Folate content of cultivated and wild traditional leafy vegetables found in Nigeria

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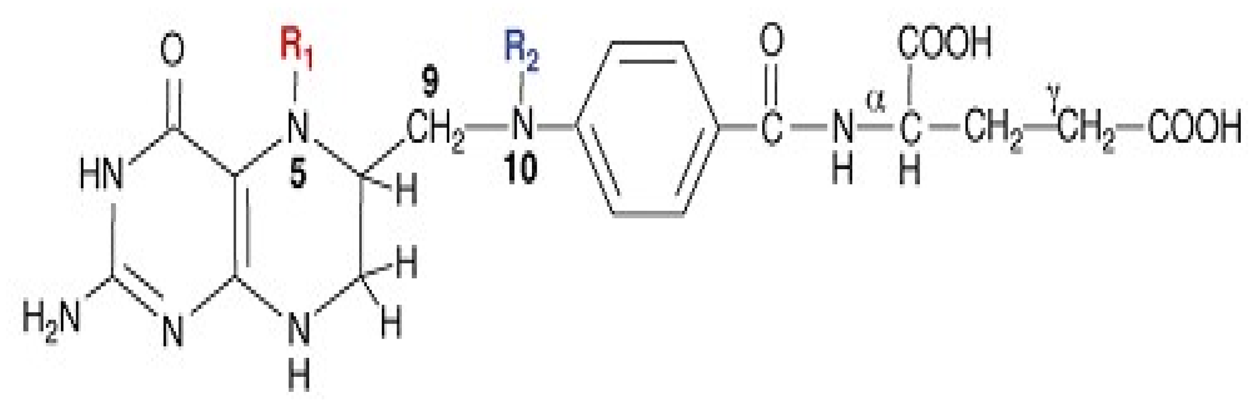
BACKGROUND



Folates (Vit. B9) is an important B-vitamin associated with reduced neural tube defects in pregnancies and cardiovascular diseases due to high homocysteine levels.

Green leafy vegetables are rich sources of folates in the diet (1).

There is great diversity of cultivated and uncultivated traditional green leafy vegetables (TGLVs) in Nigeria, that form a major component of several local dishes.

However there is a dearth on information on their folate content. Establishing accurate and reliable folate content of foods that could contribute significantly to dietary intake is important as it would enrich our local food composition table; facilitate better estimate of dietary intake of the vitamin from TGLVs among different age groups; and useful for educating the public about folate rich foods.

PURPOSE OF STUDY: To quantify the folate content of selected raw and cooked TGLVs.

Table 1: Cultivated and uncultivated TGLVs studied

Scientific name (family)	English/ Local name	Status
Amaranthus hybridus L. (Amaranthaceae)	Pig weed/*Efo tete/ green*	Cultivated
Abelmoscus esculentus fruit (Malvaceae)	Okro/ *ila*	Cultivated
Abelmoscus manihot (L.) Medikus (leaves and tender shoots) – (Malvaceae)	Okro leaves/ *ilasa*	Cultivated
Adansonia digitata (Malvaceae)	Baobab leaves/ *Luru / kuka*	Uncultivated
Corchorus olitorius L. (Malvaceae)	Jute mallow/ *ewedu*	Cultivated
Crassocephalum crepidioides (Benth.) S. Moore (Asteraceae)	*Ebolo*	Uncultivated
Launaea taraxacifolia (Willd.) Amin, ex C. Jeffrey (Asteraceae)	African lettuce/ wild lettuce/ *Yanrin*	Uncultivated
Solanum macrocarpon L. (Solanaceae)	*Efo igbagba*	Cultivated/ wild

MATERIALS AND METHODS

Fresh samples from Oyo state Nigeria

Packaged and transported in cold chain to lab – SQPOV, INRA Avignon, France

Raw (fresh) → boiled for 5mins in water approx. 1g/4ml

Drained and cooled

Ground in liquid nitrogen with cutting mill (A11 analytical mill, IKA, Staufen, Germany)

stored at -80°C until analysis

10g vegetable sample

30ml 0.1M phosphate buffer with 1% ascorbic acid

boiled in water bath 100°C – 10 min
Cooled – 15 min
centrifuged for 10 min at 5000*g*.

Folate extraction

1ml of chicken pancreas conjugase to extract & incubated at 37°C

2h.

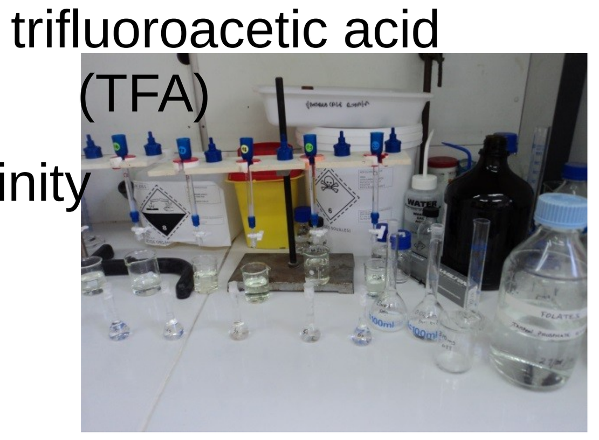
Deconjugation

Chemical transformation of folates to 5-methyltetrahydrofolic acid (THF-5CH3) monosodium glutamate and / or diglutamate.

