing. Cleaner environment – better production. Internal inspection for fresh fish. Use of binding material in fish processing. Course for crews of processing ships. Water is food.

Electronic newsletter – Every month, Rf sends out information by e-mail, offering a current survey of what is happening at Rf and providing an excellent and succinct overview of Rf's activities. Subscription is free of charge. You can send an e-mail to info@rfisk.is and ask to be added to the mailing list.

Homepage – the homepage provides a range of information and is a good way of disseminating information both to and from Rf. For example, it is possible to search through Rf's report and publication archive as well as accessing summaries of published reports. The website is at www.rfisk.is

Publications

Open reports

Birgir Guðlaugsson: Freeze-drying with geothermal steam. Experiments on Reykjanes (in Icelandic). Rf report 2-98.

Guðmundur Stefánsson and Kári Pétur Ólafsson: The effect of varying acidity on the vinegar curing of herring fillets (in Icelandic). Rf report 5-98.

Ragnar Egilsson: Information systems for fish markets (in Icelandic). Rf Report 6-98.

Sigmar V. Hjartarson, Hjörleifur Einarsson, Hannes Magnússon and Sveinn Víkingur Árnason: Bulk Storage of Cod. Comparison of Ice, CSW and CO₂ - Saturated CSW Storage. Rf Report 7-98.

Birna Guðbjörnsdóttir and Hjörleifur Einarsson: Assessment of cleaning with an ATP-measurement device (in Icelandic). Rf Report 9-98.

Guðrún Ólafsdóttir and Emilía Martinsdóttir: Final Report of the Concerted Action "Evaluation of Fish Freshness" AIR3 CT94 2283, December 1997-April 1998. Rf Report 12-98.

Sigrún Guðmundsdóttir and Guðmundur Stefánsson: Shelf life of spice-salted capelin (in Icelandic). Rf Report 13-98.

Classified Reports

Guðjón Atli Auðunsson, Elín Árnadóttir, Helga Halldórsdóttir, Þuríður Ragnarsdóttir and Öyvind Glömmi: Survey of inorganic trace elements and PAH-elements in the marine biosphere (in Icelandic). Rf Report 1-98.

Birna Guðbjörnsdóttir: Snow crab (In Danish). Rf Report 3-98.

Gunnar Páll Jónsson: Greenland halibut (In Danish). Rf Report 4-98.

Margrét Bragadóttir, Richard Hansen and Birgir Guðlaugsson: Enhancing Stability and Economy of Salted Dried Whole Capelin. Rf Report 8-98.

Birna Guðbjörnsdóttir and Hjörleifur Einarsson: Assessment of hygiene in the Icelandic fishing industry (In Icelandic). Rf Report 10-98.

Margrét Bragadóttir: Redfish Colour-Processing Improvements Onboard Freezing trawlers. Rf Report 11-98.

Þyri Valdimarsdóttir, Ása Þorkelsdóttir, Emilía Martinsdóttir, Óskar Í. Sigurðsson and Þuríður Pétursdóttir: Development of methods to assess the quality of Arctic char for export (In Icelandic). Rf Report 14-98

Richard Hansen: Capelin drying . Report No. 2. (In Icelandic) Rf Report 15-98.

Emilía Martinsdóttir, Hannes Magnússon and Kári P. Ólafsson: Fillets frozen at sea as a chilled product (In Icelandic). Rf Report 16-98.

Arnheiður Eyþórsdóttir and Anna Margrét Jónsdóttir: Transportation of fillets during processing – pumps instead of conveyor belts (In Icelandic). Rf Report 17-98.

Jón Heiðar Ríkharðsson, Ragnar Örn Egilsson, Sævar Kristinsson and Ingi Þór Hermannsson: Productivity in processing on land (In Icelandic). Rf Report 18-98.

Hélène Liette Lauzon: Shrimps - Hólmadrangur I (In Icelandic). Rf Report 19-98

Eva Yngvadóttir and Helga Halldórsdóttir: Pollution monitoring in the sea off Iceland (In Icelandic). Rf Report 20-98.

Richard Hansen: Brine freezing (In Icelandic). Rf Report 22-98.

Gunnar Páll Jónsson and Kári P. Ólafsson: Roe on seaweed (In Icelandic). Rf Report 23-98.

Rf Advisory Notes

- Nr. 9 Smoke-curing of food (In Icelandic). Kári P. Ólafsson and Hélène Liette Lauzon.
- Nr. 10 Gaping in fish (In Icelandic). Jónas Bjarnason.
- Nr. 11 Rigor mortis in fish (In Icelandic). Jónas Bjarnason and Sigurjón Arason.

