Huey™

Cognitive Autonomation for Industry

Human vision is incredible. The human eye can..

- Distinguish between a million different colours
- Work in bright sunshine or at night
- See an ant close by or a twinkling star trillions of kilometers away
- Change focus almost instantly and stay focused even whilst moving our heads about

Taste, smell, look and feel are all important parameters, when determining the quality of teas.

The human eye is used extensively, throughout the tea supply chain to gauge visual attributes (colour, shape, size) of tea leaf, infused leaf and liquor.

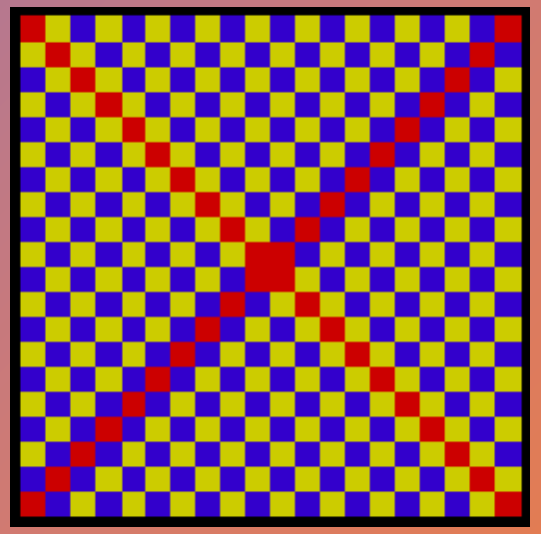
AND YET...

1. Colour and vision are perceptions and do not often accurately reflect the physical reality around us.

2. We have no objective language to describe our perceptions. Descriptive terms such as “Green”, “Brown”, “Twisted” and “Mixed” are highly subjective.

3. Perceptions cannot be adequately recorded, reviewed and communicated in a manner that enables industrial and technological progress.

These “Red” squares are all the same colour! Would you believe it?



Cover up the image leaving only one red diagonal exposed. Clearly the squares along any one diagonal are all the same colour. The centre square is common to both diagonals, therefore both diagonals must also be the same red colour. Yet, when the pattern is seen as a whole, they appear to be entirely different from each other.

Huey™

Is a system that helps autonomate (automation with a human touch) cognitively complex tasks in industry.

Huey uses Machine Vision and Artificial Intelligence to compare samples. The measurement method is non-destructive and rapid.

Information extracted from Huey helps augment human capability and can typically be used in industry to:

1. Support quality related decisions.

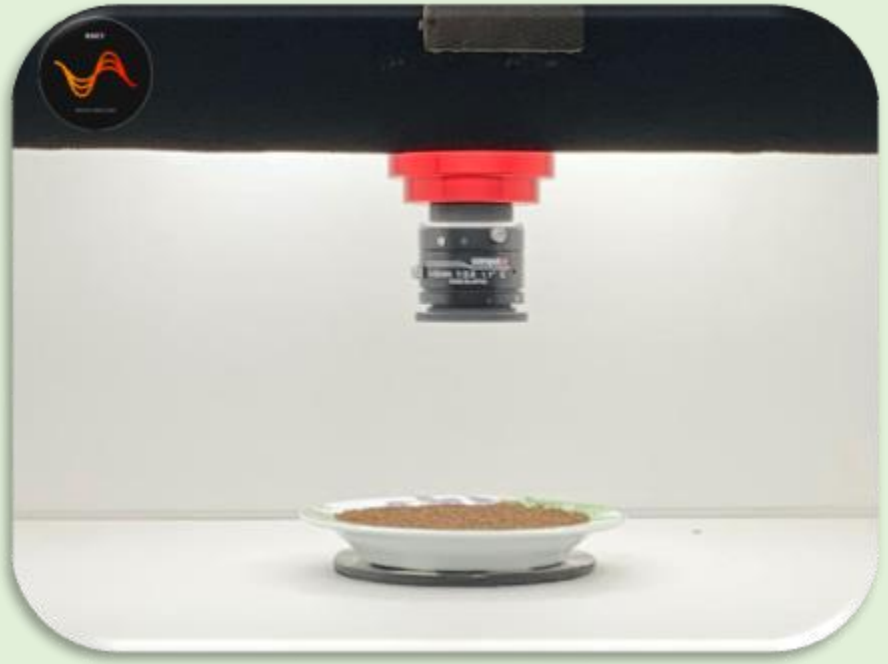
2. Communicate objectively with customers and supply partners.

