Presentation to ICO/PSCB
London, 26 September 2007

Works on coffee
by the

International Organization for Standardization

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- ISO stands for **International Organization for Standardization** with headquarters in Geneva, Switzerland
- ISO has a membership of **156 national Standards Institutes**
- ISO develops **voluntary technical standards**, which add value to all type of business operations
- In the economical dimension, ISO standards promote:
  - **efficiency and effectiveness**
  - **facilitation of trade**
  - **dissemination of new technologies**

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- A large part of ISO standards are aimed to be used as **tools for qualifying** product **authenticity and quality**
- The objective is to end with **simple-to-use standards** in order to allow good and repeatable **characterization of products** (coffee, in our case)
- ISO vocation is developing standards that provide the link between:
  - creative potential (**great ideas**)
  - tackling problems (**practical implementation**)

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- ISO develops **only** those standards that are **requested by the market**
- This work is carried out by experts coming from those **industrial, technical and business sectors** that have asked for the standards, and which subsequently put them to use
- These **experts may be joined by others** with relevant knowledge, such as representatives of:
  - **government agencies**
  - **consumer organizations**
  - **academia**
  - **testing laboratories**

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- ISO sub-committee **dedicated to coffee** (TC34/SC15) is at present animated by **20 participating members** among which the most active are:
  - Brazil, Colombia, France, Germany, Cuba
- The secretariat is held by the **Brazilian national body** ABNT
- **22 coffee standards** have been published so far
- Three main axes are currently under discussion:
  - **vocabulary**
  - **water content**
  - **defects**

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COFFEE VOCABULARY

- The word "coffee" is a **multi-faceted** one
- ISO standard 3509:2005 covers several, **but not all**, of its meanings
- "Coffee" is seen by **trade and industry** mainly as:
  - **a tree**
  - **an agricultural product**
  - **a traded commodity**
  - **a roasted product off-the-shelf**
- **Consumers and media world** do refer to "coffee" mainly as a **beverage**, ready for consumption, often evoking ritual and social behaviours

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COFFEE VOCABULARY

- ISO Standard 3509, even in its recent revision of 2005, **does not cover any step after "grinding"**
- This lack of definitions frustrates attempts to classify beverage consumptions trends, **both in their traditional and more modern aspects**
- A new working group, led by France, has been created to study the global situation and to **propose redefinitions and integrations**

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WATER IN COFFEE

- The word "water" too is a **multi-faceted** one
- ISO standards cover some, **but not all**, of its meanings
- **Trade and industry** mainly see "water" as either:
  - a **foreign material** present in raw coffee, bought as coffee and therefore affecting coffee price
  - a spoilage factor of raw coffee **at field** and transport, enhancing **mould attack** opportunities and eventually leading to lot rejection
  - a spoilage factor of raw coffee **during final storage**, leading to **enzymatic reactions** that produce off-tastes in the long term
  - a roasting/quenching/packaging **technological aid**, **sold as coffee** in the finished product off-the-shelf

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WATER IN COFFEE

- Each of these contexts deserves **a precise definition** of what is meant by "water", in order to build a method of analysis able to **address the real problem** and to produce the desired effect
- The four practical problems introduced in the foreword should be **tackled separately**, by carefully determining the appropriate "water" species
- **Existing ISO standards** ISO 1446:2001; ISO 6673:2003 and the Karl-Fischer-related ones do cover the field **up to a point**, but more attention is to be paid to developments in analytical technology

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WATER IN COFFEE

- The first item **affects roasting yield**, i.e. the mass of R&G coffee that can be eventually sold. It sounds logical that an analysis that mimics the roasting process could be appropriate
- It is well known that **mould attack can be prevented** by keeping "water activity" (a_W) low. No ISO standard covers this aspect so far
- The production of **off-tastes in the long term storage** is a poorly understood and little investigated phenomenon. It seems proper it is left to attention of academic research
- Any thermal analysis of roasted coffee products is prone to the error of **determining volatile species** other than H_2O as water (e.g. CO_2)

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WATER IN COFFEE

- To the present scientific knowledge, at least the following **five** physico-chemical statuses of H_2O exist:

- **superficial water**: pure H_2O in open spaces
- **capillary water**: pure H_2O in narrow channels
- **osmotic water**: H_2O with solutes, either ionic or molecular
- **imbibition water**: H_2O chemically bond by adsorption
- **crystallization water**: H_2O chemically indispensable for the intimate structure of various compounds, unremovable

