How to extract the varietal screening index from acceptability thresholds and overall liking?

L. Adinsi,[1,2] I. Djibril Moussa,[1] L. Honfozo,[1] A. Bouniol,[3,4] K. Meghar,[3,4] E. O. Alamu,[5] M. Adesokan,[5] S. Arufe,[3,4] M. Ofoeze,[6] B. Okoye,[6] T. Madu,[6] F. Hotègni,[1] P. Pede,[1] U. Chijioke,[6] B. Otegbayo,[7] J. D. Hounhouigan,[1] C. Mestres,[3] D. Dufour [3] and **N. H. Akissoé**[1*]

(1) Faculté des Sciences Agronomiques, Université d'Abomey-Calavi, 01 BP 526 Cotonou, Bénin
(2) Ecole des Sciences et Techniques de Conservation et de Transformation des Produits Agricoles, Université Nationale d'Agriculture, Sakété, Bénin
(3) CIRAD, UMR QualiSud, F-34398 Montpellier, France
(4) QualiSud, Univ Montpellier, Avignon Université, CIRAD, Institut Agro, IRD, Université de La Réunion, Montpellier, France.
(5) International Institute of Tropical Agriculture, (IITA)-PMB 5320, Oyo Road, Ibadan, Oyo State, Nigeria.
(6) National Root Crops Research Institute, Umudike PMB 7006 Umuahia, Abia State, Nigeria
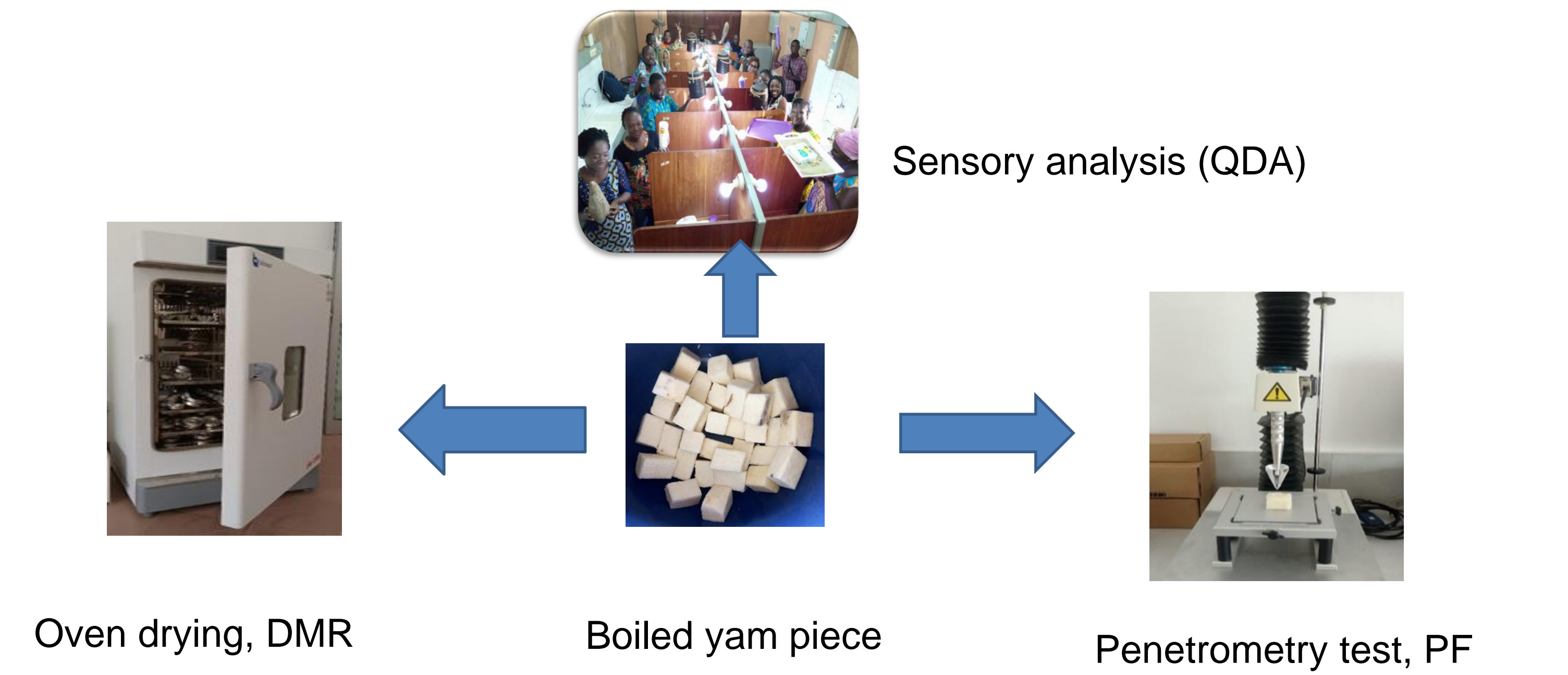(7) Bowen University, Iwo, Osun State, Nigeria