Peer reviewed articles

G. Ólafsdóttir. Application of gas sensors to monitor freshness of fish and fish products. In Proceedings



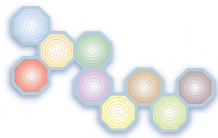
from "Electronic Noses in The Food Industry", sponsored by SIK and MATFORSK, Stockholm, Sweden, 16th-17th November, 1998.

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G. Ólafsdóttir, and Fleurence, J. 1998. Evaluation of fish freshness using volatile compounds - Classification of volatile compounds in fish. In Methods to Determine the Freshness of Fish in Research and Industry, Proceedings of the Final meeting of the Concerted Action "Evaluation of Fish Freshness", AIR3 CT94 2283. Nantes Nov. 12-14, 1997. International Institute of Refrigeration, 55-69.



Research Projects for 1998

(This is not a complete list)

No	Description	Responsible person
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Environment and health

The role of this group is to increase knowledge in the field of environmental issues, safety and health.

1087	Hygiene and cleaning	Birna Guðbjörnsdóttir
1267	Inorganic trace elements in Icelandic food	Guðjón Atli Auðunsson
1300	Life cycle assessment	Helga R. Eyjólfssdóttir
1314	Air pollution in the fish meal industry	Guðrún Ólafsdóttir
1323	AMSUM 97	Helga Halldórsdóttir
1345	Seabirds around Iceland	Guðjón Atli Auðunsson
1353	Micro-organisms in farmed halibut	Rannveig Björnsdóttir
1359	Energy savings	Eva Yngvadóttir
1361	Snow crab and Greenland halibut - assessment of risk	Birna Guðbjörnsdóttir
1368	Pathogens in fish	Birna Guðbjörnsdóttir
1369	Pathogens in meat	Birna Guðbjörnsdóttir
1375	Design and hygiene	Eva Yngvadóttir
1383	Krossanes - environmental issues - environmental issues	Richard Hansen
1385	AMSUM - 98	Helga Halldórsdóttir
1395	QUASH	Öyvind Glömmi
1399	Wood in the food industry	Birna Guðbjörnsdóttir
1400	REYKJAVÍK - Environmental impact 98-99	Guðjón Atli Auðunsson
1401	Seepage from rubbish dumps	Jóhann Örlygsson

Quality and stability

The role of this group is to increase knowledge of changes in food products from the procuring of raw materials to the consumption of the product and the effects of these changes on quality and stability

1050	Ripening of herring	Guðmundur Stefánsson
1057	Cod hatching	Sigurður Einarsson
1068	Shelf-life predictions	Hélène Liette Lauzon
1135	The use of gas sensors	Guðrún Ólafsdóttir
1139	Evaluation of fish freshness	Guðrún Ólafsdóttir
1165	Fillets frozen at sea	Emilía Martinsdóttir
1179	Vinegar-pickling of herring	Guðmundur Stefánsson
1180	Effects of high-fat-content feed	Soffía Vala Tryggvadóttir
1183	Redfish colour	Margrét Bragadóttir
1216	Quality and safety of smoked fish	Hélène Liette Lauzon
1233	Carrie	Guðmundur Stefánsson
1255	Maillard	Hjörleifur Einarsson
1268	Quality standards for Arctic char	Þyrí Valdimarsdóttir
1269	Seasonal variation in shrimp for processing	Helga R. Eyjólfssdóttir
1276	The effect of rigor mortis on saltfish processing	Sigurjón Arason
1277	The effect of rigor mortis on the quality of fish	Sigurjón Arason
1290	Stability of capelin meal	Margrét Bragadóttir
1291	Fish roe and herring	Guðmundur Stefánsson
1304	Qualpoiss 2	Sigurður Einarsson
1310	Stability of frozen herring	Guðmundur Stefánsson
1312	Stability of frozen cod products	Margrét Geirsdóttir
1315	Computerized sensory evaluation & electronic nose in shrimp processing	Emilía Martinsdóttir
1318	Nature and causes of gaping in cod flesh	Soffía Vala Tryggvadóttir
1338	Canned capelin for the Taiwanese market	Sigrún Guðmundsdóttir
1349	Physical qualities of shrimp	Sigurjón Arason
1357	Storage qualities of vinegar-cured herring	Guðmundur Stefánsson
1360	Computerized sensory evaluation in fish processing	Emilía Martinsdóttir

