



Dishes from the wild!

THE NON-TRADITIONAL VEGETABLES OF MARINDUQUE

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Introduction

- **AGRICULTURE PRESSURE**: Feeding the projected 9B people in 2050 (Godfray, *et al.*, 2010).
- **CLIMATE CHANGE**: Agricultural intensification can cause greenhouse gas emission of 3Gt per year of global CO₂-carbon equivalents, and about 250 Mt per year of global N (Tilman, *et al.*, 2011).
- **RELIANCE ON HANDFUL MAJOR CROPS**: Risky to environment, people's health and economics—unsustainable in the long run (Ebert, 2014).
- **NON-TRADITIONAL VEGETABLES**: Found in nature (even in marginal lands) provide nutritional security to local people as part of their diet (Jain & Gupta, 2013; Ebert, 2014).
- Many of these have high nutritional value (Kiatinge, *et al.*, 2011; Ebert, 2014) and nutraceutical value (Gupta, *et al.*, 2010).

Objectives

This study looked on:

1. Identification of the non-traditional vegetables in Marinduque
2. Screening for phytochemicals present and phytonutrient (bioactive) contents, such as Vit. A and C, Ca, Fe and Zn.

Methodology

Botanical Identification of Non-traditional Vegetable

Preparation of Plant Extracts (AOAC, 2006)

PHYTOCHEMICAL SCREENING

- Alkaloids (Mayer's Test)
- Flavonoid (Shinoda Test)
- Saponin (Froth Test)
- Tannin (Ferric chloride Test)
- Terpenoid (Salkowski Test)
- Steroid (Liebermann-Burchard Test)
- Cardiac glycoside (Keller-Killiani Test)

PHYTONUTRIENT SCREENING

- HPLC-UV-VIS for Vitamin A (AOAC, 2006)
- DCPIP Test (2, 6-dichlorophenolindophenol) for Vitamin C (AOAC, 2006)
- AAS (UV-VIS Spectrophotometric Method for Ca, Fe & Zn, AOAC, 2006)

Results & Discussion

Kolowratia elegans Presl. (Zingiberaceae)

Local name: **Tagbak**



Ethanolic extract
of soft rhizome and pith

Distribution: In the thickets, along rivers and creeks and low to medium forest

Food use: The soft pith and young rhizome is added to other vegetables dishes, like bamboo shoots

Amaranthus tricolor Lin. (Amaranthaceae)

Local name: **Dalaura**



Ethanolic extract
of the young fronds

Distribution: In the lowland gardens, backyards, ricefields and watery areas

Food use: Young leaves are blended as refreshing drink with lemon and used as additive in stew and soups

***Ardisia squamulosa* Presl.** (Myrsinaceae)
Local name: **Katagpo**



Ethanolic extract
of young leaves

***Broussonetia luzonica* Blanco** (Moraceae)
Local name: **Salugim, Himbabao**



Ethanolic extract
of young leaves and
flowers

Distribution: In the thickets of low to medium altitude forest

Food use: Young leaves are added to other vegetable dishes, like *sinigang* and *ginataang gulay*

Distribution: In the thickets of low to medium altitude forest

Food use: Young leaves and flowers are added to other vegetable dishes, like *sinigang*, *bulang-lang* and *pakbet* additive

***Centella asiatica* Lin. (Apiaceae)**
Local name: **Takip-kuhol**



Ethanolic extract
of the leaves

***Cinnamomum iners* Reinw. (Lauraceae)**
Local name: **Kalingag**



Ethanolic extract
of young leaves

Distribution: In open fields, under coconut grove backyard and gardens
Food use: Young leaves are blended into refreshing drink, dried as tea and added in making *sinigang* and other dishes

Distribution: In medium to high altitude forest and long the river thickets
Food use: Young leaves are added as flavoring to *sinigang* and other meat dishes

***Colubrina asiatica* (L.) Brongn.** (Rhamnaceae)
Local name: **Kabatete**



Ethanolic extract
of young leaves

***Cordia dichotoma* Forst. f.** (Boraginaceae)
Local name: **Anonang**



Ethanolic extract
of young leaves

Distribution: Near the coastal areas and peripheries of mangrove areas

Food use: Young leaves are added to other vegetable dishes, like in *tinula* and other stewed vegetables with meat

Distribution: In low to medium altitude forest and even in the backyards

Food use: Young leaves are added to other vegetable dishes, stewed pork or beef and *ginataang gulay*

***Glinus oppositifolius* (L) A. DC.** (Aizoaceae)
Local name: **Salsalida**



Ethanolic extract
of leaves and stems

***Piper umbellatum sub. peltatum* (Willd). C DC.**
Local name: **Kamamba**



Ethanolic extract
of young leaves

Distribution: Watery fields, ricefields and areas near the river or creeks
Food use: Whole plant is used for stewed pork or beef and *as Papait*

Distribution: Found in low to medium altitude forest
Food use: Young leaves make into *laing* Cut to pieces and made into *pinais* with tomato

