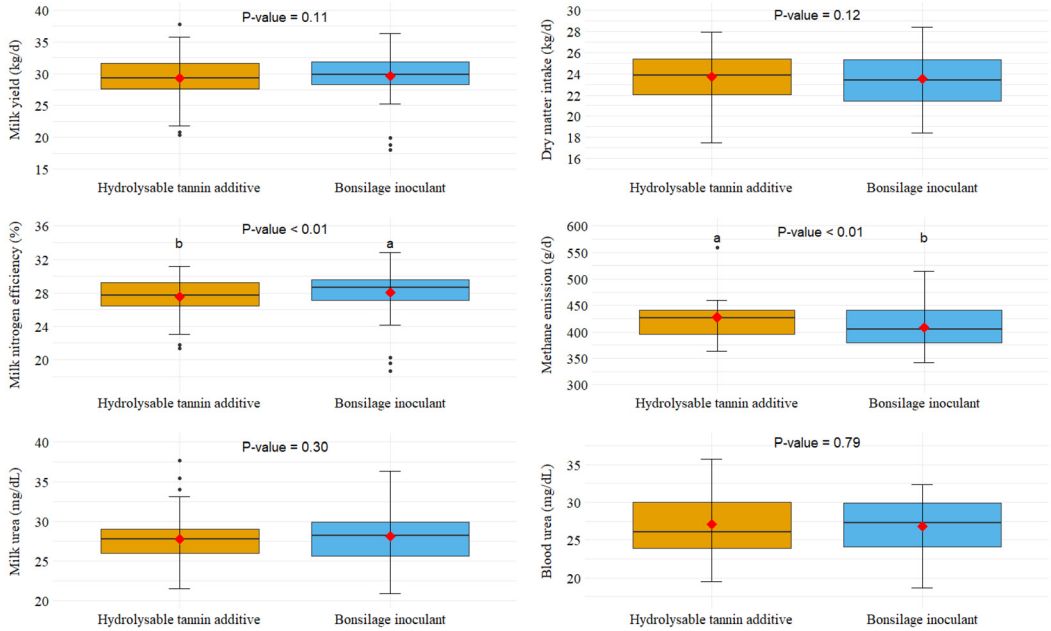

FIGURE. Boxplots representing parameters for 22 dairy cows fed a diet with a hydrolysable tannin (3.2 g/kg DM in diet) vs. a Bonsilage (3.6 mg/kg DM in diet) treated autumn grass silage in a cross-over experiment with two periods of 4 weeks. The red boxes represent the mean value for each treatment.

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O117 Ensiling as a preservation method for using *Saccharina latissima* in ruminant feeding

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Keywords: Seaweeds; Silages; *Saccharina latissima*; Ruminants

Introduction
Seaweeds could be an interesting alternative to conventional feedstuffs used in animal nutrition, as they contain biocompounds that might contribute to animal health and increase the quality of animal products. Furthermore, seaweeds do not compete with the use of land. Nevertheless, their high-water content limits their utilization and conservation methods, such as ensiling, are needed to prevent spoilage (Novoa-Garrido et al., 2020). The objective of this study was to evaluate different ensiling methods of *Saccharina latissima* on ruminal fermentation.

Material and Methods
Samples of *S. latissima* were collected at Bodø (Norway), chopped and ensiled in vacuum bags with four treatments (2 bags/treatment): without additives (Control), with formic acid (FA; 4 ml/kg), with acid lactic bacteria (ALB; Biocenol†), and acid lactic bacteria after pre-drying seaweeds to reach 30% of dry matter (30ALB). Silages were stored in darkness for three months at room temperature (16 °C) before being frozen (-40°C) and freeze-dried. Chemical composition of fresh seaweed and silages was analyzed following the methods described by the AOAC (2005), and ruminal fermentation parameters were determined in 24 h *in vitro* incubations using rumen inoculum from goats

Table 1
Fermentation parameters after 24h of *in vitro* incubation of fresh *Alaria esculenta* and different *A. esculenta* silages using as inoculum sheep rumen fluid.