1367	Halophilic bacteria - rapid detecting methods	Sigrún Guðmundsdóttir
1370	OVAX - lamb	Guðjón Þorkelsson
1371	Ram meat	Þyrí Valdimarsdóttir
1372	Evaluation of mutton	Guðjón Þorkelsson
1374	Evaluation of pork	Guðjón Þorkelsson
1380	NF - saltfish	Sigurjón Arason
1381	TMAO-aldolase in fish products	Sigurður Einarsson
1382	Electronic nose	Guðrún Ólafsdóttir
1384	Integrated storage methods	Grimur Eggert Ólafsson
1392	Quality of cod flesh resulting from varying levels of feeding	Soffía Vala Tryggvadóttir
1394	Bacteriosin - Concerted action	Hélène Liette Lauzon
1403	Modified atmosphere systems at sea	Guðmundur Stefánsson
1404	Physical qualities of saltfish	Sigurjón Arason
1413	AROMA	Guðrún Ólafsdóttir

Information, processing and measurement technology

The role of this group is to promote research in the field of information, processing and measurement technology in which projects and working procedures are at the forefront.

1056	Products frozen at sea	Helga R. Eyjólfssdóttir
1090	Continuous measurement technology (Nordfood)	Helga R. Eyjólfssdóttir
1106	Water-jet deboning	Kristberg Kristbergsson
1157	Freeze drying of seafood products	Birgir Guðlaugsson
1161	Capelin Drying	Helga R. Eyjólfssdóttir
1241	Standard for fish silage - Nordtest	Sigurjón Arason
1242	Herring for human consumption	Gunnar Páll Jónsson
1257	Additives in shrimps	Helga R. Eyjólfssdóttir
1287	Saltfish yield during brine	Jónas Bjarnason
1307	Scallop powder	Sigurjón Arason
1309	Landing of capelin	Sigurjón Arason
1326	Development of automated tuna head meat removal	Guðmundur Stefánsson
1327	Protein from capelin	Guðmundur Stefánsson
1328	Transporting fillets	Arnheidur Eyþórsdóttir
1334	Information systems for fish markets	Ragnar Örn Egilsson
1340	Capelin for human consumption	Richard Hansen
1351	Productivity in fish processing	Jón Heiðar Ríkhartsson
1356	Traceability of seafood products	Ragnar Örn Egilsson
1358	Processing of whelk	Gunnar Páll Jónsson
1366	Refrigerating boiled shrimp	Sigurjón Arason
1378	Individually quick frozen fillets processed at sea as a raw material	Helga R. Eyjólfssdóttir
1390	Improvements to fish drying	Richard Hansen
1396	Concerted action on pelagic fish	Guðmundur Stefánsson
1398	Brine freezing	Richard Hansen
1412	Effect of fishing gear and handling on quality	Magnús Freyr Ólafsson
1418	Multi-faceted sensor technology	Soffía Vala Tryggvadóttir

Consumers and markets

The role of this group is to conduct research to aid product development and the marketing of food

1184	Icelandic Seaweed	Guðmundur Stefánsson
1260	Roe on seaweed	Gunnar Páll Jónsson
1266	SOUS VIDE processing of food	Guðjón Þorkelsson
1313	Shelf life of ready made fish dishes	Áslaug Högnadóttir
1373	Horse meat - export	Guðjón Þorkelsson
1386	Shrimps - Hólmadrangur I	Hélène Liette Lauzon
1387	Bread in the Nordic countries	Þyrí Valdimarsdóttir
1415	Packaging - concerted action	Grimur Eggert Ólafsson
1416	Quality labelling of fish	Guðrún Ólafsdóttir

Management and Employees 1998

Board of Directors



Árni Kolbeinsson
Secretary-General of the Ministry of Fisheries.
Chairman of the Board since 1986. Appointed by the Ministry of Fisheries.



Alda Möller
Director.
Member of the Board since 1998.
Appointed by Rf's Advisory Council.



Bjarni Grímsson
Director of Fisheries.
Member of the Board since 1994.
Appointed by the Fisheries Association of Iceland.

Director General



Prof. Hjörleifur Einarsson
Microbiologist, at Rf since 1987.

Analytical Services Division



The Analytical Services staff.

Heiða Pálmadóttir, Siving.
Civ. Eng. Chemical engineer, at Rf since 1982.
Director of Analytical Services.

Ásta M. Ásmundsdóttir, M.Sc.
Chemist, at Rf since 1996.

Ásthildur Eyjólfssdóttir.
Assistant, at Rf since 1971.

Baldvin Valgarðsson, B.Sc.
Food scientist, at Rf since 1997.

Eyrún Þorsteinsdóttir.
Researcher, at Rf since 1974.

Greta M. Garðarsdóttir.
Assistant, at Rf since 1990.