***Schismatoglottis calyptrata* (Roxb.) Zoll. & Mor. (Araceae)**

Local name: **Alipaya, Payaw**



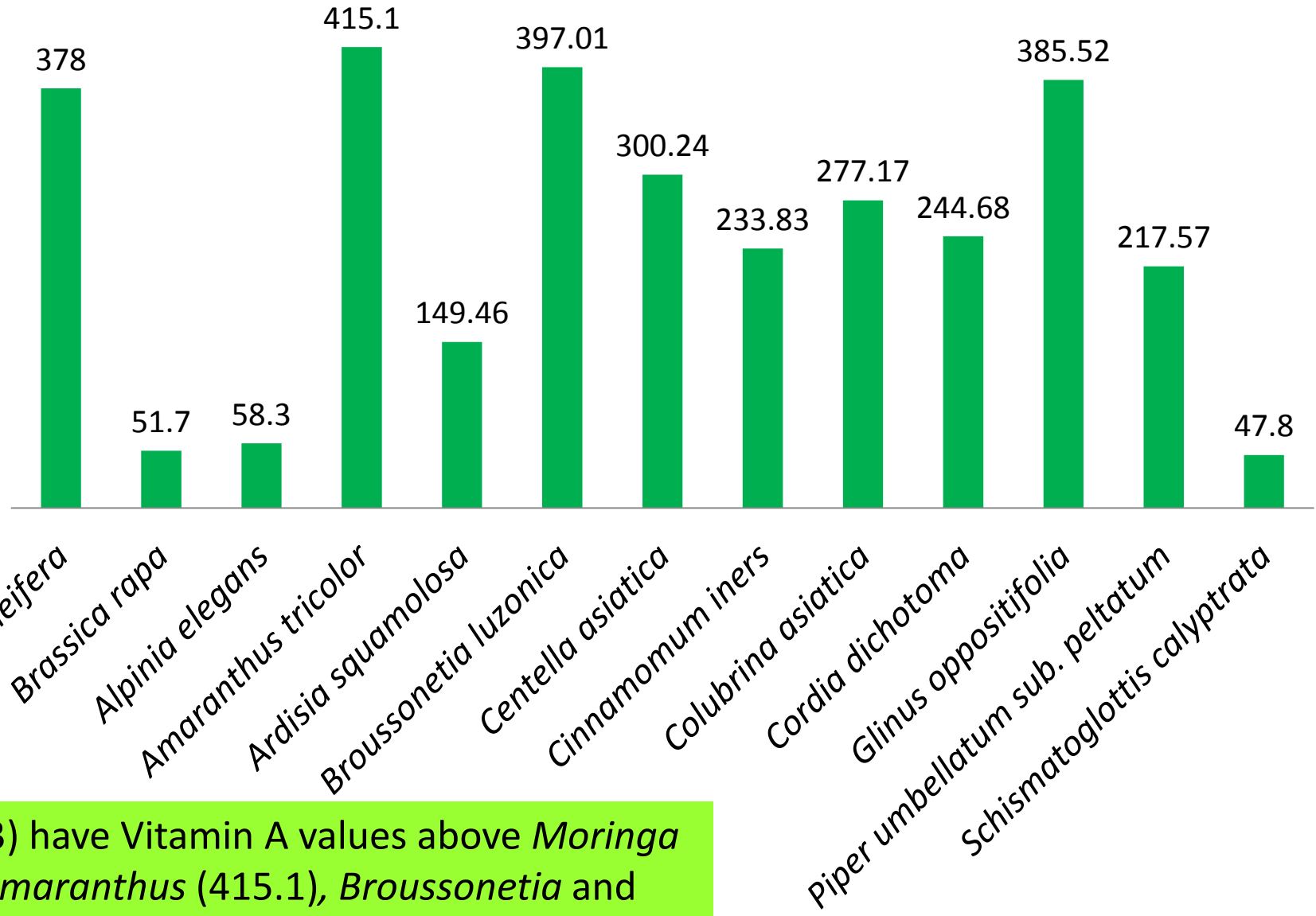
Ethanolic extract
of young petioles & leaves

Distribution: Found in low to medium altitude forest, generally attached to watery limestone cliffs

Food use: The soft, young tender leaves and petioles are made as added to *laing na gabi*.