Sample[1]	pH	VFA[2] (mmol/g DM)	Molar proportions (mol/100 mol)						Ac/Pr (mol/mol)	NH_3-N (mg/100 ml)	CH_4 (ml/g DM)
			Ac[3]	Pr[4]	Butyrate	Isobutyrate	Isovalerate	Valerate			
Fresh seaweed	7.04[b]	3.82[a]	60.9[b]	24.9[c]	10.1[a]	1.24[a]	1.18[a]	1.65[a]	2.51[a]	114[a]	10.4[a]
CONS	6.94[a]	4.45[b]	59.9[a]	24.9[c]	10.8[b]	1.26[a]	1.35[c]	1.81[b]	2.46[a]	133[b]	12.3[b]
FAS	6.95[a]	4.54[b]	61.2[b]	24.2[b]	10.4[a]	1.28[a]	1.26[b]	1.70[a]	2.60[ab]	125[b]	13.8[b]
LBS	6.96[a]	4.67[b]	60.3[a]	24.4[bc]	10.7[ab]	1.38[b]	1.38[c]	1.88[b]	2.52[a]	143[c]	12.4[b]
PLBS	6.94[a]	5.03[c]	60.3[a]	22.9[a]	11.3[c]	1.58[c]	1.54[d]	2.35[c]	2.70[b]	159[d]	13.6[b]
SEM	0.010	0.078	0.15	0.17	0.09	0.020	0.016	0.027	0.024	2.4	0.53
P-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

[1] CONS, ensiled without additive; FAS, ensiled with 4g formic acid/kg seaweed; LBS, ensiled with *Lactobacillus fermentum* (3×10^6 CFU/g seaweed) and *Lactobacillus plantarum* (7.5×10^6 CFU/g seaweed); PLBS, seaweed pre-wilted (30% DM) and ensiled as LBS.
[2] VFA, volatile fatty acids.
[3] Ac, Acetate.
[4] Pr, Propionate.
[a,b,c,d] Means within in a column with different superscripts differ significantly ($P < 0.05$).

as described by Marcos et al. (2019). Data were analyzed as a mixed model using the PROC MIXED of SAS, in which the effect of the treatment (fresh seaweed and silages) was considered fixed and that of goat was considered random.

Results and Discussion
Fresh *S. latissima* contained 78.6 g of DM/kg and 775, 15.8, 528 and 260 and 40.3 g/kg DM of OM, N, NDF, ADF and lignin, respectively. When compared with the fresh seaweed, ensiling decreased NDF and ADF content up to 369 and 236 g/kg DM, respectively (average values from the four silages), whereas lignin increased by 15.3 g/kg DM, which suggest the loss of easily-fermented fiber fractions and the formation of compounds that are recovered in the lignin analysis. Significant differences among treatments were observed in gas production, but total VFA production was similar ($P > 0.05$). On the other hand, VFA profile differed among samples. Acetate molar proportion was 6.3% lower in the fresh seaweed than in the silages. Among silages, Control had the highest acetate molar proportion and ALB the lowest one. In agreement with these results, the fresh seaweed had the highest proportion of propionate, followed by ALB and FA silages, which could be due the loss of soluble sugars during ensiling. Proportions of butyrate and minor VFA were higher in Control and 30ALB silages than in the rest of the samples. Likewise, Control silage showed the highest NH_3-N concentration, indicating an extensive protein degradation. The FA and 30ALB silages had the highest CH_4 production and CH_4/VFA ratio, whereas the fresh seaweed had the lowest values (see Table 1).

Conclusion and Implications
Ensiling of *S. latissima* did not influence total VFA production, but fermentation profile was conducted towards more acetate and CH_4 production. Using formic acid or acid lactic bacteria after pre-drying were useful methods to reduce protein degradation during ensiling.

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O118 The effect of rumen-protected methionine in faba bean rich diets on the nitrogen utilisation of dairy cows

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Keywords: Faba bean; Methionine; Nitrogen; Dairy cow

Introduction
Grain legume faba bean (FB; *Vicia faba*) is of growing interest in ruminant feeding both as whole crop silage and as concentrate due to the rapidly rising prices of inorganic N fertilizers. However, FB protein is low in methionine and has high rumen degradability that may limit