Technological and Higher Education Institute of Hong Kong
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Near Infra-red Spectrometry Database Development for Astragali Radix (*Huangqi*)

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BACKGROUND

Two species of Astragali Radix:

- Legally available in the market.
- Both have slightly difference uses as ingredients.

Processing or powdering Chinese medicine

→ Species are hard to authenticate.

Existing methods for species determination:

Expensive

Need multiple pre-treatments

Investigated a near-infrared spectroscopy → Distinguish species → ↑ Medicine quality & stability.

Convenient Efficient

OBJECTIVES

Establish a Near Infra-red Spectrum (NIRS) model from Astragali Radix standard.

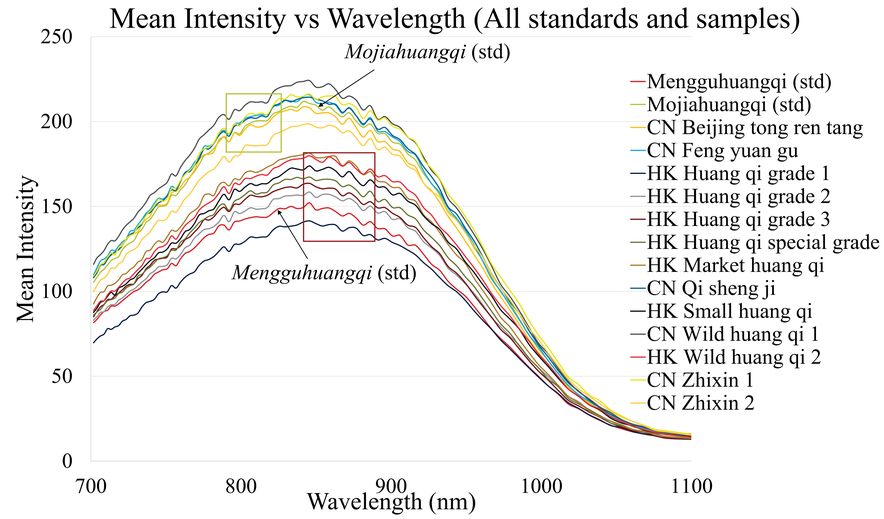
Develop a similarity analysis method to distinguish the species of Astragali Radix in the market.

RESULTS

Table: Comparison of NIRS results for two species

Model / As sample	*Mengguhuangqi* (Mg)	*Mojiahuangqi* (Mj)	NIRS result
Mengguhuangqi (std)	100%	N (44%)	Mg
Mojiahuangqi (std)	N (64%)	100%	Mj
CN Beijing tong ren tang	N (65%)	P (100%)	Mj
CN Zhixin 1	N (58%)	P (99%)	Mj
CN Zhixin 2	N (69%)	P (98%)	Mj
CN Feng yuan gu	N (61%)	P (100%)	Mj
CN Qi sheng ji	N (59%)	P (99%)	Mj
HK Huang qi grade 1	N (93%)	N (27%)	Rejected (Close to Mg)
HK Huang qi grade 2	P (98%)	N (54%)	Mg
HK Huang qi grade 3	P (96%)	N (62%)	Mg
HK Huang qi special grade	N (94%)	N (67%)	Rejected (Close to Mg)
CN Wild huang qi 1	N (55%)	P (98%)	Mj
HK Wild huang qi 2	N (84%)	N (82%)	Rejected
HK Small huang qi	N (88%)	N (75%)	Rejected
HK Market huang qi	N (84%)	N (84%)	Rejected

*** P = Positive, N = Negative**



Two standard models, *Mojiahuangqi* and *Mengguhuangqi* **were clearly distinguished** using NIRS, which was valid for the similarity check.

Mojiahuangqi and *Mengguhuangqi* were the dominant species in the China and Hong Kong market, respectively.

Some samples had a **high similarity rate** but did **not meet the 95% confirmation line**.

METHODOLOGY

Portable NIR spectrometer → Collect spectrum data

- Scan Astragali Radix (2 standards and 13 market samples)

NIR spectrum of each sample → Compared to standard models → Check for similarities

Using RStudio & python

Similarity rate > 95%

Confirm high similarity chemical structure of the specific Astragali Radix.

Determine the species correctness for Chinese medicines.

CONCLUSION

The Astragali Radix samples were of bad quality, such as substandard or stained products.

Corresponding chemical testing methods (e.g. HPLC) can further prove the results and validate the methodology in future studies.