Simple Sorghum Grain Quality Evaluation Procedures

Janet Taylor  
*University of Pretoria, Janet.taylor@up.ac.za*

John R.N. Taylor  
*University of Pretoria, John.taylor@up.ac.za*

Follow this and additional works at: [http://digitalcommons.unl.edu/intsormilpresent](http://digitalcommons.unl.edu/intsormilpresent)  
Part of the [Agronomy and Crop Sciences Commons](http://digitalcommons.unl.edu/intsormilpresent/1), [Food Chemistry Commons](http://digitalcommons.unl.edu/intsormilpresent/2), and the [Other Food Science Commons](http://digitalcommons.unl.edu/intsormilpresent/3)
SIMPLE SORGHUM GRAIN QUALITY EVALUATION PROCEDURES

Janet Taylor and John Taylor

Janet.taylor@up.ac.za

Department of Food Science
University of Pretoria
Pretoria
South Africa
Traditionally

- Sorghum best known as subsistence crop
- Plays crucial role in rural food security
Changes are happening

• Rising grain prices are forcing commercial industry to look for alternative raw materials

• A need to source those raw materials close to where they are going to be used

New developments in the brewing industry has enabled sorghum to be used as a raw material to brew lager beer.
The brewing of lager beer from sorghum: This is one of the opportunities for subsistence farmers to become commercial farmers.

Sorghum is being grown by local groups of small-holder farmers to provide the raw materials for these new lager beers. Production costs are reduced and the farmers are uplifted from the status of subsistence farmers to those who have an income from the sale of their produce.
Both the farmer and the processor need to be happy with the trade.

We need some way of ensuring that the grain the farmer is selling is of the quality he claims and the grain the processor is buying is of the quality he needs. Quality can then define the price paid.
How do we do this?

There are existing Sorghum Grades and Standards in the region

BUT

They are not always appropriate for the intended use

So what do we use instead?
Most Appropriate Sorghum Grain Quality Criteria Identified

• High tannin/non-tannin
• Hardness
• Germinability
• Grain purity
• Grain colour

How do we measure them?
Limitations

- Simple: not need skilled lab technician
- Should not need specialised equipment
- Chemicals must be readily available and inexpensive
- Methods should be robust and rapid
Tannin

What you need:

Tannin Standard

Non-tannin Standard
Tannin

What you do:

1. Measure Caustic (5 g/100 ml bleach)
2. Add bleach, mix
3. Count out samples
4. Add bleaching reagent
5. Shake, leave for 10 min
6. Wash
7. Blot dry
Tannin

Before bleach test

What you get:

- Tannin
- White non-tannin
- Red non-tannin

After bleach test
Tannin

**ODDBALL SAMPLES**

*Before bleach test*

*Mixed sorghum varieties*

*Type II sorghum*

*After bleach test*
Tannin

Cannot malt or brew with sorghum tannin grain without pre-treatment
Tannins imparts bitter flavour to food products

Causes:
Tannins bind to proteins (enzymes) and prevents the enzymes working.
Tannins reduce the protein quality of food products
Grain Hardness

What you need:

Corneous

Intermediate

Floury
Hardness

What you do:

• Cut 20 sound, whole grains in half, longitudinally

• Compare half of each grain with the illustration shown on the previous slide
Hardness

What you get:

Corneous

Floury

Intermediate
Germinability

What you need:

What you do:

• Add 5 ml water to bottle lid, add newspaper circles until water is just absorbed
• Count out 100 sound kernels, place on damp newspaper, close with foil
• Place in cooler box for 48 h
• Count germinated grains after 24 and 48 h

What you get:

Chitted grain

Unchitted grain
Germinability

Dead grain will not germinate
Cannot make malt from dead grain

Causes:
Old grain
Insect eaten
Moulded
Pre-sprouted in the field
Heat damaged
Grain purity

What you need:

What you do:

- Measure grain into 35 mm film pot or similar
- Hand sort defects
- Use 10 x 10 cm grid and times value by 2 to calculate % defects

What you get:

% Defects = Number of squares X 2
Actual samples grown by small-holder farmers

Sample 1

Sample 2
Defects are un-threshed grain,

If grain is properly threshed it would command a higher price
Defects are mainly moulded grain. This grain is unfit for consumption.
Grain Purity

No one wants to pay good money for rubbish

Causes:
Dust, stones, stalks
Broken kernels
Insect eaten grain
Foreign grain
Moulded grain
Un-threshed grain
Colour

What you need:
- Colour standards
- White paper

What you do:
- Count out 100 sound kernels on a sheet of white paper
- Compare with colour standards

What you get:
- White colour standard
- Red colour standard
5 Simple methods for sorghum grain quality can be found on www.INTSORMIL.org

Tannin, Hardness, Germinability and Grain purity have been accepted as draft ICC (International Association for Cereal Science and Technology) standard methods.
ACKNOWLEDGEMENT

The work was kindly supported by the USAID-Rapid (Regional Activity to Promote Integration Through Dialogue and Policy Implementation) Program