

Your opportunity to licence Cattle faecal NIRS equations

MLA is seeking diagnostic labs to offer Faecal Near Infrared Reflectance Spectroscopy (NIRS) service for cattle graziers across northern Australia.



The problem

The major nutrients limiting cattle growth and performance in northern Australia are energy, protein and phosphorus. Deficiencies occur in the soil or plants.

Unfortunately, testing soil or pasture to identify deficiencies doesn't capture animal diet selection in northern tropical pastures.

An accurate decision support tool that provides quantitative analysis of actual diet quality to graziers is required.



The solution

Near Infrared Reflectance Spectroscopy (NIRS) technology enables producers to directly assess diet quality, enabling them to make proactive and timely management decisions.

Faecal NIR calibration equations were developed to predict:

- dietary crude protein (CP)
- dry matter digestibility (DMD)
- faecal nitrogen (N) concentration
- non-grass proportion of diet
- growth rate.

This current available licence applies to northern Australia. See the related **Technical Document** for more information.



The opportunity

MLA is seeking partners and licensees with relevant facilities and experience to provide NIR faecal dietary diagnostics services using these equations, with the initial licence relating to northern Australia application.

If interested, please respond to the accompanying '**Expression of interest**' document.

More information

For more information or to register your Interest in securing a licence, please email ip@mla.com.au by **15 July 2022**.

Amanda McAlpine
Manager, Knowledge and IP
T: 0406 428 395
E: amcalpine@mla.com.au

Expression of interest

Cattle faecal NIRS equations



Guidelines

June 2022

Meat & Livestock Australia (MLA) are seeking licensees to provide faecal NIR diagnostics services using dedicated NIRS equations and calibrations for northern pastures.

This Expression of Interest (EOI) document provides details on the expression of interest process and selection criteria for assessing new licensees.

Background

Near Infrared Reflectance Spectroscopy (NIRS or NIR) technology enables producers to directly assess diet quality, enabling them to make proactive and timely management decisions.

Faecal NIRS calibration predictions were developed to provide producers with an indication of:

- dietary crude protein (CP)
- dry matter digestibility (DMD)
- faecal nitrogen (N) concentration
- non-grass proportion of diet
- potential animal production (liveweight gain).

These predictions were developed for a range of northern Australian pastures.

Technology:

Faecal NIRS-related predictive equations have been generated for northern pastures and are available with corresponding calibration database (further defined in Attachment 1).

Intellectual property

Intellectual property is NIRS-compliant algorithms that have been developed with calibration databases for a discrete range of northern pasture types. See Attachment 1 for more information.

Partnering opportunity

MLA are inviting Expressions of Interest (EOI) from potential licensees with a proven track record in delivering ruminant nutrition services.

A technology licence is attached and incorporates the following terms:

- royalty free
- adequate quality laboratory controls (including GLP)
- turn around result time, five days
- marketing plan
- reporting on adoption.

Expression of interest

This expression of interest process will consist of four steps. Dates are listed:

1. Initial interest in submitting an EOI to be emailed to ip@mla.com.au.
Closing date: **15 July 2022**
2. Further information provided, if required.
3. Submission of partnership proposal to be emailed to ip@mla.com.au.
Closing Date: **15 September 2022**
4. Licence execution.

MLA may consider proposals and licences submitted later than the dates outlined above at their absolute discretion. MLA is not bound to accept any EOI and reserve the right at their absolute discretion to extend, vary, suspend, terminate or abandon this EOI.

Expression of interest process and submission dates

1. Initial interest

To be emailed to ip@mla.com.au by **15 July 2022**. The initial EOI requires overview of the company and capabilities in relation to commercialising NIR diagnostics (see **Technical Document** attached).

2. Technical information

A **Technical Document** is attached. Further information can be discussed and provided on request.

3. Submission of partnership proposal

To be emailed to ip@mla.com.au by **15 September 2022**.

The partnership proposal needs to describe:

- ability to provide quality NIR faecal diagnostics to the Northern cattle industry
- ability to implement the technology outlined in the **Technical Document** (attached)
- ability to market the technology to Northern graziers
- acknowledgment of the draft licence terms attached.

