

BACKGROUNDS

- Feedstuffs nutrition value information are important in formulating ration to fulfil animal requirements.
- The information include physical, chemical and utility values that can be analyzed through several methods.
- One of the current popular methods in analyzing feedstuffs chemical contents is Near Infrared Spectroscopy (NIRS) method.
- NIRS instrument has advantages for its fast, low cost, non-destructive, no requirements for solvents or reagents. However, its accuracy depends on database used in the calibration process.
- So far, NIRS database were developed from wet chemical analysis of temperate feedstuffs that might different from tropical feedstuffs.
- Therefore, this research was aimed at comparing nutritive values of Indonesian local feedstuffs as determined by wet chemical and NIRS methods.

RESULTS

- Wet chemicals were lower than NIRS results in Napier grass except for DM and ADF (Table 1)
- In other feedstuffs, most of wet chemical parameters were not significantly different to NIRS results (Table 1).
- The differences mostly occurred in DM and fiber (Table 1).
- Prediction of wet chemical results were made from NIRS in high correlation parameters such as CF for Napier grass, ADF for corn stover and CF for corn husk. (Figure 1-3).
- The insignificant different data had lower correlation coefficient which showed a great variation instead of similarity results (Table 1).

Table 1. Feedstuffs nutrient contents determined using NIRS and wet chemical analysis

| Feedstuffs | Methods | Parameters | | | | | |
|---------------|---------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | | DM | ASH | CP | CF | NDF | ADF |
| Napier Grass | NIRS | 89.09 ^a | 13.93 ^b | 12.57 ^b | 29.81 ^b | 50.40 ^a | 34.34 ^b |
| | Wet C. | 90.47 ^b | 12.94 ^a | 9.92 ^a | 29.15 ^a | 59.66 ^b | 34.28 ^a |
| | R | 0.465 | 0.766 | 0.57 | 0.898 | 0.545 | 0.581 |
| Natural grass | NIRS | 91.45 | 13.93 | 11.03 | 27.66 | 49.25 ^a | 35.40 ^b |
| | Wet C. | 90.47 | 11.46 | 10.17 | 29.50 | 58.94 ^b | 32.02 ^a |
| | R | 0.127 | -0.55 | 0.462 | -0.377 | 0.608 | 0.678 |
| Rice straw | NIRS | 89.17 ^a | 16.50 | 6.86 | 26.40 | 55.30 | 39.12 |
| | Wet C. | 90.86 ^b | 18.78 | 5.65 | 29.89 | 62.02 | 37.16 |
| | R | 0.732 | 0.394 | 0.229 | 0.479 | 0.330 | -0.153 |
| Corn Stover | NIRS | 91.34 ^b | 8.14 | 9.98 | 30.22 | 57.83 | 36.53 ^b |
| | Wet C. | 89.32 ^a | 8.72 | 8.48 | 27.90 | 59.09 | 31.28 ^a |
| | R | 0.697 | 0.188 | 0.483 | 0.687 | 0.416 | 0.905 |
| Corn Husk | NIRS | 90.78 | 5.99 | 6.53 | 30.91 ^b | 65.06 ^a | 37.64 ^b |
| | Wet C. | 89.97 | 4.39 | 6.73 | 28.81 ^a | 70.82 ^b | 33.61 ^a |
| | R | 0.259 | 0.273 | 0.246 | 0.867 | 0.767 | 0.744 |

Notes: Different superscript at the same column of each feedstuff are significantly different after paired T-test (P<0.05)