Process Flow

1.1 DRY LEAF

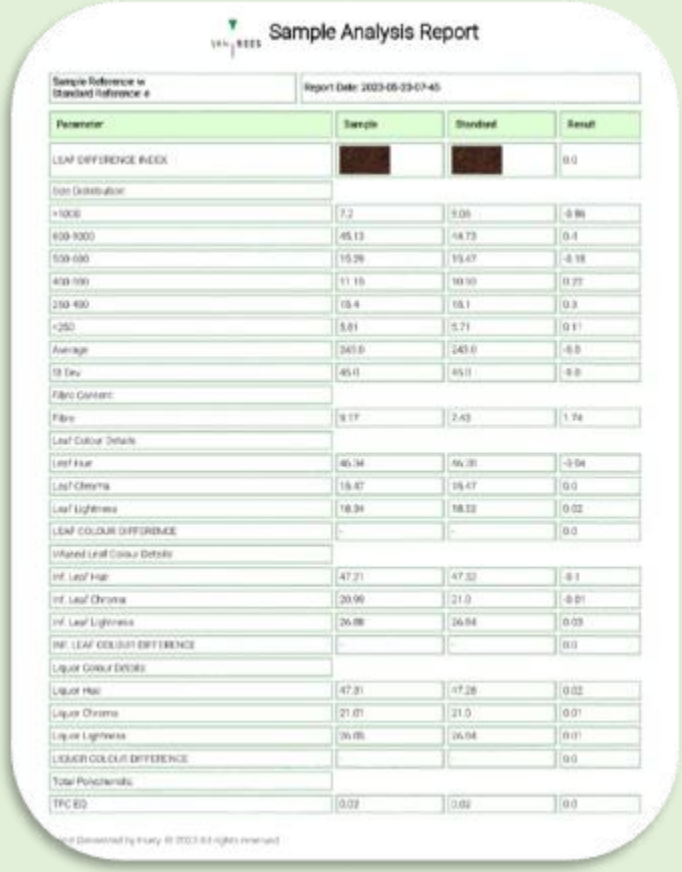
1.2 INFUSED LEAF

1.3 LIQUOR



2. MEASURE

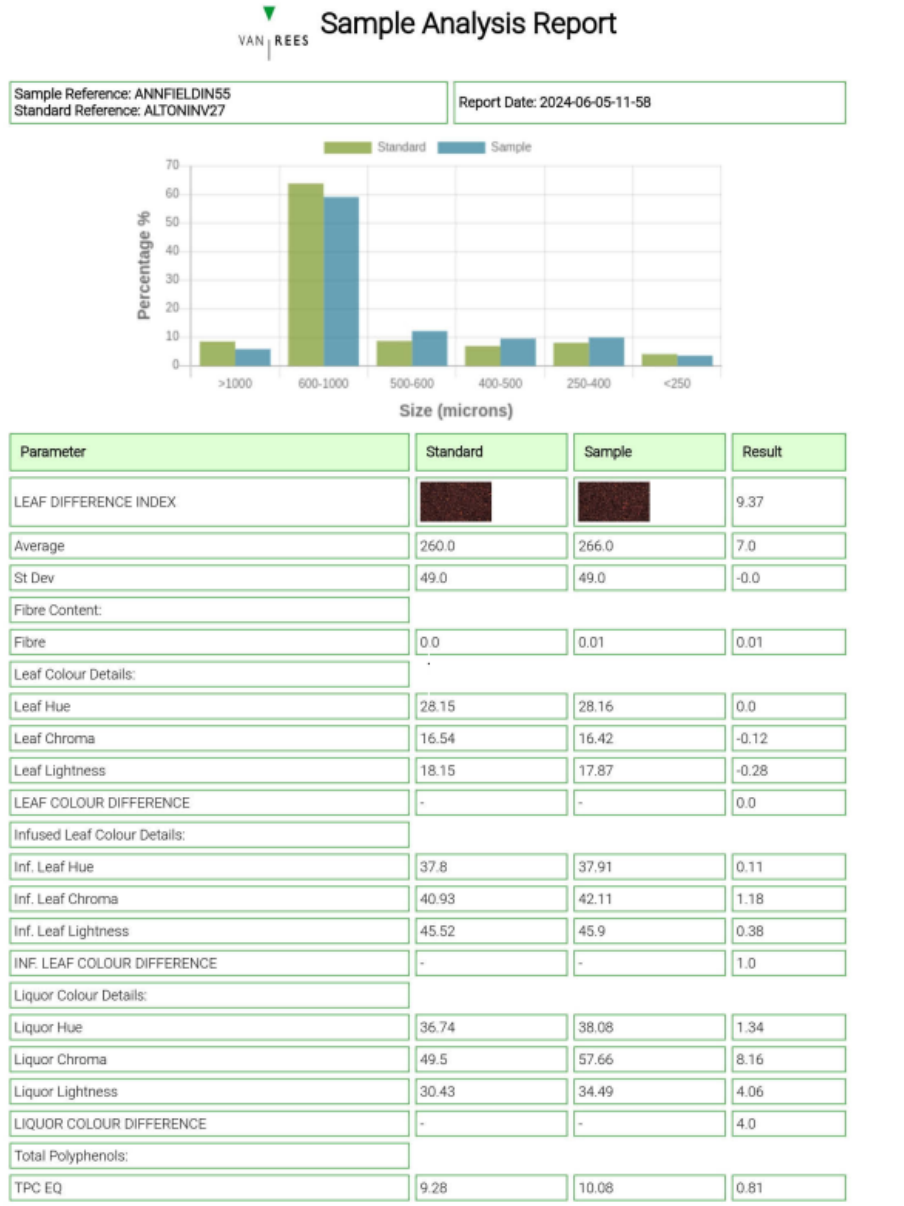
3. REPORT



Sample Analysis Report

Parameter	Sample	Standard	Result
LEAF DIFFERENCE INDEX			0.0
Size Distribution			
>1000	7.2	5.05	-0.86
630-1000	45.13	44.73	0.4
500-630	15.29	15.47	-0.18
400-500	11.15	10.93	0.22
250-400	10.4	10.1	0.3
<250	5.81	5.71	0.11
Average	343.0	343.0	-0.0
St Dev	451.0	451.0	0.0
Fibre Content			
Fibre	9.17	7.43	1.74
Leaf Colour Details			
Leaf Hue	46.34	46.39	-0.04
Leaf Chroma	19.47	19.47	0.0
Leaf Lightness	18.34	18.33	0.02
LEAF COLOUR DIFFERENCE	-	-	0.0
Infused Leaf Colour Details			
Inf. Leaf Hue	47.21	47.32	-0.1
Inf. Leaf Chroma	20.99	21.0	-0.01
Inf. Leaf Lightness	26.88	26.84	0.03
INF. LEAF COLOUR DIFFERENCE			0.0
Liquor Colour Details			
Liquor Hue	47.31	47.28	0.02
Liquor Chroma	21.01	21.0	0.01
Liquor Lightness	26.85	26.84	0.01
LIQUOR COLOUR DIFFERENCE			0.0
Total Polyphenols			
TPC EQ	0.02	0.02	0.0

Huey Sample Analysis Report and Analytical Parameters



Sample Analysis Report

