

The Performance of SLICE® for sea lice control was confirmed under commercial conditions in each of the major salmon-producing countries: [Scotland](#), [Norway](#), [Chile](#) and [Canada](#). A total of approximately 870,000 Atlantic salmon were treated in these trials.

Commercial Field Trial: Scotland

Parameters for this study are detailed below.

Housing: (16) 15m x 15m x 9m Commercial Pens with 14,163 to 15,961 Atlantic Salmon (*Salmo salar*) per pen

Treatment Design: 12 treated pens (total of 184,908 fish) and 4 untreated pens (total of 62,435 fish)

Sea Water Temperature Range: 9.8°C - 14.0°C

Salinity Range: 13.0 - 31.5 ppt (at surface)

Infestation: All fish naturally infested with *L. salmonis* and *C. elongatus* with continual reinfestation pressure during the entire study

Study Design:

Treatment Group fed SLICE-medicated feed at 50µg/kg/day for 7 consecutive days, Day 0 to Day 6, then unmedicated feed throughout the remaining trial period. [Represents feeding at a rate of 1.0% biomass/day-0.5% SLICE-medicated diet, followed by 0.5% unmedicated diet during the treatment period.]

Control Group fed unmedicated feed at a rate of 1.0% biomass/day.

Feed Preparation: SLICE-medicated feed was prepared at a commercial feed mill by coating SLICE premix onto pelleted feed, with the addition of a final coating of fish oil.

Data-Gathering Criteria: 10 fish were randomly selected from 4 treated pens and 4 untreated pens for counting of sea lice on Study Days -1, 13, 27 and 77. In addition, sea lice were

counted on 5 fish from 1 untreated pen and one treated pen on Study Days 34, 42, 49, 54, 64 and 72.

Results:

- Feeding a SLICE-medicated diet proved to be over 90% effective in the control of sea lice for 58 days after treatment.
- Reduced Skin Damage. 70 days after treatment, approximately 50% of untreated fish had dermal lesions from sea lice infestation, while less than 10% of SLICE-medicated salmon showed sea lice damage.
- Reduced Sea Lice Reproductive Potential. For up to 70 days after treatment, the percentage of gravid (egg-bearing) sea lice females on SLICE-medicated salmon was reduced by 80%. This reduction in gravid females may have dramatic impact on future sea lice populations within the SLICE treatment area.
- Well-tolerated. Fish fed a SLICE-medicated diet exhibited no adverse health effects or mortality related to this treatment.

Efficacy of SLICE (emamectin benzoate) administered daily in feed for 7 days (Day 0 to Day 6) at a dose rate of 50 µg/kg/day against sea lice (*Lepeophtheirus salmonis*) on Atlantic salmon (*Salmo salar*) naturally infested with chalimus, pre-adult and adult stages, Scotland, 1997

Study Day	# of Pens Sampled	# Fish/Pen Sampled	Treatment Group	% Efficacy	% Fish With Lice	% Gravid Females
-1(pre-treatment)	4	10	SLICE	(3.5)	95.0	56.2
-1(pre-treatment)	4	10	Untreated	(2.4)	72.5	57.9
13	4	10	SLICE	77.4	52.5	20.0
13	4	10	Untreated	(3.1)	95.0	56.5
27	4	10	SLICE	89.3	25.0	33.3
27	4	10	Untreated	(2.8)	90.0	87.9
34	1	5	SLICE	91.2	20	0
34	1	5	Untreated	(6.8)	100	100
42	1	5	SLICE	97.8	20	0
42	1	5	Untreated	(9.0)	100	75.0
49	1	5	SLICE	97.6	20	0
49	1	5	Untreated	(8.4)	100	33.0
54	1	5	SLICE	94.0	40	0
54	1	5	Untreated	(16.6)	100	36.0
64	1	5	SLICE	95.8	40	0
64	1	5	Untreated	(28.4)	100	50.0

72	1	5	SLICE	43.8	80	0
72	1	5	Untreated	(14.6)	100	67.0
77	4	10	SLICE	16.7	100	20.2
77	4	10	Untreated	(27.0)	100	55.0