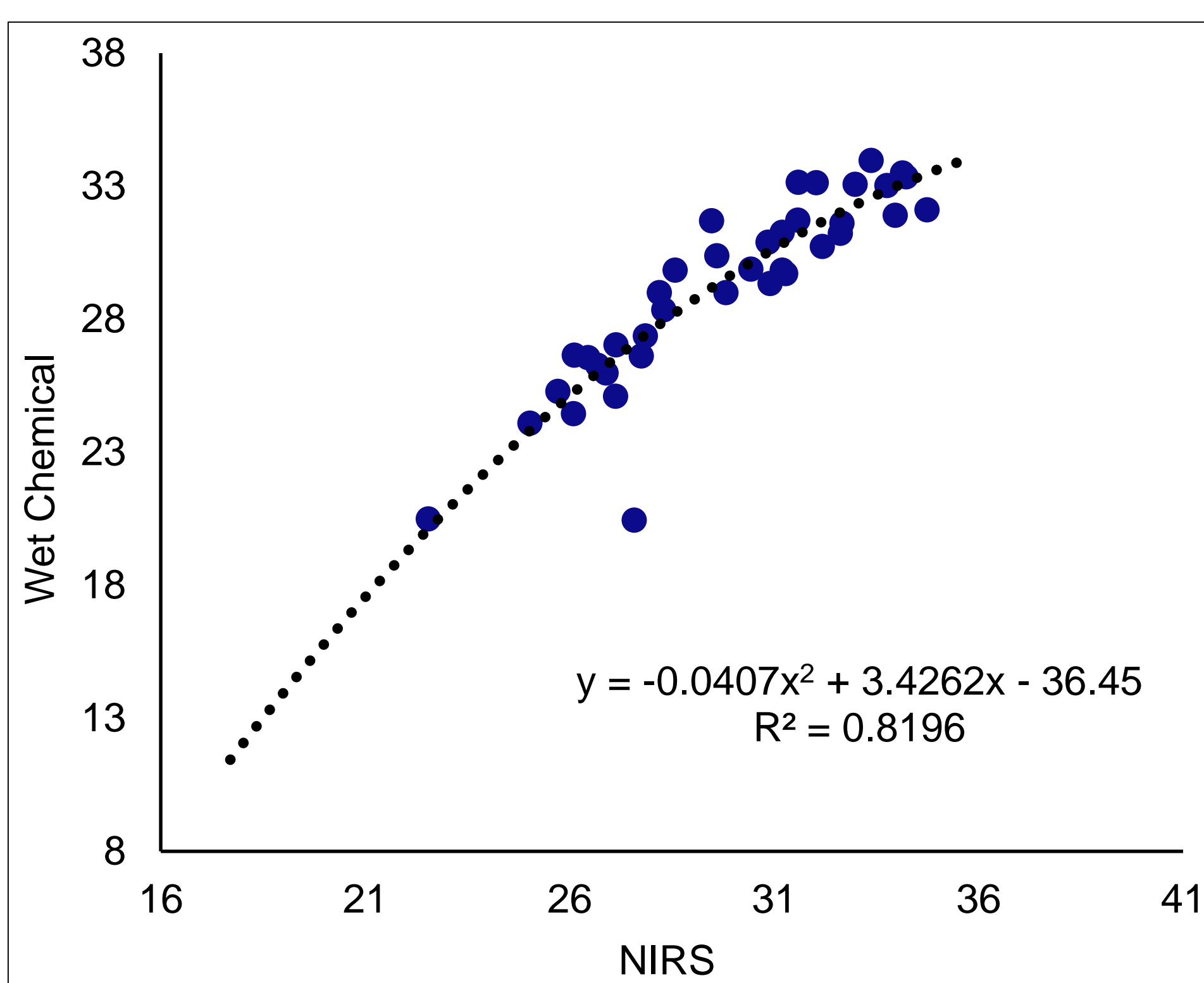


Figure 1. Prediction CF Napier grass from NIRS

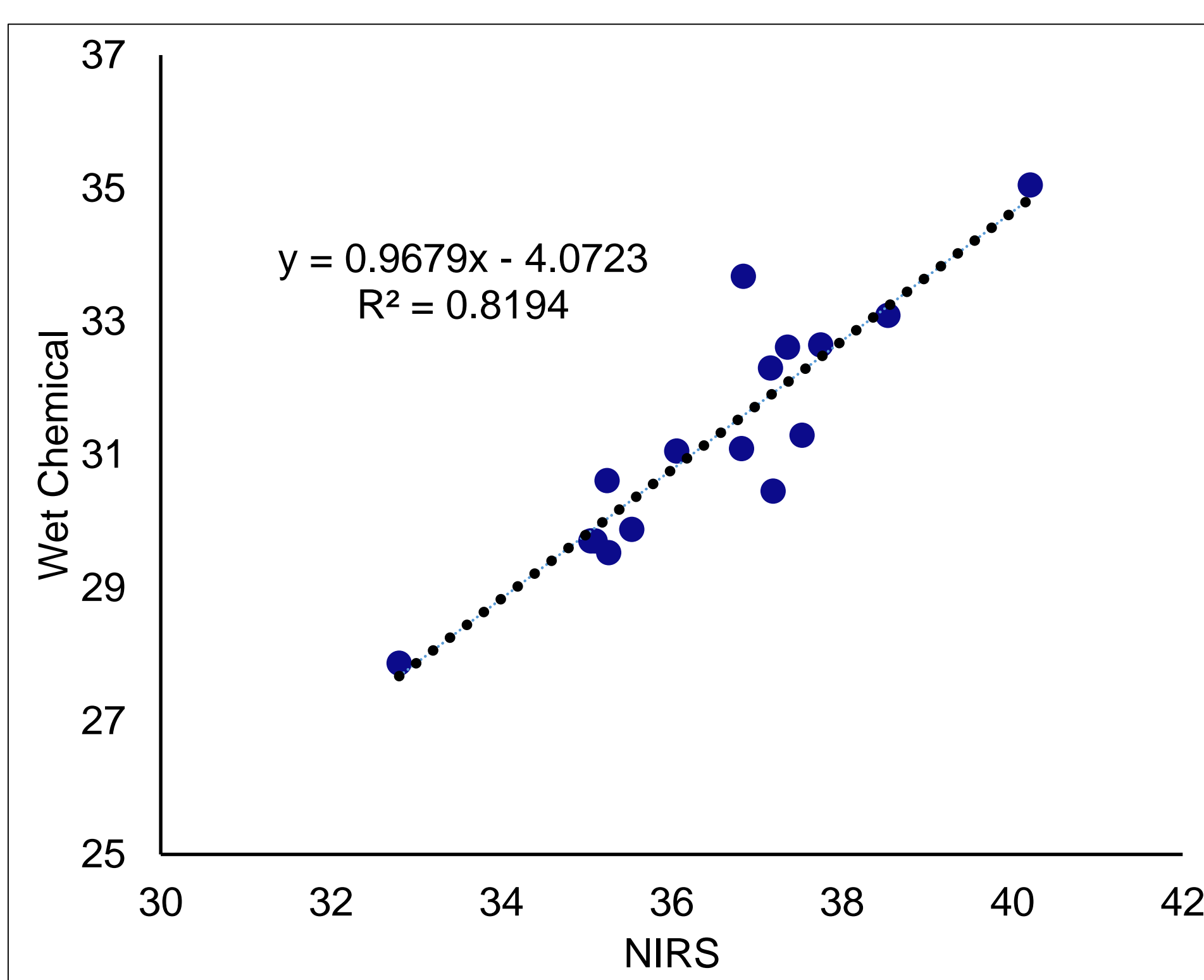


Figure 2. Prediction ADF corn stover from NIRS

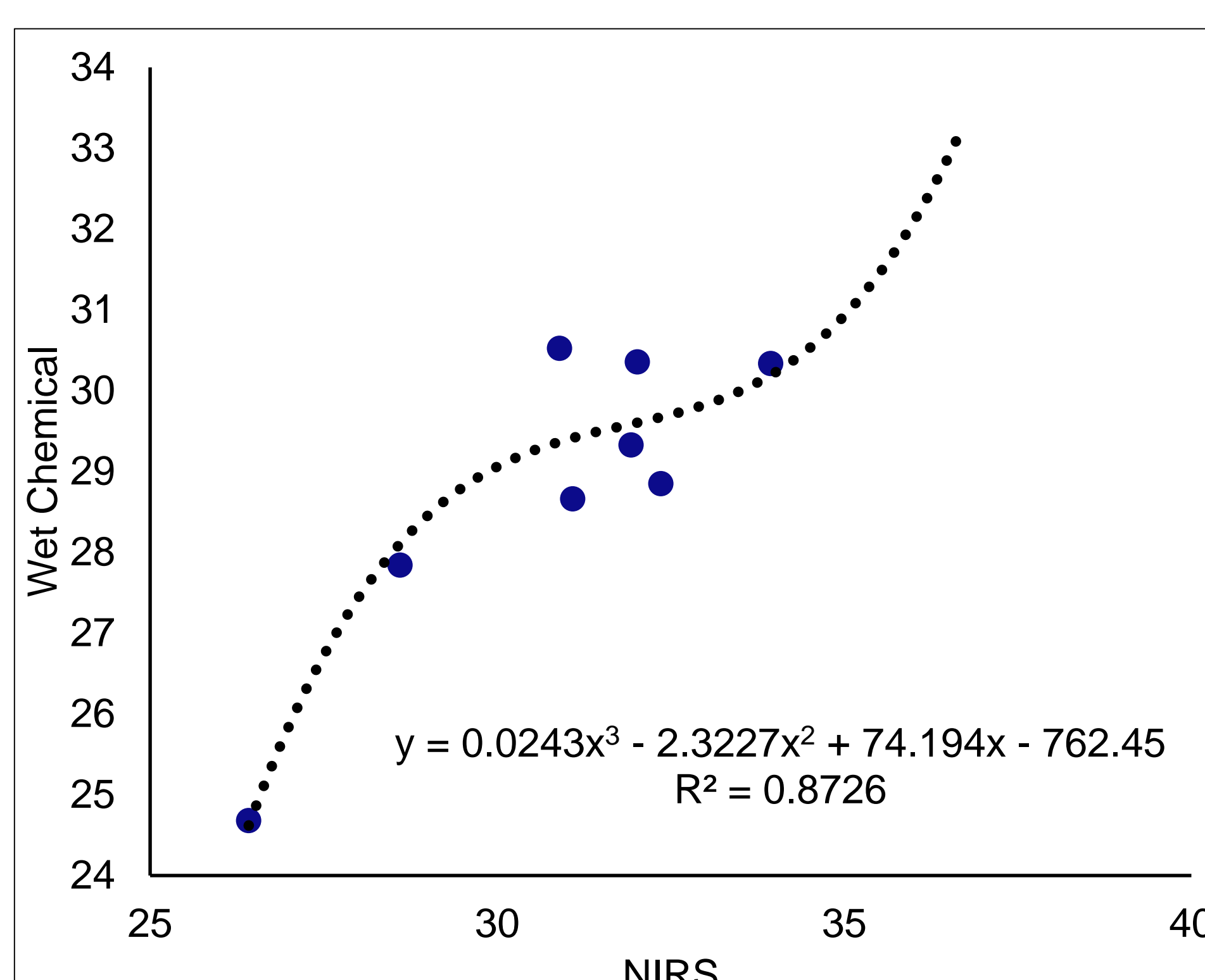


Figure 3. Prediction CF corn husk from NIRS

METHODS

- Materials
 - Feedstuffs: 5 main forages used in dairy cattle farming: Napier grass, natural grass, rice straw, corn stover, corn husk.
 - Feedstuffs Origin: 4 main dairy cattle area in West Java Province: Pangalengan, Lembang, Sukabumi, Bogor.
- Analysis
 - Wet chemical analysis (AOAC 2016) Proximate compositions (DM, Ash, CP, CF): Gerhart instruments, Germany. Plant cell walls (NDF, ADF): ANKOM Fiber Analyzer A200, United State
 - NIRS Buchi NIRFlex N-500 Solids, Switzerland.
- Data Analysis
 - Descriptive statistics
 - Paired T-Test
 - Correlation and regression

CONCLUSIONS

Wet chemical values of Indonesia local feedstuffs are different from data obtained by NIRS method. Correlation among them are also low for many parameters observed. Prediction value of wet chemical from NIRS only accurate for limited parameters. It is suggested to calibrate the NIRS local feedstuffs database.

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