

## SHORT NOTE

### **Cassava performance under Kenana Sugar Company conditions**

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The Research and Development Section of Kenana Sugar Company (KSC) has chosen cassava as a suitable alternative crop for future expansions in the bio-ethanol production. Cassava (*Manihot esculenta* Crantz) is a native of north-eastern Brazil that was disseminated by the Portuguese during the 16<sup>th</sup> and 17<sup>th</sup> centuries to tropical and subtropical areas of Africa, Asia and the Caribbean. It has a wide range of industrial and non-industrial uses; where fresh cassava is consumed as a popular alternative to potatoes or yams and is used as food thickener, filler, and binder as well. Cassava flour is used for making bread. On the other hand, industrial uses of cassava include paper, textile, adhesives, chemical and pharmaceutical industries (Henry *et al.*, 1998). Also cassava starch is used as a raw material for production of liquid glucose and dextrose as well as fructose syrup and maltose (Balagopalan *et al.*, 1998; Moorthy and Balagopalan, 1996). However, cassava is the raw material for large-scale starch extraction in many countries like India, Thailand, Indonesia and China (Henry *et al.*, 1998). Besides, cassava starch is used as a raw material for alcohol and ethanol production in many countries e.g. Thailand, China, Brazil and Mexico. However, cassava is considered as one of the world's most cost-efficient crop for bio-fuel production. That is, under optimal condition ethanol yield from cassava is the highest of all the energy crops (6,000kg/ha). Cassava responds well to improvements in agronomic practices and performs better than other crops under sub-optimal environmental condition (Indira *et al.*, 1997). Therefore, this work was designed with the objective to evaluate cassava performance under Kenana Sugar company condition. Cassava plants were obtained from neighboring

farms south west Kenana, February 2012. Stem cutting, 20 cm long were directly planted in rows (1m\*1.5m). Irrigation was applied at an interval of 7-10 days. Manual weeding was practiced when necessary. Yield data were collected at four ages (i.e. 9, 10, 11 and 12 months). Roots were detached from their mother plants; fresh- weighed, air dried, pulverized and underwent chemical analysis as described by Pearson (1970).

Yield and starch content of cassava roots as affected by the age of plant are illustrated in Fig. 1. It was found that roots' yield increased with age and the highest yield was obtained at 11 and 12 months. On the other hand, starch content showed a decreasing trend in relation to the age of the plant. However, the optimum age that gave the best yield and quality was 10.5 months. Chemical analysis of cassava roots is shown in Table (1). The analysis showed that cassava roots are rich in their starch (average 62.4%), as well, roots contain small amounts of protein, fat, ash, fibers and sugars. This indicates that cassava roots are rich source of nutrient elements needed for both human and animals. Also, it has been observed that the peel constitutes 17% of the total weight of the roots and it was found that the starch content of roots with peel was higher than roots without peel (Table 2).

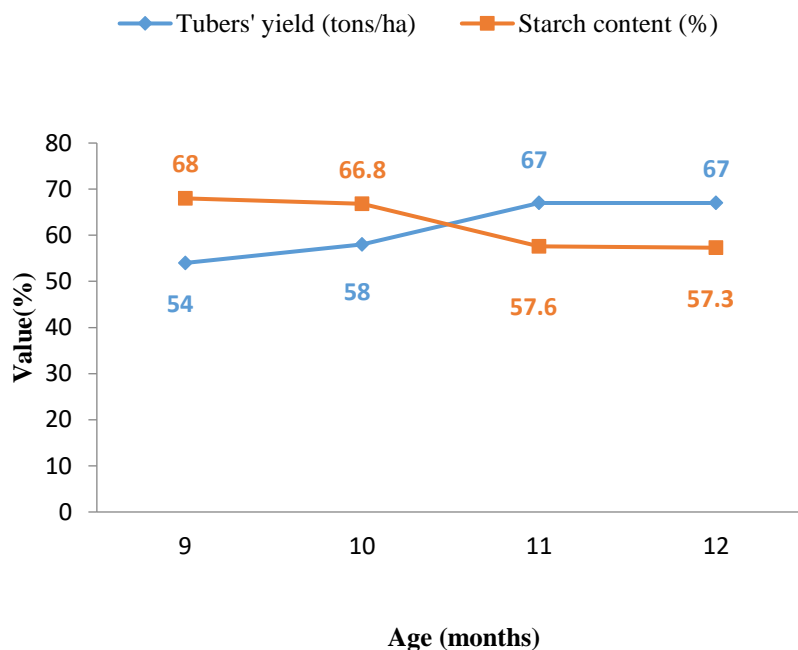


Fig 1 : Yield and starch content of cassava roots as affected by th age of plant

Tabled 1: Composition and yield of cassava roots (mean of four harvesting ages).