Sample Reference: ANNFIELDIN55
Standard Reference: ALTONINV27

Report Date: 2024-06-05-11-58

Parameter	Standard	Sample	Result
LEAF DIFFERENCE INDEX			9.37
Average	260.0	266.0	7.0
St Dev	49.0	49.0	-0.0
Fibre Content:			
Fibre	0.0	0.01	0.01
Leaf Colour Details:			
Leaf Hue	28.15	28.16	0.0
Leaf Chroma	16.54	16.42	-0.12
Leaf Lightness	18.15	17.87	-0.28
LEAF COLOUR DIFFERENCE	-	-	0.0
Infused Leaf Colour Details:			
Inf. Leaf Hue	37.8	37.91	0.11
Inf. Leaf Chroma	40.93	42.11	1.18
Inf. Leaf Lightness	45.52	45.9	0.38
INF. LEAF COLOUR DIFFERENCE	-	-	1.0
Liquor Colour Details:			
Liquor Hue	36.74	38.08	1.34
Liquor Chroma	49.5	57.66	8.16
Liquor Lightness	30.43	34.49	4.06
LIQUOR COLOUR DIFFERENCE	-	-	4.0
Total Polyphenols:			
TPC EQ	9.28	10.08	0.81

About this report: This report has been auto-generated using a proprietary machine vision system that performs imaging and colourimetry based analysis of samples of tea. The system uses AI to mimic human perception and decision making. All descriptive labels displayed are underpinned by a sound AI Model and data framework.

