

Determination of isoflavones contents in soybean cotyledons, with near-infrared spectroscopy and chemometrics

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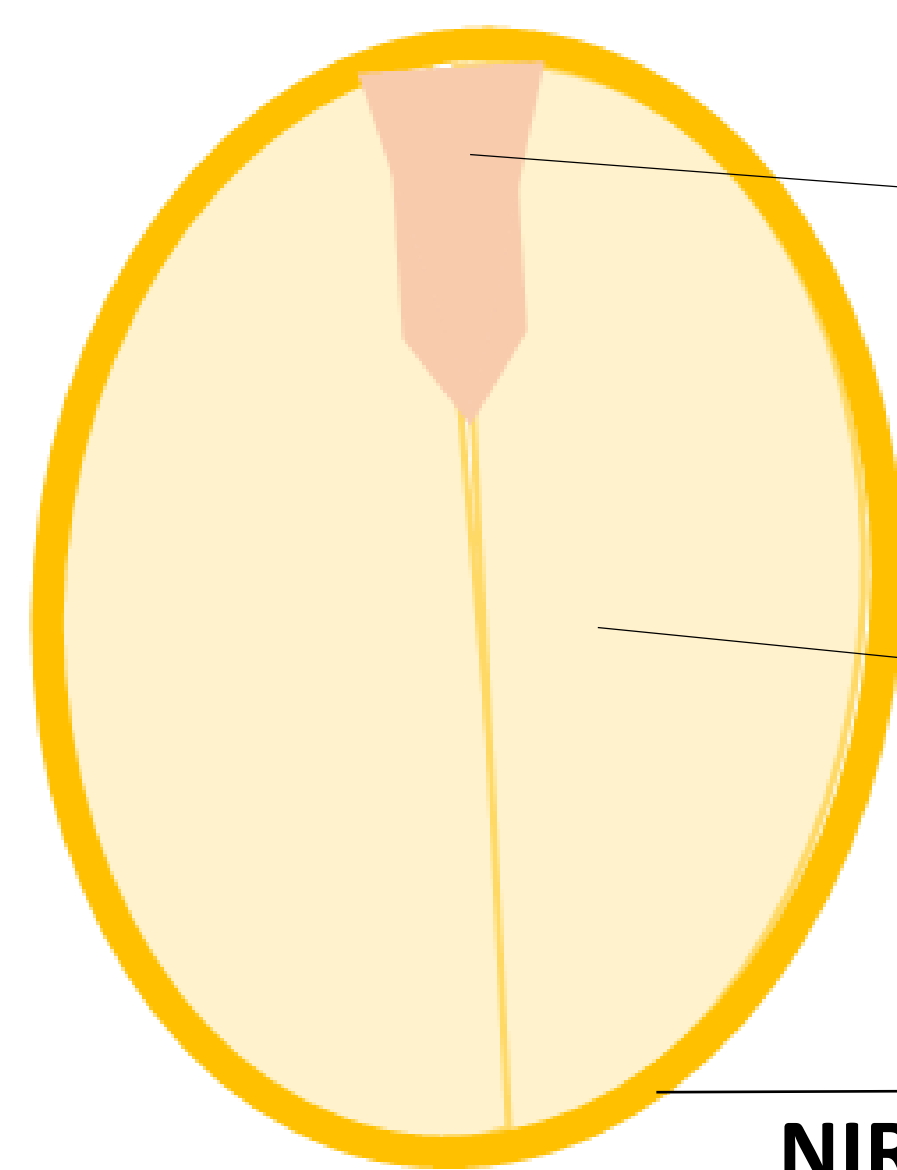
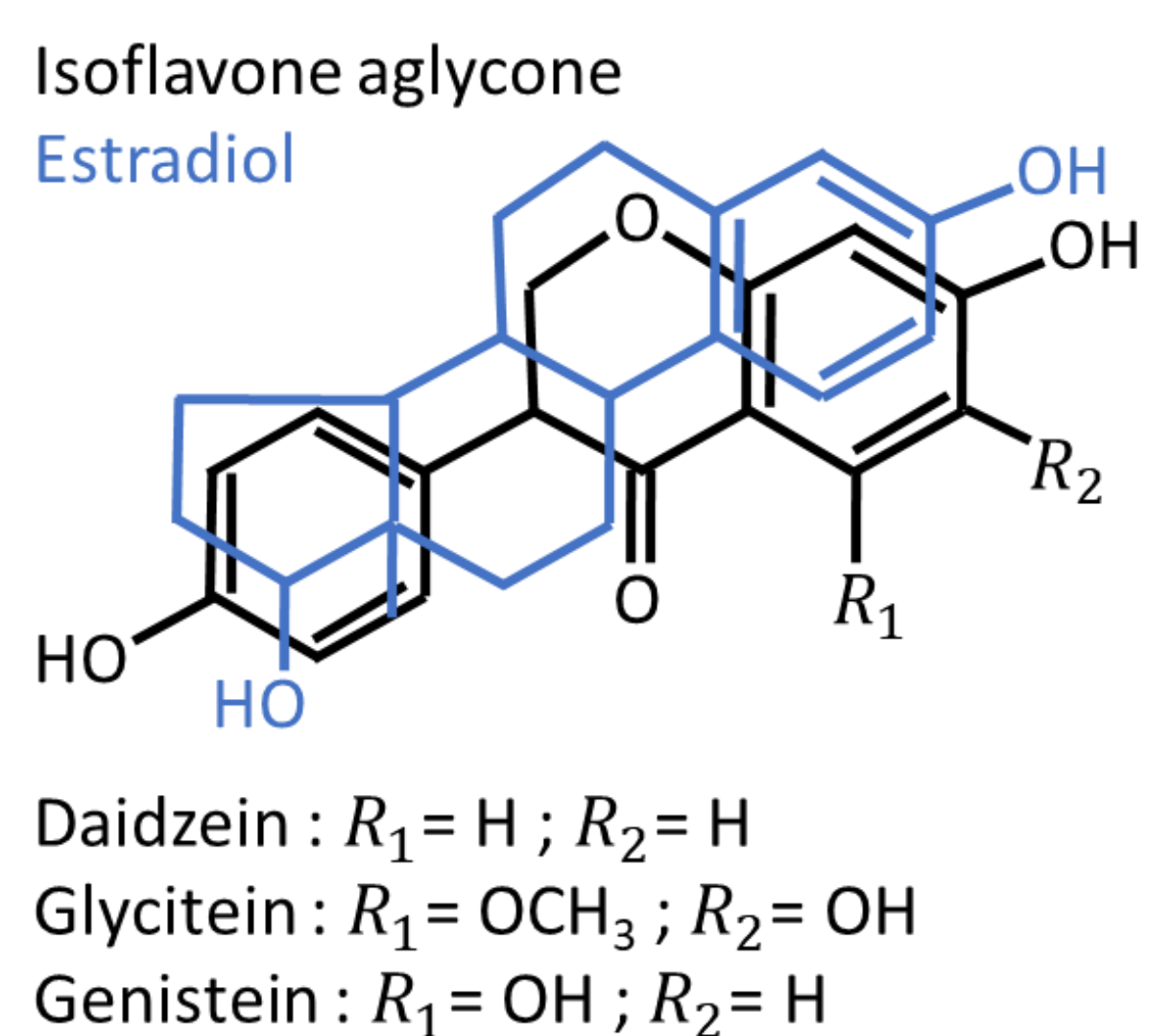
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Background

