Screening for culinary and canning quality in advanced dry bean lines ( *Phaseolus vulgaris* L.)

Project Proposal

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Common beans is one of the most important crops in eastern Africa (Pachico, 1993; Kimani et al., 2005).

In Africa, an estimated 3.7 million ha is grown with beans every year (Wortmann et al., 1998).

Beans are not only an important source of protein (>20%), but also are one of the best sources of minerals (especially Fe, Zn, Ca) and dietary fiber, and hence referred to as ‘near perfect food’ (CIAT, 1995).

In urban areas, one important form of dry bean consumption is canned beans.

Demand for canned beans is likely to increase with urbanization, due to changing eating habits (with preference for fast cooking foods), and rising costs of cooking fuel.
Growing preference for fast cooking foods, pre-cooked or canned foods due to rapid urbanization and high costs of cooking fuel.

Mex 142 are low yielding, highly susceptible to rust, angular leaf spot, common bacterial blight and drought (Kimani et al., 2005).

Justification: Bean varieties that combine superior agronomic traits, fast cooking and good canning quality has not been reported in Kenya and meet the demand of canned beans.
To meet the increasing demand for canned beans in urban areas, new bean varieties must be not only agronomically superior but meet processing industry standards.

To save time, money and biodiversity (forest), it is needed to develop faster-cooking bean lines besides agronomic superiority.

The Bean Research Program of the University of Nairobi holds advanced dry bean lines from different market classes and selected under drought condition. However, genetic variability for cooking time and canning quality among these lines are not known.
**Plant materials:** 91 advanced bean lines from 4 market classes and the control variety Mexican 142 will be used. The advanced line fall in the market classes as follows: 22 lines Red Mottled, 23 Red Kidneys, 22 Speckled Sugars and 24 Navy beans.

**Cooking time:** Matson cooker method will be used to determine cooking time (Matson, 1946).

- Seeds will be soaked in distilled water for 16 hours before cooking.
- Seeds will be cooked in distilled water, and time to cook will be determined by digital stop watch.
Continued…..

- Small red
- Red mottled
- Red kidney
- Speckled sugar
- Navy

Soaking

Matson Bean Cooker

University of Nairobi  ISO 9001:2008  Certified  http://www.uonbi.ac.ke
* **Water absorption (WU):** specific weights (10 g) of bean seeds will be soaked in distilled water for 16 hours in beakers to determine percent water absorption. Percent water absorption will recorded on time intervals of every three hours.

* **Canning quality:** 100g of dry beans will be cleaned, soaked for in cold water at 25°C for 30 minutes followed by hot soaking at 87.7°C for 30 minutes (Uebersax and Hosfield, 1996). The blanched seeds will be filled in cans with capacity of 410g. Beans will be covered with 200g of hot brine.

* Cans will be sealed with automatic can sealer and immediately transferred to a retort for cooking at 121.1°C for 45 minutes (Van Loggerenberg, 2004). Canned product will be stored at least for two weeks.
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Pilot food processing Plant-CAVS

Blanching

Seaming

Cooling system

Recorder

Retort

Steam generation and regulation

Source: Kimani et al, 2012
References