Disclaimer: This sample analysis report and associated tests have been developed, and their performance characteristics determined by Catuskoti, in a manner consistent with Van Rees Quality Standards. The testing methodologies and report are part of a novel pilot programme and have not been cleared by a standards accreditation body to date. This report is intended to be used as an adjunct to traditional tea tasting and grading work.

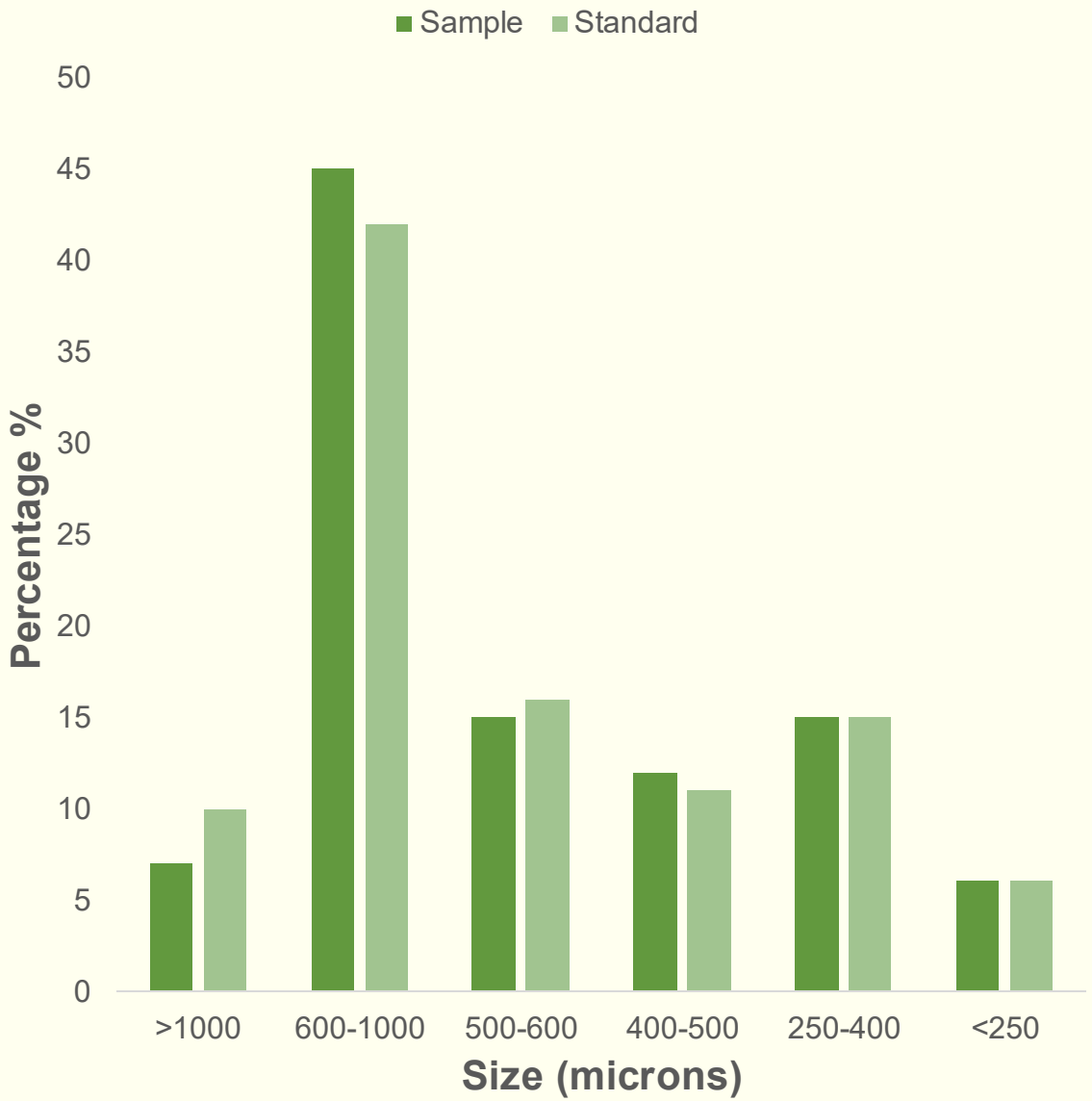
Report generated by Huey @Catuskoti 2024 All rights reserved.