() indicate the mean number of sea lice per fish

* percent efficacy was calculated by Abbott's formula based on the geometric mean number of sea lice/fish

Commercial Field Trial: Canada

An efficacy study with Atlantic salmon was conducted at 2 commercial sea farm sites in eastern Canada. Four (4) cages at each site were selected for the study, i.e. 2 cages received SLICE-medicated feed and 2 cages were untreated. A total of 76,210 fish were treated with SLICE and 75,141 fish started the study as untreated controls. Fish weighed approximately 470 gm at the start of the study and received a target dose rate of 50 µg/kg biomass/day for 7 consecutive days, Day 0 to Day 6. Feeding rates for the sites were 2.7% and 3.1% biomass/day, respectively.

Parameters and results of this study are detailed below.

Study Guidelines:

Housing: (8) Commercial rearing pens

Treatment Design: 2 replicates (1 treated pen & 1 untreated pen / replicate) for a total of 4 pens per site.

Infestation: Fish were naturally infested with sea lice, primarily *Lepeophtheirus salmonis* and secondarily with *Caligus elongatus*.

Data Collection Criteria: Salmon (10) were randomly selected from each cage by hand net at each sea farm site on Study Days, -5/-6, 7/8, 14/16, 22, 28/29, and 43/44. Additionally, at one site, 10 fish were sampled on Study Days 57 and 73 and 5 fish were sampled on Study Days 92 and 115. Fish were anesthetized and the number of sea lice (chalmus, pre-adult/adult, gravid females) were counted on each fish.

Results:

- Data were analyzed for each sea lice stage; non-motile, motile and gravid female. The percent efficacy based on the total number of sea lice/fish is shown in the table opposite.
- The untreated control pens had to be treated with Salmosan® (azamethiphos, Novartis) on three occasions during the study, Site 1 on Study Days 9, 26 and 34 and Site 2 on Study Days 10, 33 and 58. (As a result of the control group treatments, the calculated efficacy was lower than would otherwise have been observed.)
- The duration of the clinical effect of SLICE on sea lice populations was confirmed statistically through 44 days and despite considerable reinfestation pressure nearly complete sea louse control was observed through 67 days after treatment (Study Day 73
- Pre-adult, adult and gravid female sea lice were virtually eliminated on fish treated with SLICE.
- Salmon fed readily on SLICE-medicated feed and no adverse events were observed during the study.

Efficacy (%) of SLICE against sea lice (*Lepeophtheirus salmonis*) on Atlantic salmon (*Salmo salar*) in a multicentered field trial. New Brunswick, Canada, 1998

Study Day	C/T	N	Copepodites & Chalimus	Pre-adults & Adults	% Gravid Females	Total # Sea Lice
-12 (pre-treatment)	C	2	(2.0 ± 0.4)	(0.3 ± 0.2)	(0.1 ± 0.1)	(2.4 ± 0.5)
-12 (pre-treatment)	SLICE	2	(1.7 ± 0.1)	(0.7 ± 0.2)	(0.0 ± 0.0)	(2.3 ± 0.1)
-5 or -6	C	4	(3.6 ± 2.6)	(1.9 ± 0.7)	(0.0 ± 0.0)	(5.5 ± 2.3)
-5 or -6	SLICE	4	(7.4 ± 7.3)	(2.2 ± 1.6)	(0.0 ± 0.0)	(9.5 ± 5.9)
7 or 8	C	4	(3.6 ± 3.3)	(15.7 ± 10.4)	(0.1 ± 0.2)	(19.3 ± 13.4)
7 or 8	SLICE	4	16.7%	82.8%	100%	70.5%
14 or 16	C	4	(4.3 ± 4.6)	(2.2 ± 2.5)	(0.1 ± 0.1)	(6.5 ± 7.2)
14 or 16	SLICE	4	58.1%	63.6%	100%	58.5%
22	C	4	(15.7 ± 17.2)	(10.7 ± 11.7)	(0.1 ± 0.1)	(26.5 ± 28.8)
22	SLICE	4	84.1%	94.4%	100%	88.3%
28 or 29	C	4	(17.7 ± 20.9)	(8.7 ± 8.1)	(0.2 ± 0.2)	(26.3 ± 28.8)
28 or 29	SLICE	4	96.1%	94.3%	100%	95.4%
35	C	2	(34.9 ± 12.3)	(14.6 ± 7.6)	(0.3 ± 0.2)	(49.7 ± 20.1)
35	SLICE	2	80.0%	93.2%	100%	84.1%
43 or 44	C	4	(1.9 ± 1.4)	(2.6 ± 3.0)	(0.5 ± 0.6)	(5.1 ± 5.0)