Influence human health

 French consumers are increasingly concerned ¹

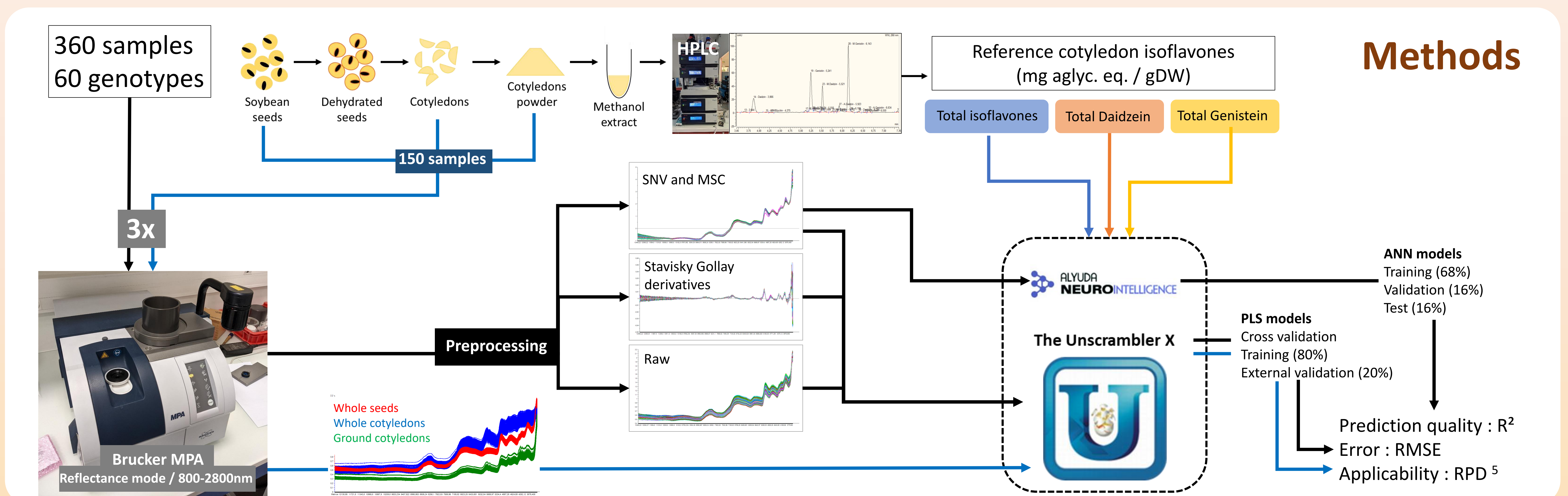


Embryo axis
 Glycitein and Daidzein 10x more concentrated than cotyledons

Cotyledon isolated for soyfood ³
 Genistein and Daidzein Accumulate after embryo axis development ²

NIRS : fast, green, low cost analysis ⁴ → Protein / Fatty acid

Objectives: Predict isoflavones contents from soybean cotyledons with near infrared spectroscopy and compare performances between raw and transformed seeds