The Huey **Sample Analysis Report** compares parameters between a sample and standard*

Reports can be viewed on screen, shared internally or with key customers.

The following slides describe the Parameters** used for analysis.

* Pre-shipment sample vs customer standard and subsequently shipment sample vs pre-shipment sample.
**Parameters selected for the Pilot with Van Rees.



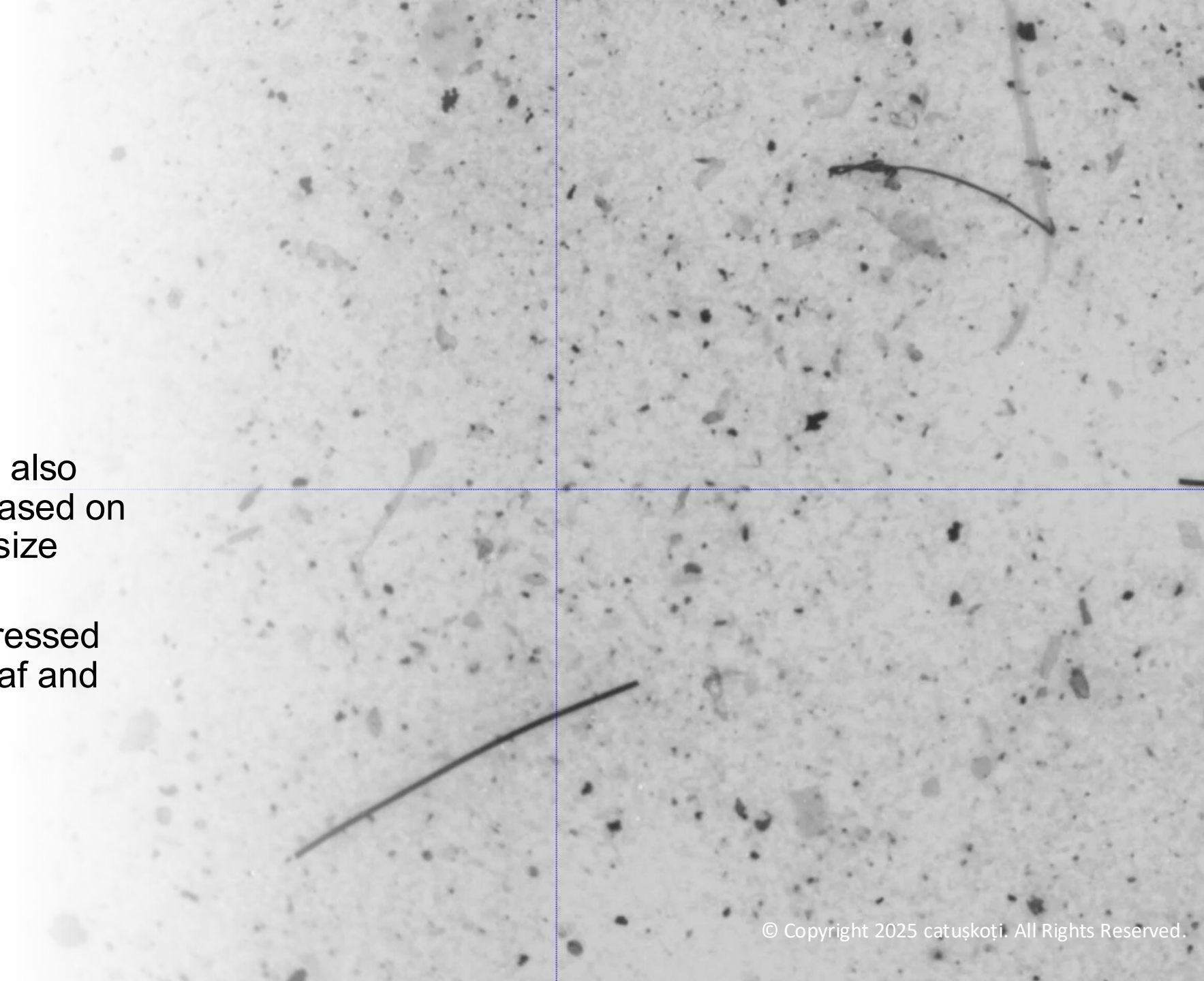
Leaf Particle Size Distribution

Huey can instantly estimate and compare leaf particle size distributions. The technique is non-destructive and can be calibrated to match the results from Sieving Machines.

Leaf Fibre Content

Huey identifies fibres (and also other types of particles), based on attributes such as shape, size and colour.

Fiber counts are then expressed as a percentage to total leaf and compared.



Colour Differences