43 or 44	SLICE	4	0%	96.2%	100%	60.8%
57	C	2	(7.1 ± 1.2)	(4.4 ± 2.4)	(0.1 ± 0.1)	(11.5 ± 3.5)
57	SLICE	2	92.3%	100%	100%	95.6%
73	C	2	(6.6 ± 1.3)	(16.6 ± 1.6)	(0.4 ± 0.4)	(23.6 ± 3.2)
73	SLICE	2	71.2%	98.2%	100%	90.7%

SLICE or Control (C)

() indicate the mean number of sea lice per fish ± standard deviation

Note: At one site, the efficacy was 79.2% on Study Day 92 and 62.9% on Study Day 115.

Commercial Field Trial: Chile

An efficacy study with Atlantic salmon was conducted at a commercial sea farm site in the vicinity of Puerto Montt, Chile. Six (6) cages were selected for the study, i.e. 3 cages received SLICE medicated feed and 3 cages were untreated, Fish received a target dose rate of 50 ug.kg/dya for 7 consecutive days, day 0 to 6

Results: · Data were analyzed for each stage; non-motile, motile and gravid female. The percentage efficacy based on the total number of sea lice/fish is shown in the table opposite · The efficacy of SLICE exceeded 90% against all parasitic stages of *Caligus rogercresseyi* (Infestations were not monitored between Study days 46 and 102 because of an algal bloom · Efficacy against gravid females exceeded 80% 95 days after treatment was concluded · Slice-induced suppression of maturing reproductive females would be expected to cause eventual reductions in reinfestation pressure (hence , fewer sea lice treatments would be required per growing season)

Parameters and results of this study are detailed below.

Study Guidelines:

Housing: 6 Commercial rearing pens

Treatment Design: 3 replicates (1 treated pen & 1 untreated pen / replicate).

Infestation: Fish were naturally infested with sea lice, primarily *Caligus rogercresseyi*, secondary *Caligus teres*.

Data Collection Criteria: Salmon (10) were randomly selected from each cage by hand net on Study Days, -1, 26, 46, and 102. Fish were anesthetized and the

number of sea lice (chalimus, pre-adult/adult, gravid females) were counted on each fish.

Results:

- Data were analyzed for each stage; non-motile, motile and gravid females. The percentage efficacy based on the total number of sea lice/fish is shown in the table opposite
- The efficacy of SLICE exceeded 90% against all parasitic stages of *Caligus* (infestations were not monitored between Study days 46 and 102 because of an algal bloom)
- Efficacy against gravid females exceeded 80% 95 days after treatment was concluded
- SLICE-induced suppression of maturing reproductive females would be expected to cause eventual reductions in reinfestation pressure (hence, fewer sea lice treatments would be required per growing season)

Efficacy (%) of SLICE against sea lice (*Caligus rogercresseyi*) on Atlantic salmon (*Salmo salar*) when administered at a dose rate of 50µg/kg/day for 7 consecutive days. Chile, Region X, 1998

Study Day	C/T	N	Copepodites & Chalimus (1-4)	Pre-adults & Adults	% Gravid Females	Total # Sea Lice
-1 (pre-treatment)	C	3	(38.6)	(34.8)	(18.1)	(91.5)
-1 (pre-treatment)	SLICE	3	(15.9)	(26.3)	(12.7)	(54.8)
26	C	3	(62.2)	(11.5)	(11.3)	(84.9)
26	SLICE	3	79.3%(12.9)	84.3%(1.8)	88.2%(1.3)	81.2%(16.0)
46	C	3	(114.9)	(26.3)	(30.2)	(171.4)
46	SLICE	3	92.1%(8.8)	90.3%(2.5)	96.3%(1.1)	92.6%(12.4)
102	C	3	(79.8)	(14.3)	(23.5)	(117.6)
102	SLICE	4	0%(61.1)	0%(7.5)	83.7%(3.8)	48.0%(61.1)