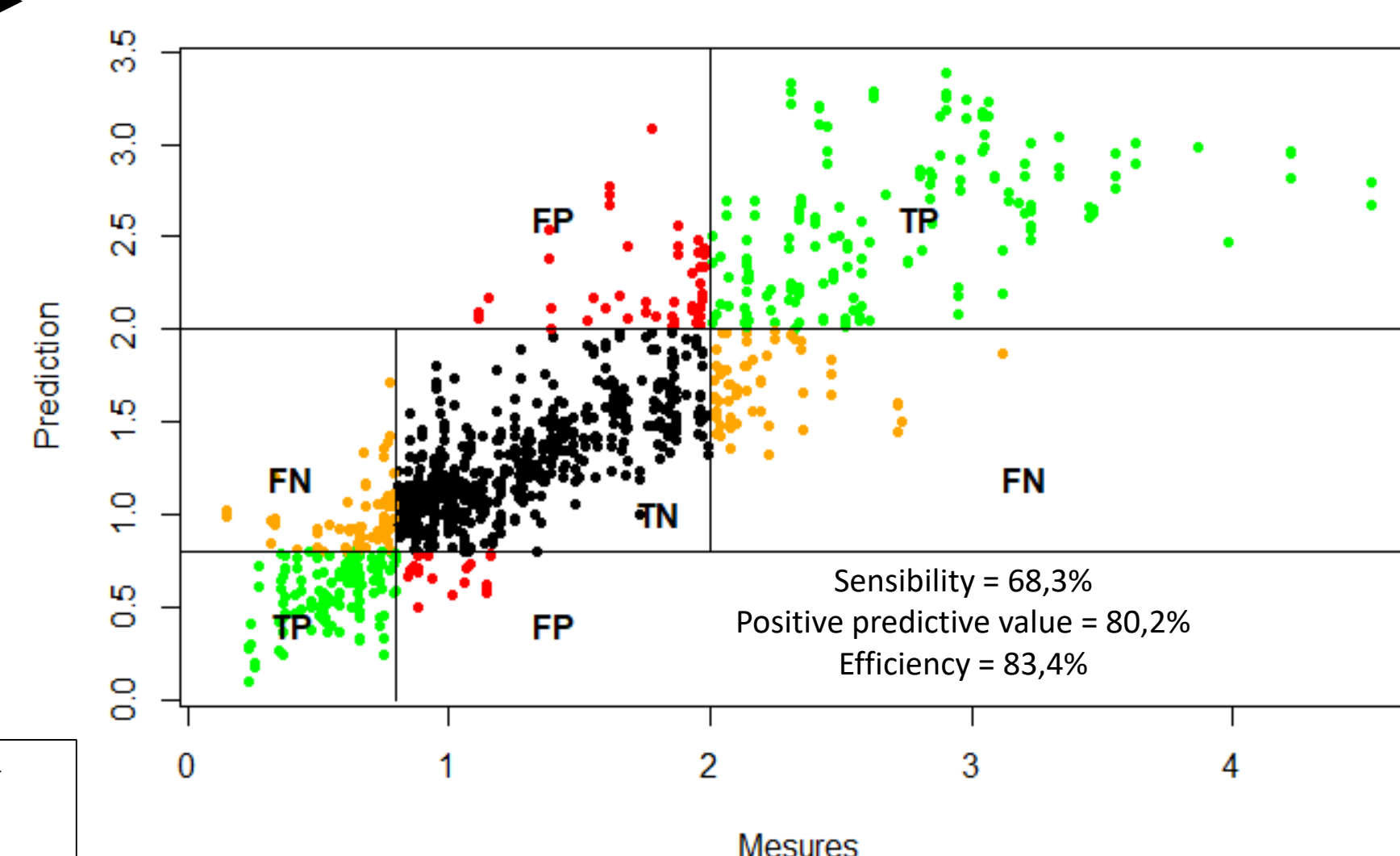


Results

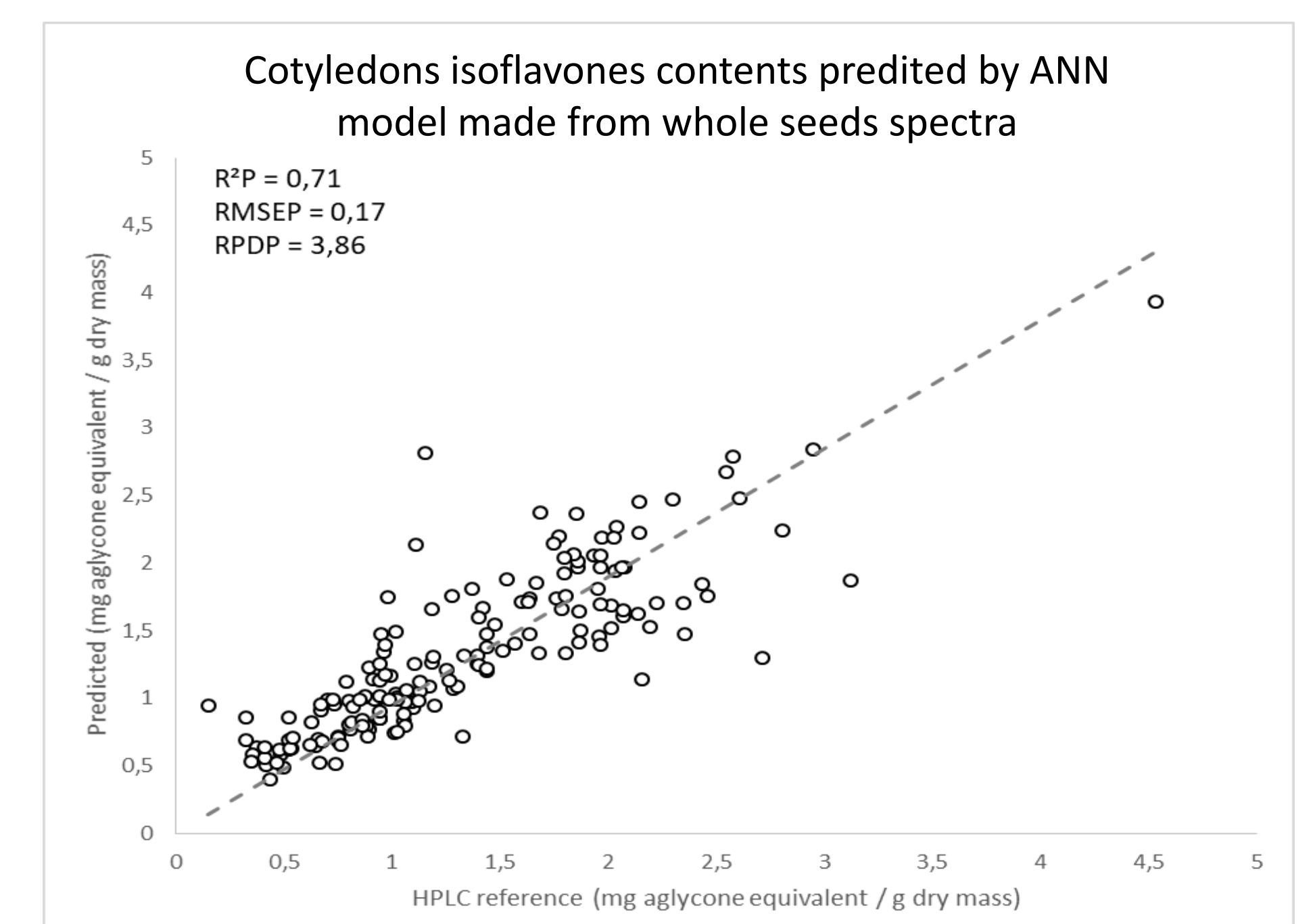
External validation of PLS models on total isoflavones

Pretraitements	R ² Pred	RMSEP	RPD Pred
Raw	0,68	0,32	1,77
D1	0,38	0,47	1,20
D2	0,14	0,57	0,99
SNV	0,67	0,32	1,75
SNV D1	0,38	0,47	1,20
SNV D2	0,13	0,58	0,97
MSC	0,67	0,32	1,75
MSC D1	0,38	0,47	1,20
MSC D2	0,13	0,58	0,97

Discrimination of high and low groups of isoflavones content in cotyledons from PLS external validation prediction



Total isoflavones predicted by ANN model from test set



Cross validation of PLS from various matrices spectra

Spectrum	Total isoflavones		Total Daidzein		Total Genistein	
	R ² CV	RMSECV	R ² CV	RMSECV	R ² CV	RMSECV
Whole seeds	0,72	0,22	0,71	0,11	0,72	0,12
Whole cotyledons	0,73	0,22	0,75	0,10	0,73	0,12
Ground cotyledons	0,74	0,22	0,74	0,10	0,70	0,12

Conclusion: Using raw or SNV/MSC transformed spectra, chemiometric analysis can produce powerful estimations of isoflavone concentration from cotyledons, regardless of the matrix examined, and especially when employing ANN models.

Reference

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- Choi and Rhee, 2006. DOI : 10.1089/jmf.2006.9.1
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