Huey detects differences in colour parameters such as Hue, Chroma and Lightness in tea leaf and liquor. Overall Colour Differences is expressed as difference in “Empfindung” or Sensation (dE Units).

Leaf Difference Index

Tea blends are heterogenous mixtures. Huey's Leaf Difference Index (LDI) provides an overall quantitative assessment of the degree of difference / similarity between different blends of tea.

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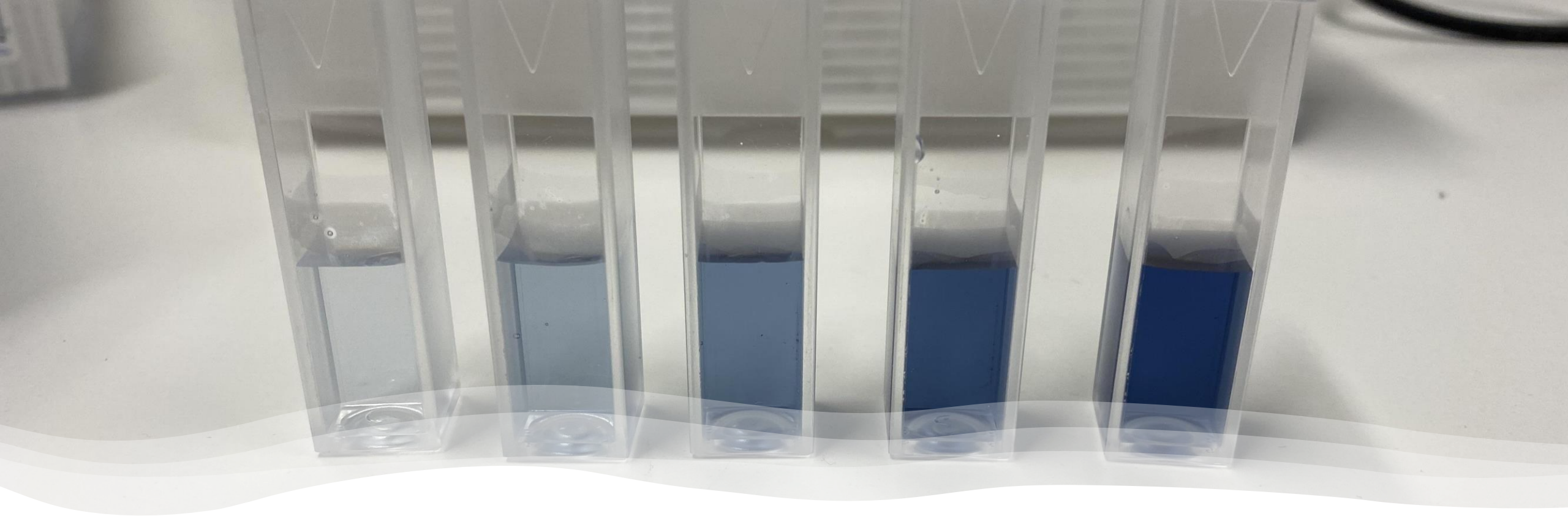

New Markers for Polyphenols

Huey can estimate Total Polyphenol Content (TPC) in tea using a novel technique. This method leverages machine learning to correlate image data with traditional spectrophotometric measurements.

Huey offers cost-effective + smart solutions that perfectly fit your workflows and will set your company on a path to data driven decision making and communication.

Thank You!

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Visit https://huey.science