Gunnhildur Gísladóttir, B.Sc.
Chemist, at Rf since 1997.

Hannes Magnússon, M.Sc.
Microbiologist, at Rf since 1977.

Haraldur Antonsson.
Agronomist, at Rf since 1975.

Helga Halldórsdóttir, B.Sc.
Chemist, at Rf since 1994.

Ingibjörg Jónsdóttir, B.Sc.
Food scientist, at Rf since 1997.

Ingibjörg Rósa Þorvaldssd., B.Sc.
Food scientist and industrial technical engineer, at Rf since 1998.

Jarmíla Hermannsdóttir.
Researcher, at Rf since 1972.

Páll Steinþórsson, B.Sc.
Food scientist, at Rf since 1985.

Robert Vincent Ryan, B.Sc.
Chemical engineer, at Rf since 1998.

Sigurður Einarsson, M.Sc.
Food scientist, at Rf since 1993.

Research and Development Division



Some of the R&D staff.

Guðmundur Stefánsson, Ph.D.
Food scientist, at Rf since 1986. Director of Research and Development.

Ása Þorkelsdóttir, B.Sc.
Food scientist, at Rf since 1988.

Birgir Guðlaugsson, B.Sc.
Mechanical engineer, at Rf since 1994.

Birna Guðbjörnsdóttir, B.Sc.
Food scientist, at Rf since 1980.

Áslaug Högnadóttir, B.Sc.
Food scientist, at Rf since 1997.

Emilía Martinsdóttir, Siving.
Chemical engineer, at Rf since 1975.

Eva Þingvadóttir, M.Sc.
Chemical engineer, at Rf since 1989.

Guðjón A. Auðunsson, Ph.D.
Chemist, at Rf since 1988.

Guðjón Þorkelsson, M.Sc.
Biologist and food scientist, at Rf since 1998.

Guðrún Ólafsdóttir, M.Sc.
Food scientist, at Rf since 1988.

Gunnar Páll Jónsson, B.Sc.
Food scientist, at Rf since 1996.

Helga R. Eyjólfssdóttir, M.Sc.
Chemical engineer, at Rf since 1995.

Hélène Liette Lauzon, M.Sc.
Food scientist, at Rf since 1992.

Jón G. Hafsteinsson, B.Sc.
Food scientist, at Rf since 1995.

Kári P. Ólafsson, B.Sc.
Food scientist, at Rf since 1997.

Kristberg Kristbergsson, Ph.D.
Food scientist, at Rf since 1998.
Associate professor at University of Iceland.

Magnús Freyr Ólafsson, B.Sc.
Biologist at Rf since 1998.

Margrét Bragadóttir, B.Sc.
Food scientist / Chemist, at Rf since 1985.

Margrét Geirsdóttir, M.Sc.
Food scientist, at Rf since 1998.

Martin Eamon Tighe.
Researcher, at Rf since 1997.

Ósvaldur Þorgrímsson,
Researcher, at Rf since 1997.

Richard Hansen, B.Sc.
Mechanical engineer, at Rf since 1997.

Sigrún Guðmundsdóttir, M.Sc.
Microbiologist, at Rf since 1995.

Sigurgeir Örn Kortsson, B.Sc.
Food scientist and biochemist, at Rf since 1998.

Soffía V. Tryggvadóttir, B.Sc.
Food scientist and fisheries biologist, at Rf since 1986.

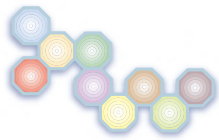
Sunneva H. Hafsteinsdóttir.
Researcher, at Rf since 1997.

Sólveig Ingólfssdóttir, M.Sc.
Food scientist, at Rf since 1994.

Þyri Valdimarsdóttir Tekn.Lic.
Food scientist, at Rf since 1998.

Þuríður Ragnarsdóttir.
Chemical technician, at Rf since 1994.

Öyvind Glömmi.
Researcher, at Rf since 1993.



Information Division



Some of the Information Services staff.

Auðbjörg Halldórsdóttir, M.A.
Director of Information Service, at Rf since 1996.

Björn Auðunsson, B.A.
Media Studies specialist, at Rf since 1998.

Eiríkur Einarsson, B.A.
Librarian, at Rf since 1971.
Head of Fisheries Library.

Elva Björk Einarssdóttir
Assistant librarian, at Rf since 1998.

Jónas Bjarnason, Dr.rer.nat.
Chemical engineer, at Rf since 1967.

Mark Townley, B.Sc. (Hons).
Chemist, at Rf since 1990.

Ragnar Örn Egilsson, B.Sc.
Marketing, at Rf since 1997.
Marketing representative.