Desirable:

- Ability to support Northern graziers with interpretations of diagnostics

Optional:

- Interest in further innovation or development of the technology
- Interest in supporting similar technology (in development) for the Southern Australian region

4. Successful partners notified

The attached licence will be executed on **30 September 2022**.

Prospective partner – What are we looking for?

The ideal commercial partner will have the intent and resources to deliver a quality diagnostic to northern Australian graziers, including:

1. Commitment and capability to run NIRS diagnostics

- Demonstrated track record with use of NIRS technologies and operation of Foss, Unity, Spectra star scanners or equivalent and ability to transfer faecal delta calibrations between scanners.
- Appropriate sample preparation facilities for faecal NIRS analysis, including and not limited to; drying ovens and sample grinding facilities (Cyclotek grinder essential)
- Supporting processes and procedures, ideally cloud based, that facilitate the collection, collation and sharing of relevant data with clients and between collaborating laboratories. In the absence of a cloud-based platform, a willingness to collaborate with technology partners to develop same for the collection, collation and sharing of data.
- Demonstrated track record and capacity to quickly respond to client needs and provide meaningful results within 5 working days for interpretation and on farm use.
- Demonstrated good laboratory practice (GLP) or similar industry accreditation that acknowledges routine use of diagnostics, reference checks and/or calibrated standards/ring tests to ensure operational integrity and delivery of accurate and reliable results.

2. Marketing

The ideal partner will have the capability to market the diagnostic service to the Northern Australian beef industry.

3. Technical support to facilitate successful adoption.

The ideal partner will provide or work with third party to provide interpretation of the faecal NIRS predictions.

More information

Meat & Livestock Australia

Amanda McAlpine
Manager, Knowledge and & IP
M: 0406 428 395
E: amcalpine@mla.com.au

Lindsey Perry
Project Manager – Grassfed Productivity
M: 0447 601 235
E: lperry@mla.com.au



Attachment 1

Technical document – Cattle faecal NIRS

Every predictive equation has been generated from a calibration database. This calibration database has spectral data matched with constituent data. Calibration files are used to generate more than one prediction equation depending on how the database has been set up.

For each constituent, there are several files which vary in size depending on the number of samples and number of constituent data. Table 1 lists the files that would be provided to the new licensee/s.

Table 1: Constituent files required to support faecal NIRS services to predict diet quality and animal productivity

Constituent	Associated files	Size files	Notes
Dry Matter Digestibility	Vivomk3.PCA vivomk3.LIB vivomk3.EQA DMD&OMD.CAL	58kb 675kb 3kb 4752kb	
Organic Matter Digestibility	Omdvivo.PCA Omdvivo.LIB Omdvivo.EQA DMD&OMD.CAL	58kb 675kb 3kb 4752kb	
Faecal nitrogen	FECN(E).PCA FECN(E).LIB FECN(E).EQA FECN.CAL	58kb 675kb 3kb 6567kb	
Faecal Ash	FECASH10.PCA FECASH10.LIB FECASH10.EQA DMD&OMD.CAL	58kb 675kb 3kb 4752kb	
Dietary nitrogen/(DCP)	DNIT1441.PCA DNIT1441.LIB DNIT1441.EQA DIET0203.CAL	58kb 675kb 3kb 5429kb	DIETARY CRUDE PROTEIN CALCULATED FROM PREDICTED N
DELF	DELF(E).PCA DELF(E).LIB DELF(E).EQA DELFEC.CAL	58kb 675kb 3kb 8933kb	
MEI MEAN	DDMIME1.PCA DDMIME1.LIB DDMIME1.EQA	58kb 675kb 3kb	
DMI INTAKE	DMI1441.PCA DMI1441.LIB DMI1441.EQA	58kb 675kb 3kb	
ADG	ADG1441.LIB ADG1441.EQA	675kb 3kb	

The functional part of the dataset is the equation file and using the Winisi software has the extension .eqa.

Any new provider will need to use Winisi software.

Other supporting files have .PCA and .LIB extensions – these are the principle component database files and the library. The software uses the library to give a measure of ‘fit’ for incoming samples using global H and Global N measurements.

Any new provider will need to have the equation files and the library files and the pca files.

CSIRO hold the relevant calibration files for the prediction equations.