Slice or Control (C)

() indicate the mean number of sea lice per fish

Commercial Field Trial: Norway

SLICE® (Emamectin) vs. Ektobann® (Teflubenzuron, Skretting AS)

In these trials conducted at four different sites in Western Norway, a total of 1,170,543 Atlantic salmon were treated with either **SLICE®** (emamectin benzoate) or Ektobann® (teflubenzuron, Skretting AS) at their recommended therapeutic dose rates.

The **SLICE** treatment groups of 561,266 salmon received a target dose rate of 50µg/kg bodyweight/day for 7 consecutive days. Salmon in the Ektobann® treatment groups numbering 609,277 were administered a target dose rate of 10mg/kg bodyweight/day, also for 7 consecutive days.

Salmon in these Norwegian trials ranged in size from 92g to 347g. All were held under commercial rearing conditions and fed a **SLICE**-medicated diet or an Ektobann®-medicated diet at the rate of 0.5% biomass/day throughout the treatment period.

The study guidelines outlined below were consistent for each of the 4 trial sites.

Housing: (6) Commercial Rearing Pens Treatment

Design: Allocated randomly into 3 x 2 replicates (each replicate consisted of a **SLICE**- treated pen and an Ektobann®-treated pen)

SeaWater Temperature: 12.8°C - 15.8°C

Infestation: Naturally infested with primarily *L. salmonis* and secondarily with *C. elongatus*.

Data-Gathering Criteria: Salmon (20) were randomly selected from each cage and killed on Study Days -2, 1, 7, 14, 21, 36, 51* (Study Day 0 was the first day of treatment). Sea lice in all stages (chalmus, pre-adult, adult) were counted.

Results:

Efficacy of SLICE® (emamectin benzoate) and Ektobann® (teflubenzuron) for control of sea lice on salmon, Norway, 1998

Mean Number of Sea Lice (all stages) Per Fish									
Site	Treatment	Number of Fish Treated	Day -2	Day 1	Day 7	Day 14	Day 21	Day 36	Day 51
1	SLICE®	100,369	3.00*	3.45	0.79**	0.38**	0.03**	0.07	
1	Ektobann®	111,203	3.02*	3.00	1.05**	1.13**	1.30**	0.37	
2	SLICE®	129,469	3.70	1.63	0.25	0.05	0.07		0.23
2	Ektobann®	130,945	4.43	2.80	0.00	0.15	0.07		13.91

3	SLICE®	176,550	4.11	1.73	0.67	0.55	0.48		
3	Ektobann®	193,166	2.53	1.50	0.58	0.53	0.93		
4	SLICE®	154,608	9.70	7.83	2.07	0.63	0.68		
4	Ektobann®	173,963	9.28	8.01	1.90	1.32	2.28		
Summary (all sites)	SLICE®	561,266	5.13	3.66	0.94	0.40	0.32		
Summary (all sites)	Ektobann®	609,277	4.82	3.83	0.88	0.78	1.18		

**indicates sea lice were counted 1 day earlier than shown in the column heading.*

***indicates sea lice were counted 1 day later than shown in the column heading.*

- **All four of these Norwegian studies demonstrated the following excellent response to SLICE therapy within 7 days of beginning treatment.**
- **21 post treatment days, the mean number of sea lice on fish that received the SLICE-medicated diet was significantly lower than those treated with Ektobann®. (This efficacy differential continued following observations on Day 36 and again on Day 51.)**
- **At Site 2, the mean number of sea lice 51 days after treatment on salmon treated with SLICE was 0.23 lice/fish, while fish administered Ektobann® presented increased re-infestation levels with an average of 13.9 sea lice per fish.**