Rósa Sveinsdóttir, B.A.
Icelandic language specialist, at Rf since 1993.
Public relations officer.

Sigurjón Arason, M.Sc.
Chemical engineer, at Rf since 1978.

Sigurlína Gunnarsdóttir, B.A.
Librarian, at Rf since 1988.
Fisheries Library.

Sveinn V. Árnason, M.Sc.
Mechanical engineer, at Rf since 1986.

Operations Division



Some of the Operations Division staff.

Jón H. Ríkharðsson, B.S., M.B.A.
Industrial engineer, at Rf since 1989. Director of Finance.

Guðlaug Guðmundsdóttir
Clerk, at Rf since 1990. Reception.

Guðlaug Marinósdóttir
Clerk, at Rf since 1995. Office supervisor.

Hjördís Bergstað.

Clerk, at Rf since 1991. Reception and document archiving

Unnur Steingrímsdóttir, B.Sc.
Biologist, at Rf since 1985. Quality Manager.

Rf in Akureyri



Some of Rf staff in Akureyri.

Arnheiður Eyþórsdóttir, B.Sc.
Food scientist, at Rf since 1988. Branch Manager. Analytical Services.

Axel Eyfjörð Friðriksson, B.Sc.
Fisheries scientist, at Rf since 1998. Research and Development.

Grímur Ólafsson, Ph.D.
Food scientist, at Rf since 1997. Research and Development.

Jenný Dögg Björgvinsdóttir, B.Sc.
Fisheries scientist, at Rf since 1997. Analytical Services.

Jóhann Örlygsson, Ph.D.
Microbiologist, at Rf since 1996. Research and Development.

Rannveig Björnsdóttir, M.Sc.
Immunologist and fish pathologist. At Rf since 1991. R&D.

Svanhildur Gunnarsdóttir.
Researcher, at Rf since 1987. Analytical Services.

Rf in Ísafjörður



Rf staff in Ísafjörður.

Kristinn Þ. Kristinsson, B.Sc.
Fisheries scientist, at Rf since 1995. Branch manager. Analytical Services.

Halldóra Jóhannsdóttir.
at Rf since 1997. Analytical Services.

María G. Halldórsdóttir.
Researcher, at Rf since 1989. Analytical Services.

Rf in Neskaupstaður



Rf staff in Neskaupstaður.

Þorsteinn Ingvarsson,
Fisheries technologist, at Rf since 1977.
Branch manager. Analytical Services.

Karl Rúnar Róbertsson, B.Sc.
Food scientist, at Rf since 1997.

Lilja H. Auðunsdóttir.
Researcher, at Rf since 1985. Analytical Services.

Rf in Vestmannaeyjar



Some of Rf's staff in Vestmannaeyjar.

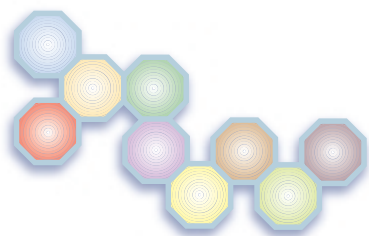
Sigmar Hjartarson, cand. scient.
Fisheries biologist and aquaculture scientist, at Rf since 1995. Branch Manager. Research and Development.

Áslaug Rut Áslaugsdóttir, B.Sc.
Biologist, at Rf since 1994.

Guðrún Sigurgeirsdóttir, B.Sc.
Food scientist, at Rf since 1993.

Margrét Lárusdóttir.
Researcher, at Rf since 1978.

Valgarð Thoroddsen, B.Sc.
Food Scientist, at Rf since 1998.



Icelandic Fisheries Laboratories

Homepage: www.rfisk.is

Reykjavík

Skúlagata 4
PoBox 1405
121 Reykjavík
Tel: +354 562 0240
Fax: +354 562 0740
E-mail: info@rfisk.is

Akureyri

Glerárgata 36
PoBox 224
600 Akureyri
Tel: +354 462 5725
Fax: +354 462 5216
E-mail: akur@rfisk.is

Ísafjörður

Árnagata 2
PoBox 64
400 Ísafjörður
Tel: +354 450 3000
Fax: +354 450 3005
E-mail: isa@rfisk.is

Neskaupstaður

Mýrargata 10
PoBox 151
740 Neskaupstaður
Tel: +354 477 1250
Fax: +354 477 1923
E-mail: nes@rfisk.is

Vestmannaeyjar

Strandvegur 50
PoBox 130
902 Vestmannaeyjar
Tel: +354 481 1111
Fax: +354 481 3114
E-mail: vest@rfisk.is