Any new provider will need to have the capacity to receive and prepare faecal samples for scanning

Results are influenced by moisture content and the successful laboratory will need to operate and maintain appropriate drying and grinding (Cyclotek™) facilities to ensure standardised quality control.

Shifting calibrations between instruments

To move a calibration to a new instrument, a small number of faecal samples of the type of interests are required. These samples need to be scanned on the ‘master’ instrument and the ‘slave’ and can then be used to adjust for biases.

A new provider would maintain the ‘slave’ (the new instrument being commissioned).

Attachment 2

Licence template

Near Infrared Reflectance Spectroscopy Commercialisation Licence
 Meat & Livestock Australia Limited ABN 39 081 678 364 ('MLA')
 Level 1/40 Mount St, North Sydney NSW 2060

Licensee details

Entity:			
ABN/ACN:		Contact person:	
Email:		Telephone:	
Address:			

Background

- MLA is a producer-owned, not for profit organisation that delivers research, development and marketing services to the Australia's red meat industry.
- The Licensee wishes to obtain a licence from MLA to use the Licensed Subject Matter and exercise the Licensed IP Rights and MLA agrees to grant that licence on the terms of this short form licence, which consists of Licence Details, Governing Terms, Licence Schedule and any other annexures.

Licence details

Licensed subject matter:	Faecal NIRS cattle calibration equations for predicting faecal $\delta^{13}C$ (from which the dietary non-grass proportion is calculated), faecal N concentration and diet digestibility estimates. Calibration equations and a suite of relevant Win ISI software for the determination of diet quality based on spectral signatures derived from NIRS.		
Licensed IP rights:	Copyrighted material (Further listed in the Licence Schedule]		
Date of this licence:		MLA ref:	p00076
End Date of licence:		Territory:	All Australian states and territories
Designated Use:	Commercial delivery of a cattle faecal NIR analytical service to predict diet quality		
Basis:	Non-exclusive, sublicensable on written consent		

Governing terms

This short-form licence sets out the terms and conditions under which the Licensee may make use of the Licensed Subject Matter and exercise the Licensed IP Rights. Capitalised terms used in this licence, unless otherwise defined, have the meanings set out in the variables inserted by the parties.