Folate Binding Protein

eluent solution - 0.02M DL-dithiothreitol (DTT) and 0.02M trifluoroacetic acid (TFA)

Purification of folates by affinity chromatography



Water + 1 ml/l formic acid: acetonitrile

RP-HPLC

RESULTS

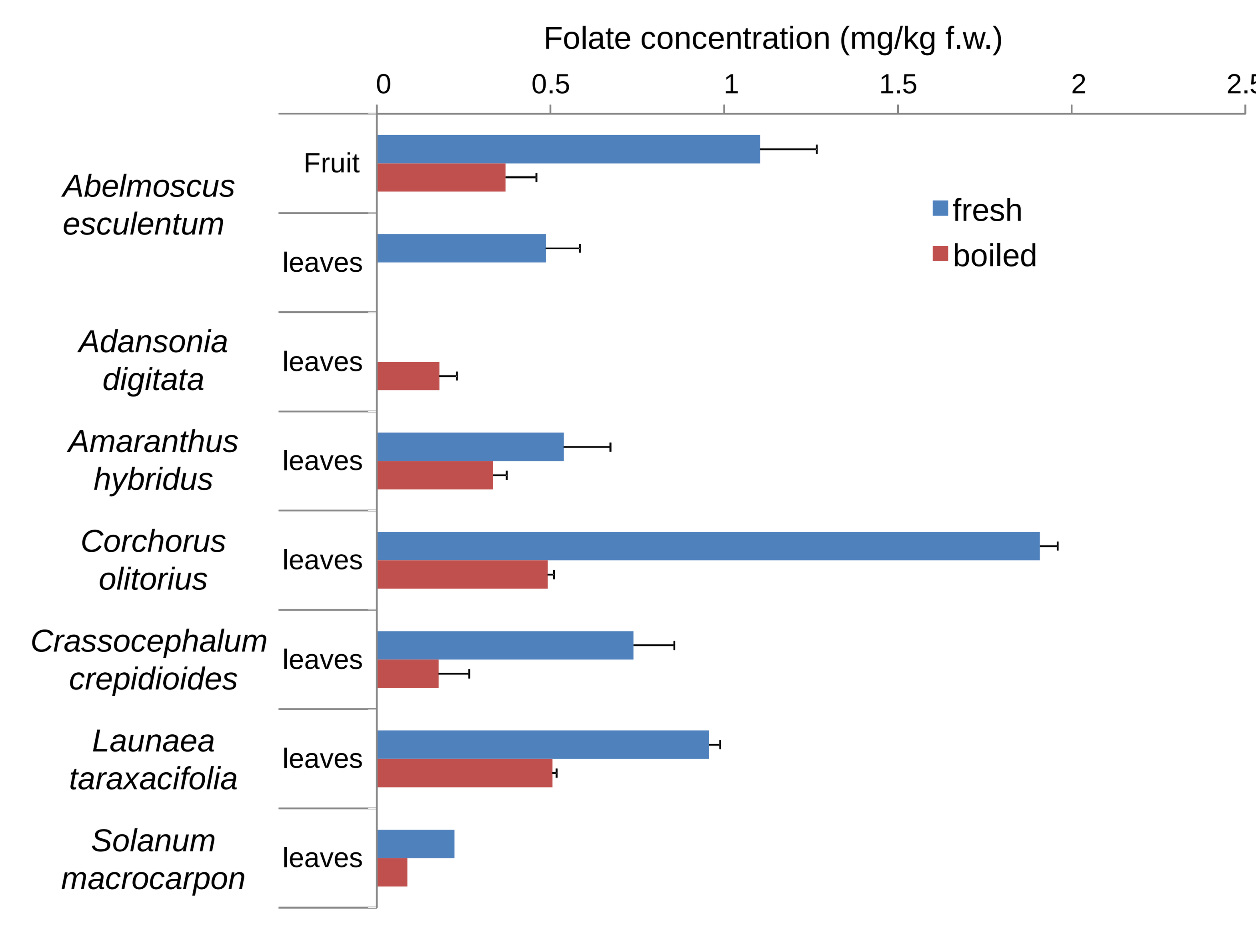


FIG 1: Folate monoglutamate content of fresh and boiled vegetables

CONCLUSIONS

TGLVs are good sources of folate. But boiling caused a considerable decrease in the folate content: **47% to 88%.** TGLVs are consumed in their cooked form in Nigeria, preparation methods that would allow for optimal retention of folate are necessary. For example limited contact with water or steam cooking (2).

100g of the boiled leafy vegetables could contribute **2 – 12%** of RDA for women of reproductive age in Nigeria.

REFERENCES

1. Ogle et. al. (2001). *Asia Pacific J Clin Nutr. 10(3): 216–221*
2. Delchier et. al. (2013). *Food Chemistry* 139 : 815–824