Parameters	(%)
Starch	62.4
Sugars	2.9
Protein	2.6
Fat	0.9
Ash	3.5
Fiber	2.0
Pulp	83
Peel	17
Moisture content	58

Table 2: Effect of rasping on composition of cassva roots

Parameters	Content (%)				
	Starch	Sugars	Protein	Ash	Fiber
Cassava roots for peel	62.6	4.5	1.8	3.3	2.6
Cassava rottts without Peel	57.3	3.8	2.2	2.4	2.3

Despite the fact that cassava is a native of the tropics of South America, it has been proven that it can thrive well and give roots with high yield and high starch under KSC conditions that makes cassava a potential source of nutrient elements. Also, the high starch content of cassava roots is increasing the opportunity of obtaining higher yields of bio-ethanol per unit area. Moreover in the presence of the well developed technology of production of bio-ethanol from cassava in the world, the cassava can be considered as the most potential alternative crop for production of bio-ethanol in KSC.

Hence, it is recommended to set timeline with respect to production of cassava for exportation of cassava chips in the interim plan, as well as, to plan for starch industry and bio-ethanol production in the mid and long term plans. In addition, cassava by-products including leaves, stems and peel can be utilized for animal feed. For the sake of strengthening research and transfer of technology, it is highly recommended to create international contacts with cassava research institutes and vital sites as well; however, frequent visits to these places are of important. For crop sustainability, as high starch content and high yields are the most important breeding objectives in response to cassava processing industry, it is recommended to establish a variety development program.

### REFERENCES

- Balagopalan, C., G. padmaja, S.K. Nanda and S. n. Moorthy. 1998. In: Cassava in Food, Feed and Industry. CRC Press, Florida, USA. 205 p.
- Henry, G. A. Westby and C. Collinson .1998. Global Cassava End-Uses and Markets: Current Situation and Recommendations for Further Study, European Group on Root, Tuber and Plantain, France.
- Indira, J.E., David, S.O. and Marcio, C.M., 1997 Agronomy of cassava, Research Guide 60, International Institute of Tropical Agriculture.
- Moorthy, S.N. and C.G. Balagopalan. 1996 Novel carbohydrates from cassava starch, pp. 320-43. In: C. balagopalan, T.V.R. Nayar, S. Sundaresan, T. Premkumar and K.R.Lakshmi (eds.).
- Pearson, D. 1970. The Chemical Analysis of Food 6<sup>th</sup> edition  
Publisher: Churchill

## إنتاجية الكسافا تحت ظروف مشروع سكر كنانة

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### الخلاصة

في إطار الخطة الاستراتيجية لشركة سكر كنانة للعام 2020م والرامية للتوسع الكمي والنوعي في إنتاج الوقود الحيوي بنوعية ( البيوديزل والبيويثانول) وكذلك في إطار البحوث الرامية للإيجاد مصادر خام أخرى لصناعة البيوديثنانول يبتدر قسم بحوث التصنيع في مركز البحوث التطوير بكنانة ولأول مرة في السودان بحوث تطوير نباتات الكسافا والمعروف باحتوائه على نسب عالية من النشا يهدف استخدامه كخام لتصنيع الايثانول الحيوي. تمت الاستفاده من نباتات الكسافا المستوطنة في منطقة مشرع سكر كنانة كمصدر للعقل والتي تمت زراعتها في حقول الأبحاث بكنانة في فبراير عام 2012م. تم أخذ عينات من الدرنات في أعمار مختلفة 9، 10، 11 و12 شهراً بعد الزراعة بغرض تقدير إنتاجية الفدان وتقدير نسبة محتوى النشا في الدرنات. أبانت النتائج الأولية أن أعلى متوسط للإنتاج الكمي (61 طن للفدان) والنوعي ( النسبة المئوية للنشا 61%) كان قد تم التحصل عليه بعد عشرة أشهر ونصف من تاريخ الزراعة. تشير هذه النتائج الأولية للمستقبل الواعد لهذا المحصول ليستخدم كخام في صناعة الأيثانول علاوة علي الاستخدامات الأخرى والمتمثلة في صناعة النشا والصناعات المصاحبة لذلك إضافة للاستفاده من المخلفات في تغذية الحيوان. عليه ولغرض التحقق من الحزم الفلاحية لهذا المحصول تم تأسيس تجارب عدة في إطار مشروع تطوير هذا المحصول الواعد بإذن الله.