- A working group to look into this topic **is foreseen**

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COFFEE DEFECTS

- The term "coffee defect" is quite difficult to be **defined unambiguously**
- Several dissimilar approaches are ruling the trade in different countries, with **little coherence or coordination, if any**
- ISO has started to deal with the topic **more than twenty years ago**. A first agreed Standard was published in 1993
- Submitted to thorough revision, it was **re-issued in 2004**
- As per the present day, ISO standard 10470:2004 **is final and in force**

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COFFEE DEFECTS

- Obviously enough, application of ISO 10470 is **by no means mandatory**, but **completely voluntary**
- If adopted by the main Boards of Trade and introduced in international contracts, ISO 10470 could
  - **prevent dissimilar approaches** in different countries
  - **improve coherence** and mutual understanding
  - **limit litigations** by the parties
- Last but not least, it could set the basis for **enhancement of quality in the spirit of ICO resolution 420** (Coffee Quality Improvement Programme)

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COFFEE DEFECTS

- Main innovative features of ISO 10470:2004 are:
  - **unification of descriptors** in both Arabicas and Robustas
  - **weighing criterion**, as opposed to **defect count**
  - subdivision of defects in five categories:
    - ✓ **non-coffee defect**
    - ✓ **defect of non-bean origin**
    - ✓ **irregularly formed bean**
    - ✓ **bean of irregular visual appearance**
    - ✓ **off-taste coffee**

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COFFEE DEFECTS

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COFFEE DEFECTS

- Another significant novel feature is the attribution to each defect of **two different coefficients** likely to affect product value:
  - **loss of mass:** effect of the **feasible sorting out** of relevant defects **on the amount of coffee left in the lot** (e.g. stones are unlikely to be allowed to roast!)
  - **sensorial concern:** impairment suffered by the **quality of final roasted product**, should the relevant defect be allowed to remain in the lot

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COFFEE DEFECTS

- Apart from the description of defects, ISO 10470 offers a **non-normative example** of utilization, which could be adjusted by different contracts to suit as well as possible **own** economic clauses
- Such an **hypothetical** example of application leads to establishing “Quality Impact Units”. It would ideally allow the negotiating parties to agree on **quantification of the commercial value of a lot**
- In the frame of ISO five-year term revision policy, standard 10470:2005 will be revised to acknowledge any new exigencies called for by the profession. Participation to ISO works of exacting professionals from all stakeholders **is crucial to this purpose**

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CONCLUSIONS

- **The importance of coffee business**, the second major money-spinner around the world, cannot be neglected
- The International Organization for Standardization feels **bond to serve** the needs of such a world
- So far, a considerable amount of time and gray matter has been invested by coffee producers, industry and trade to ask ISO to put **transparency and sound science** in it
- More resources are needed to continue and fulfil the demands for **tools that make a difference**
- **All helping hands are more than welcome** to join this effort and make their voices heard in **our fully international and open-minded forum**

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Annex A
(informative)

Application example

Obtain a representative sample of 300 g after having performed adequate sampling following a procedure such as given in ISO 4072.

Spread the test portion over a plain orange or black surface and examine it under diffuse daylight (not direct sunlight), or artificial light reproducing daylight as closely as possible. For a better identification, refer to Annex C of ISO 10470:2004, *Green coffee — Defect reference chart*, which shows colour photographs of the defects.

Pick out all foreign matter and defective beans and group them by categories as defined in ISO 10470. Put them in separated piles or different containers. Weigh, to the nearest 0,1 g, each category of foreign matter and defects and calculate their mass fraction as a percentage.

The impact of foreign matter and defects on the quality is calculated for both loss of mass and sensorial concern by multiplying each percentage by the coefficient found in the Defect reference chart of ISO 10470. At the end, the final values obtained are equivalent to “Quality Impact Units”.

Hypothetical example

Defect	Mass		Loss of mass		Sensorial concern	
	g	%	Coefficient	Actual	Coefficient	Actual
Stones	1,2	0,4	1,0	0,4	0	0
Beans in parchment	3,0	1,0	0,5	0,5	0	0
Black beans	3,0	1,0	0	0	1,0	1,0
Immature beans	10,5	3,5	0	0	0,5	1,75
Spongy beans	9,0	3,0	1,0	3	0,5	1,50
Brown beans	7,5	2,5	0	0	1,0	2,50
Sound beans	265,8	88,6				
TOTAL	300,0	100,0		3,9		8,75

This procedure can be applied to any contract of purchase of green coffee that may be negotiated between provider and client. For (a) certain defect(s), the contract may impose either a maximum mass fraction in percent or a maximum value of “Quality Impact Units”. Such limits may be defined in advance between the two parties.