



Monitoring results with SLICE® (emamectin benzoate) at a Scottish salmon farm

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Introduction

In 2010, MSD Animal Health launched the SLICE® Sustainability Project (SSP), a program designed to help the global salmon industry develop sustainable sea lice control programs. The project accomplishes this by providing support to salmon producers, by utilizing proven management practices and by focusing on four core actions — Protect, Conserve, Review and Succeed.

SSP monitoring services provided in the UK are part of a local program called SLICE Monitor.* The services include testing for sea lice sensitivity utilizing bioassays and fillet analysis as well as monitoring for clearance of sea lice. This bulletin demonstrates how these services can be applied to help evaluate and deliver positive treatment outcomes.

The monitoring service was developed with the cooperation of major salmon producers and is enabling development of a valuable central, global database. The database already incorporates information from Scotland, Ireland, Norway, Chile and Canada and is being used to monitor and manage sea lice resistance; it also provides

a guide for needed research aimed at sea lice control and sustaining the global salmon industry.

Field case

The Meridian Salmon Group, one of the top-five salmon farming companies in Scotland, was due to stock its Carradale site, located in southwest Scotland.

The health team planned to treat the first influx of sea lice with SLICE® (emamectin benzoate), a highly effective, medicated feed premix indicated for the treatment and prevention of all parasitic stages of sea lice on salmon.

The site was stocked in March 2010 and SLICE treatment was initiated in May 2010 (Table 1), when the fish weighed an average of 80 g.

As part of SSP, MSD Animal Health, the manufacturer of SLICE, provided the SLICE Monitor service to the company. A representative from its technical service division met with the producer's

continued

TABLE 1

Treatment dates	Other treatments	SLICE dose (per label)	Feed regimen	Target EB* concentration in feed	Water temp
May 10-16, 2010	None	50 µg/kg/day	Standard 7 days, 3-4 meals/day; 1.25% feed rate	4.4 mg/kg Feed assays: 3.25, 3.41 mg/kg	8° C (46.4° F)

Table 1. First SLICE treatment at the Meridian Salmon Group's Carradale site

*emamectin benzoate

health team 24 hours after SLICE treatment to take fillet samples and feed samples for flesh and feed testing, gather data for the SLICE database and teach farm employees how to perform future sampling.

Flesh and feed testing

Flesh testing indicates the level of emamectin benzoate in flesh as a result of the fish consuming feed medicated with SLICE. Fish are sampled by a standard operating procedure; samples are frozen, packaged and sent for analysis which, in this case, was performed at the Eclipse Scientific Group, an analytical testing service (Table 2 and Figure 1).

A standard dose of 50 µg/kg/day of emamectin benzoate for 7 days should achieve a target flesh level of 60 µg/kg emamectin benzoate, which delivers a satisfactory reduction in numbers of sensitive lice.

Variability within flesh samples is normal, given the variable feed rates of fish in a pen holding 50,000 to 60,000 fish and considering that only five fish are sampled to minimize the number of fish producers must sacrifice for testing. To achieve a more statistically significant result, more fish would need to be sampled.

To determine feed dosage via feed assays, approximately 250 g of medicated feed, as delivered to the farm and to fish, was placed in labeled containers with identifying details and sent to the Eclipse Scientific Group for analysis. (Feed can be frozen for storage purposes.)

Note, too, that the target feed dose is rarely achieved via analysis. The goal is to have as few instances as possible below the target level. A modified feed assay has recently become available that improves feed analysis.

TABLE 2

Fish sample	1	2	3	4	5
Pen	14	14	14	14	14
Fish weight (g)	80	80	80	80	80
Flesh result (µg/kg)	92.13	87.64	111.24	106.74	134.83

Table 2. Flesh results from samples taken 24 hours after the first SLICE treatment

FIGURE 1

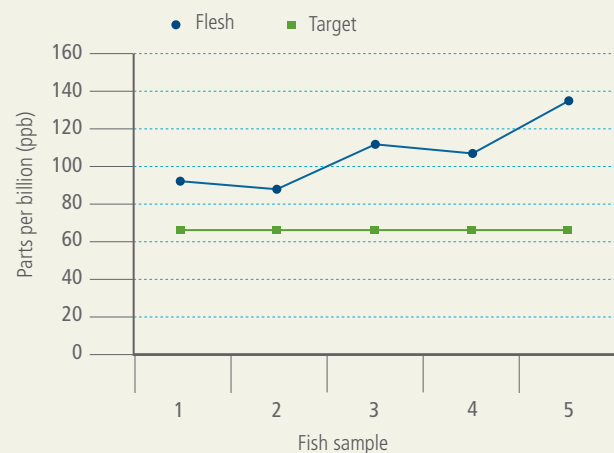


Figure 1. Concentration of emamectin benzoate (EB) in fish flesh (µg EB/kg fish = ppb) taken 24 hours after the first SLICE treatment

Efficacy after first SLICE treatment

The efficacy of SLICE treatment is reflected by lice data, which were supplied by the Meridian Salmon Group. The first SLICE treatment proved to be efficacious, with lice numbers remaining at or near zero for 8 weeks (Figure 2).