INTRODUCTION

Boiled yam key quality attributes for West African consumers are: crumbly, easy to break, and sweet taste (Adinsi et al., 2024). The acceptability thresholds of these key attributes are confronted with two pitfalls: the first is related to the number of criteria to be satisfied at the same time by a genotype before being selected; the second is related to the prioritization of those that would pass the thresholds of all the criteria. However, a way to circumvent these pitfalls consisted in comparing each genotype to the ideal/optimum through the overall acceptability score.. This study modelled the overall liking with a view to defining an effective comparison index that takes into account the positioning of each genotype relative to the acceptance thresholds of the ideal/optimum
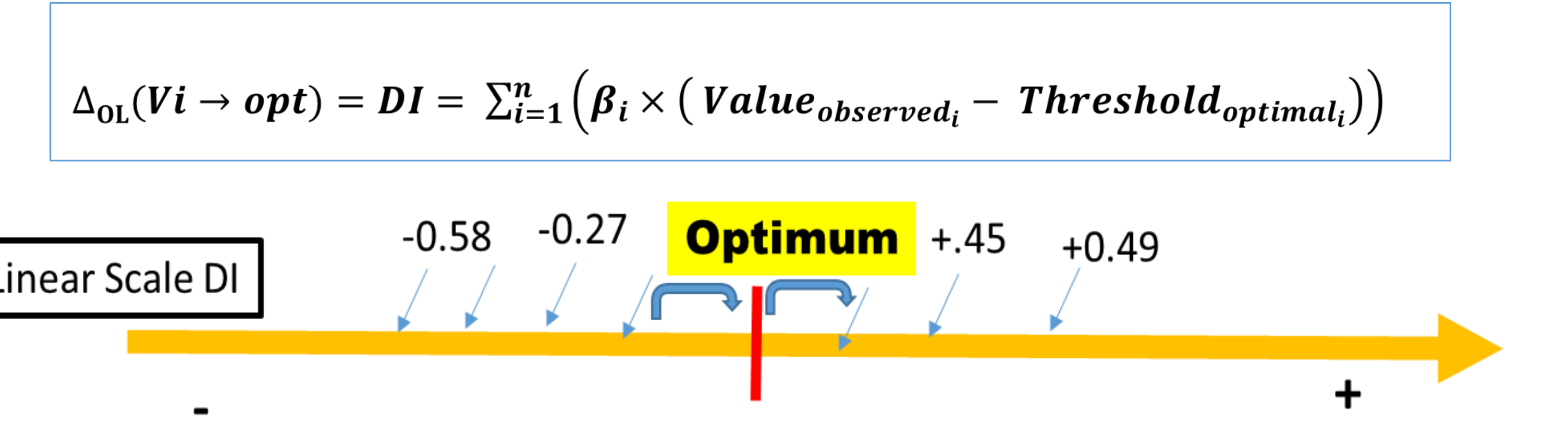
METHODS

Plant materials (landraces and improved yam varieties) were obtained from Benin and Nigeria farmers' fields and research centres,

- Samples were prepared as described by Adinsi et al. (2023)
- Sensory (QDA, overall liking, JAR) and biophysical analyses
- . On the scale of overall liking (OL), the deviation from the ideal/optimum (DIOL(obs→opt)) was determined for each variety (Adinsi et al., 2023)

Sensory analysis (QDA)

