

ILRI EQUIP NIRS Activities



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GATES foundation

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Activities

- New NIRS equations – Tef straw, Napier grass and barley straw , Aflatoxin predictability
 - Shared with Rapid Phenotyping” laboratory in Australia
- Mapping potential of NIRS hubs in South Asia and East and West Africa
- Exploration of 4 handheld mobile NIRS
- Miscellaneous – NIRS purchase for BF initiated, other infrastructure being prepared
- NIRS platforms (EIAR, Holleta, Mekelle University)

Napier NIRS equations based on 150 samples

	Calibration		Validation		Final predictive equation	
	R ²	SEV	R ²	SEC	R ²	SEC
Nitrogen (%)	0.97	0.09	0.93	0.2	0.98	0.09
NDF (%)	0.92	1.1	0.88	1.9	0.96	0.9
ADF (%)	0.98	0.6	0.93	1.2	0.96	0.8
ADL (%)	0.92	0.2	0.85	0.3	0.90	0.2
IVOMD (%)	0.99	0.4	0.95	0.9	0.98	0.5
ME (MJ/kg)	0.99	0.05	0.97	0.09	0.99	0.05

Tef straw NIRS equations based on 104 samples

	Calibration		Validation		Final predictive equation	
	R ²	SEV	R ²	SEC	R ²	SEC
Nitrogen (%)	0.99	0.04	0.95	0.1	0.99	0.07
NDF (%)	0.96	0.8	0.92	1.6	0.98	0.8
ADF (%)	0.94	0.6	0.92	0.9	0.92	0.8
ADL (%)	0.94	0.2	0.79	0.3	0.89	0.2
IVOMD (%)	0.99	0.3	0.97	0.6	0.99	0.3
ME (MJ/kg)	0.99	0.04	0.96	0.07	0.99	0.03

Barley straw NIRS equations based on 100 samples

	Calibration		Validation		Final predictive equation	
	R ²	SEV	R ²	SEC	R ²	SEC
Nitrogen (%)	0.96	0.05	0.93	0.07	0.97	0.04
NDF (%)						
ADF (%)						
ADL (%)						
IVOMD (%)	0.95	0.3	0.94	0.3	0.94	0.3
ME (MJ/kg)	0.96	0.02	0.93	0.03	0.97	0.02

Trait variations in 550 feeds, feed ingredients, forages and roughages used for exploration of mobile NIRS

	Mean	Minimum	Maximum
Nitrogen (%)	2.6	0.3	8.1
NDF (%)	51.2	8.3	82.8
ADF (%)	28.6	2.8	60.5
ADL (%)	5.2	1.1	11.8
IVOMD (%)	8.5	5/1	11.3
ME (MJ/kg)	60.0	38.2	81.1
Aflatoxins (PPB)	881	0	20 464

Phenotyping for feed and fodder quality by Near Infrared Spectroscopy (NIRS)

Physico-chemical
c. 60 000 US \$
Calibration
Validation



Non-evasive
c. 200 samples/d
>30 traits

At current: ILRI



**NIRS equations sharable across
compatible instruments**

Available FOSS-based NIRS Hub Infrastructure

India: ILRI, ICRISAT, private sector

Nigeria:

ILRI, ICRISAT, IITA,

NARES

private sector

Mali:

ICRISAT, NARES

Burkina Faso:

Coming, ILRI-

INERA



Ethiopia:

ILRI, EIAR, MU??

private sector

Uganda:

NARES

Tanzania:

NARES

From stationary to mobile handheld NIRS?



PHAZIR™



Available and proposed phenotyping infrastructure

- FOSS type NIRS ready for networking in South Asia, East Africa and West Africa
- NIRS equations for all key cereal and legume crops and feeds and feed ingredients available for sharing
- ILRI platform for NIRS equations being migrated from Wiki to pCloud
- Suitability of diverse mobile NIRS being explored using 550 feed samples scanned on 4 mobile NIRS

Thank you very much for your attention!

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ILRI thanks all donors and organizations who globally supported its work through their contributions to the **CGIAR system**

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