The success of the first SLICE treatment, plus the additional data gathered on parameters including the feeding and inclusion rates, prompted the producer to initiate an additional SLICE treatment (Table 3) when the fish in one pen were an average of 297 g and in another pen, 411 g. In this instance, farm staff handled the sampling of fish and feed (Tables 4 and 5 and Figure 3).

continued



TABLE 3

Treatment dates	Other treatments	SLICE dose (per label)	Feed regimen	Target EB* concentration in feed	Water temp
August 12-18, 2010	None	50 µg/kg/day	Standard 7 days, 3-4 meals/day; 1.00% feed rate	6.0 mg/kg Feed assays: 5.37, 5.35 mg/kg	14° C (57.2° F)

Table 3. Second SLICE treatment at the Meridian Salmon Group's Carradale site

*emamectin benzoate

TABLE 4

Fish sample	1	2	3	4	5
Pen	2	2	2	2	2
Fish weight (g)	297	297	297	297	297
Flesh result (µg/kg)	97.2	87.2	67.9	59.6	47.7

TABLE 5

Fish sample	1	2	3	4	5
Pen	4	4	4	4	4
Fish weight (g)	411	411	411	411	411
Flesh result (µg/kg)	103.7	75.2	102.8	120.2	136.7

Tables 4 and 5. Flesh results from samples taken from two pens 24 hours after the second SLICE treatment

FIGURE 2

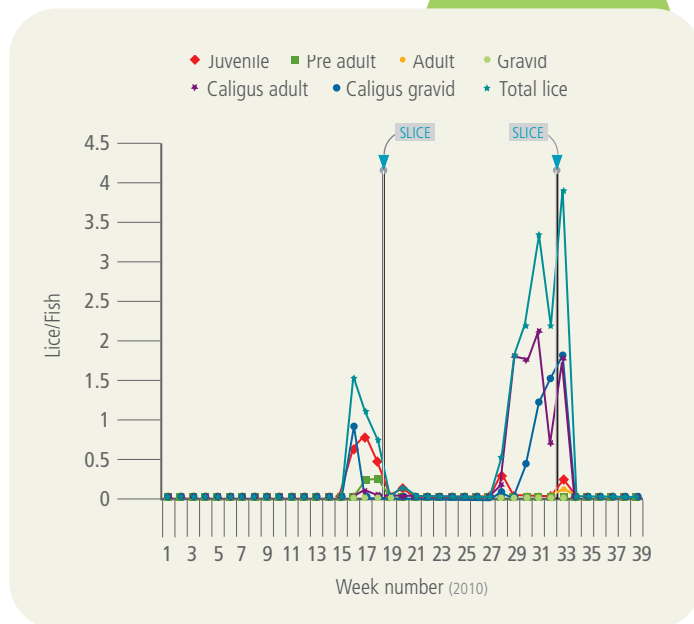


Figure 2. Numbers of lice at all stages after treatment with SLICE on weeks 18 and 32

FIGURE 3

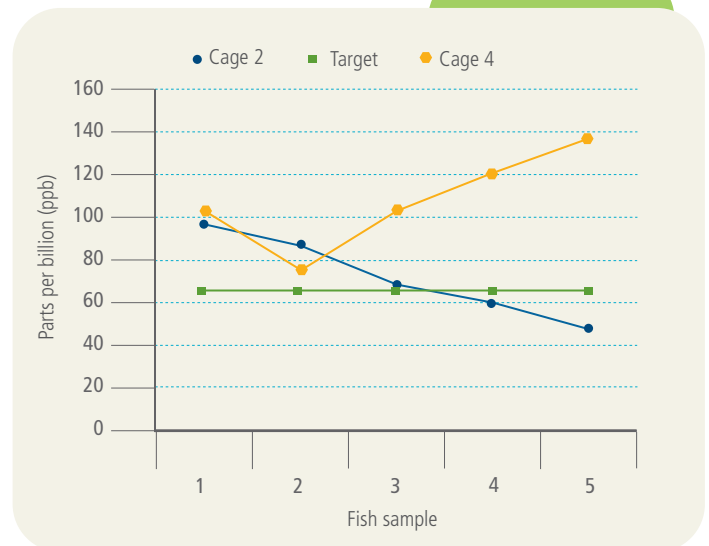


Figure 3. Concentration of emamectin benzoate (EB) in fish flesh (µg EB/kg fish = ppb) taken 24 hours after the first SLICE treatment



Discussion and conclusions

Although flesh samples, feed targets and lice counts are important aspects of SLICE monitoring, it is imperative that *all* aspects of monitoring be adopted and considered in order to enable a full assessment of SLICE treatment efficacy.

For instance, *in vitro* bioassays conducted with sea lice are recommended to help determine the sensitivity of lice in a producer's region. Bioassays, as in this case, are not always available, due to a variety of reasons, but can be particularly helpful. They can be used routinely throughout the growing cycle to help predict the sensitivity of sea lice to treatment or to detect changes in sensitivity within a population of sea lice.

The experience at the Meridian Salmon Group demonstrates the effectiveness of SLICE treatment and corroborates other extensive field experience with this medicated feed premix. It also underscores the benefits when animal health companies and producers share data that can be used to help make future treatment decisions. Cooperation and the exchange of information are central to the SLICE Sustainability Project.

*SLICE Monitor is known as the SLICE Sustainability Project in markets outside the UK.

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