- 1. Grant:** Subject to these terms and the Licence Schedule, MLA grants to the Licensee, a personal, non-transferable, licence to use the Licensed Subject Matter the Basis and exercise the Licensed IP Rights in the Territory until the End Date, solely for the Designated Use.
- 2. Sub-licensing:** If the Designated Use specifically includes sub-licensing to third parties, this licence is sub-licensable solely to the extent required for the Designated Use. The Licensee must promptly report the grant of any sub-licences to MLA, disclosing the identity of the sub-licensee and the terms and conditions of the sub-licence. The Licensee must ensure that any licensees comply with all terms and conditions of this Licence.
- 3. Financial Obligations:** The Licensee must make any payments set out in the Royalty or Other Payment Details in the Licence Schedule, in the manner set out in that Schedule.
- 4. IP Protection Maintenance and Costs:** IP Protection costs will be covered as outlined in the Licence Schedule, in the manner set out in that Schedule.
- 5. Diligence and Commercialisation Obligations:** The Licensee must use its best efforts to Commercialise the Project Outcomes and Project IP for the benefit of the Australian red meat industry, and particularly in the manner (if any) set out in the Diligence Obligation Details in the Licence Schedule. Where products or services based on Project Outcomes will be supplied, the Licensee must ensure that those products or services comply with all applicable laws and standards, and that customers/ users of the Project Outcomes in the Australian red meat industry have preferential access to, and pricing for, products and services based on Project Outcomes.
- 6. Acknowledgement:** The Licensee must acknowledge the role of MLA in the creation of the Licensed Subject Matter, and MLA's ownership of the Licensed IP Rights, in the manner set out in the Licence Schedule or otherwise as reasonably requested by MLA. In any publication or disclosure of information contained in or derived from the Licensed Subject Matter, the Licensee must include the acknowledgement "Funding from Meat & Livestock Australia Limited – mla.com.au".
- 7. Confidentiality:** If any Licensed Subject Matter is marked 'confidential', 'proprietary', 'in confidence' or similar or if the Licensed IP Rights include confidential information, trade secrets or know-how, then the Licensee must keep confidential such Licensed Subject Matter and Licensed IP Rights, use them solely for the Designated Use, and may disclose them to third parties solely to the extent required for the Designated Use and under obligations of confidentiality.
- 8. Reporting:** The Licensee must at the request of MLA (or as otherwise set out in the Reporting Requirement Details of the Licence Schedule) report to MLA in writing details of its Commercialisation of the Licensed Subject Matter, and such use by any permitted licensees or assignees, including an explanation of how such Commercialisation is benefiting the Australian red meat industry.
- 9. Termination:** This Licence expires on any end date set out in the Licence Details. MLA may withdraw this Licence by notice in writing to the Licensee if MLA reasonably forms the view that the Licensee's Commercialisation of the Licensed Subject Matter is not for the benefit of the Australian red meat industry, or if the Licensee materially breaches any term or condition of this Licence. On expiry or withdrawal of Licence, the Licensee must cease all Commercialisation of Licensed Subject Matter, and ensure the cessation of such use by any sublicensees.
- 10. Liability:** The Licensee acknowledges that the Licensed Subject Matter and Licensed IP Rights are provided on an 'as is' basis and MLA makes no representations regarding their completeness or accuracy. To the extent permitted by law MLA gives no warranty, assurance or guarantee in relation to the Licensed Subject Matter or Licensed IP Rights (including any warranty as to whether their use or exploitation will infringe any third party rights) or the uses to which they may be put by the Licensee or their fitness or suitability for any particular purpose or under any conditions notwithstanding that any such purpose or conditions may be known to MLA. The Licensee acknowledges that it has satisfied itself as to these matters and that its use and exploitation of the Licensed Subject Matter and Licensed IP Rights is entirely at its own risk. To the extent permitted by law, all conditions and warranties, express or implied, arising under statute or common law, are excluded. MLA will not be liable for any loss of profit or for any direct, special, indirect, consequential or economic loss or damage. To the extent permitted by law, MLA's liability for breach of any consumer guarantee, which cannot be excluded, is limited at the option of MLA to (in the case of services supplied or offered by MLA, which are not of a kind ordinarily acquired for personal, domestic or household use or consumption) resupplying or paying the cost of resupplying the service; or (in the case of goods supplied or offered by MLA, which are not of a kind ordinarily acquired for personal, domestic or household use or consumption) replacing the goods, supplying equivalent goods, repairing the goods or paying the cost of replacing the goods, supplying equivalent goods or repairing the goods. The Licensee indemnifies MLA against all damages, losses, costs and expenses incurred by MLA arising out of or in connection with any breach of these terms of use or the Licensee's use or exploitation of the Licensed Subject Matter or Licensed IP Rights.
- 11. Counterparts:** This Agreement may be signed in counterparts and all counterparts taken together constitute one document.
- 12. Governing Law:** This Licence is governed by the law applicable in New South Wales, Australia.

Signed for and on behalf of MLA:

Meat & Livestock Australia Limited

Signature

Name in Full

Position

Date

Signed for and on behalf of the Licensee

Signature

Name in Full

Position

Date

Licence schedule

Acknowledgement of funding details:

- Unless advised otherwise, Acknowledge MLA on all publications and where possible promotional materials (including labels).

Reporting requirement details:

Licensee to report 6 month periods from execution of the agreement on:

- samples received and samples reported, average processing time
- regions (where possible),
- commercialisation and marketing/promotional activities
- Promotional activities;
- Prediction reliability and accuracy; and
- Calibration times, Diagnostic issues.

Diligence obligation details:

The Licensee will:

- Implement and maintain an adequate quality control program (including GLP or similar) which includes regular calibration and a ring test within acceptable ranges at least annually. Any breach of this quality control measure is to be read as a material breach of this licence.
- Undertake best commercial endeavours to ensure a 5 day turnaround for results
- Provide MLA with a short marketing plan covering the next 3 years, outlining actions being taken to promote the availability of the test. This marketing plan is to be updated every 2 years.
- Products to be made available in Australia at a fair and reasonable price
- Australian customers be treated as priority customers, over and above overseas counterparts.

Royalty or other payment details:

- No royalty due

IP protection maintenance and costs:

- NA

Special conditions:

- A minimum of \$5 million product liability and public indemnity
- Algorithms to be kept confidential.