Oven drying, DMR   Boiled yam piece   Penetrometry test, PF

Statistical analyses: ANOVA and Linear (simple and multiple) regressions
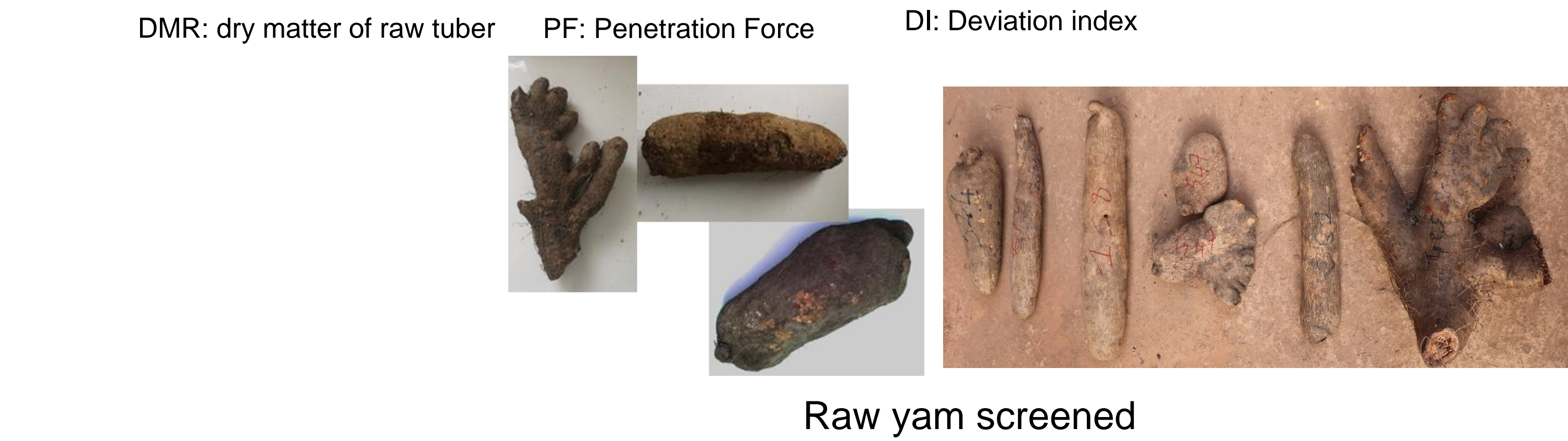
RESULTS

The overall liking (OL) was predicted by multiple regression analysis from penetration force and dry matter of raw tuber (DMR) (R^2 = 0.79, lack of Fit = 8.11, P < 0.05. Therefore, the OL for each variety and for ideal/optimum product were determined, as well as the deviation from the ideal/optimum (DI)..

$$\Delta_{OL}(Vi \rightarrow opt) = DI = \sum_{i=1}^{n} \left(\beta_i \times \left(Value_{observed_i} - Threshold_{optimal_i} \right) \right)$$

Linear Scale DI   -0.58 -0.27 **Optimum** +.45 +0.49

−   +

Regardless of the harvesting location, DI ranged from -0.58 to 0.49 for Variety x location samples. DI ranked all yam varieties grown at Abuja among the top seven. In each location, TDa 1508044 was assigned the first rank (Table 1).

Table 4. Ranking of yam genotypes based on the deviation from idea

Varieties	Location	DMR	PF (N)	Overall liking	DI	Rank
TDa 0000194	Abuja	34.2[a]	3.7	7.1	0.40	4
	Ubiaja	30.5[b]	5.5	5.6	-0.35	12
TDa 1508044	Abuja	31.0[a]	3.1	6.7	0.49	1
	Ubiaja	32.2[a]	4.2	6.5	0.15	8
TDa 1510043	Abuja	26.7[a]	3.3	5.8	0.27	5
	Ubiaja	34.6[a]	6.6	5.9	-0.58	13
TDa 1515030	Abuja	27.0[b]	3.5	5.8	0.21	7
	Ubiaja	39.5[a]	6.2	7.0	-0.27	11
TDa 1520008	Abuja	33.6[a]	3.5	7.0	0.45	3
	Ubiaja	31.0[b]	4.8	6.0	-0.10	9
TDa 1520050	Abuja	31.5[b]	3.8	6.5	0.27	5
	Ubiaja	25.5[b]	4.3	5.2	-0.12	10
TDa 1520002	Abuja	32.9[a]	3.4	6.9	0.46	2
	Ubiaja	35.3[a]	nd	nd	nd	nd

DMR: dry matter of raw tuber   PF: Penetration Force   DI: Deviation index

Raw yam screened

DISCUSSION

Many selection indices had been developed (*León et al., 2021*) but that is the first time DI is established by integrating acceptability thresholds of ideal sample, DI is a robust tool for screening yam genotypes, Among variables involved in the model, penetration force sands for crumbliness/mealiness, If the DMR is easily assessed, the penetration force did not express really the crumbliness, so it needs to be refined.

CONCLUSION

DI allows to select varieties close to the ideal and even better than the ideal in the order of preference, This procedure can be applied to other crops as part of varietal screening,

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Corresponding author: noel,akis@yahoo,fr