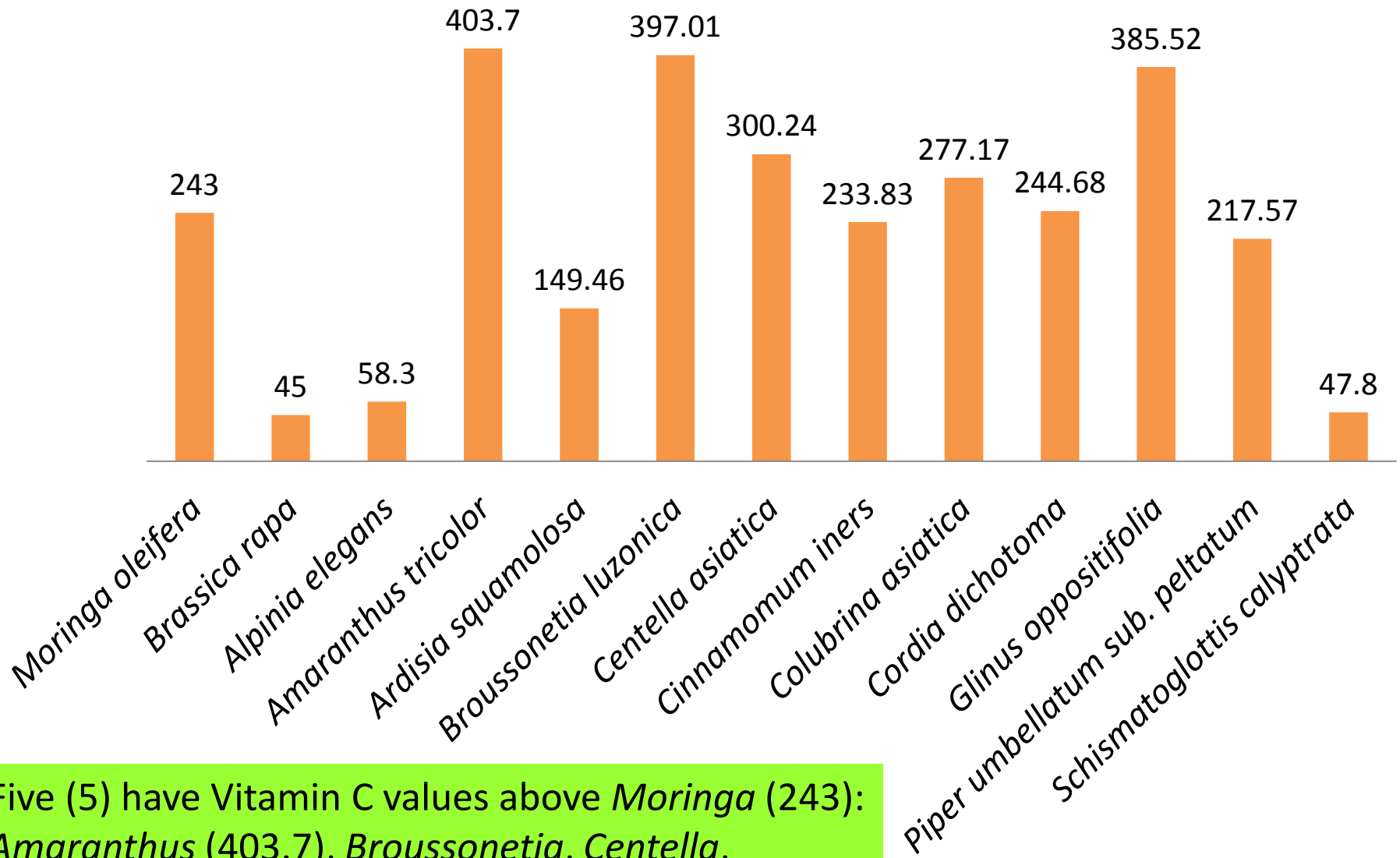
Phytochemical Contents					Pharmacological Activities		
Plant Botanical Name	Alkaloid	Flavonoid	Saponin	Tannin	Terpe- noid	Steroid	Cardiac glycoside
<i>Alpinia elegans</i>	+	++	-	-	++	-	+
<i>Amaranthus tricolor</i>	+	++	-	+	++	-	-
<i>Ardisia squamolosa</i>	+	++	-	+	+	+	-
<i>Broussonetia luzonica</i>	+	++	+	++	++	+	+
<i>Centella asiatica</i>	++	++	+	+	+++	+	+
<i>Cinnamomum iners</i>	++	++	-	+	+++	+	-
<i>Colubrina asiatica</i>	++	+++	++	++	++	-	+
<i>Cordia dichotoma</i>	+	++	-	+	++	+	-
<i>Glinus oppositifolia</i>	++	++	++	+	++	+	+
<i>Piper umbellatum</i>	++	++	-	+	++	+	+
<i>Schismatoglottis calyptrata</i>	-	+	-	-	++	+	-
Alkaloid (Wagner’s test)	+++ heavy reddish brown ppt			++ reddish brown ppt		+ light brown ppt	
Flavonoid(Shinoda test)	+++ deep red or orange color			++ red or orange colour		+ light red or orange color	
Saponin (Froth test)	+++ froth formed remains for 20 sec			++ froth remains for 10 sec		+ froth remains >10 sec	
Tannin (Ferric chloride test)	+++ deep blue or green color			++ blue or green color		+ light blue or green	
Terpenoid (Salkowski test)	+++ deep red in the interface			++ red color in the interface		+ pink to light red	
Steroid (Liebermann-Burchard)	+++intense green color			++ green color		+ light green	
Cardiac glycoside (Keller-Killani)	+++violet ring below the brown ring			++ light violet ring		+ very light violet ring	

Vitamin A ($\mu\text{g}/100\text{g}$)



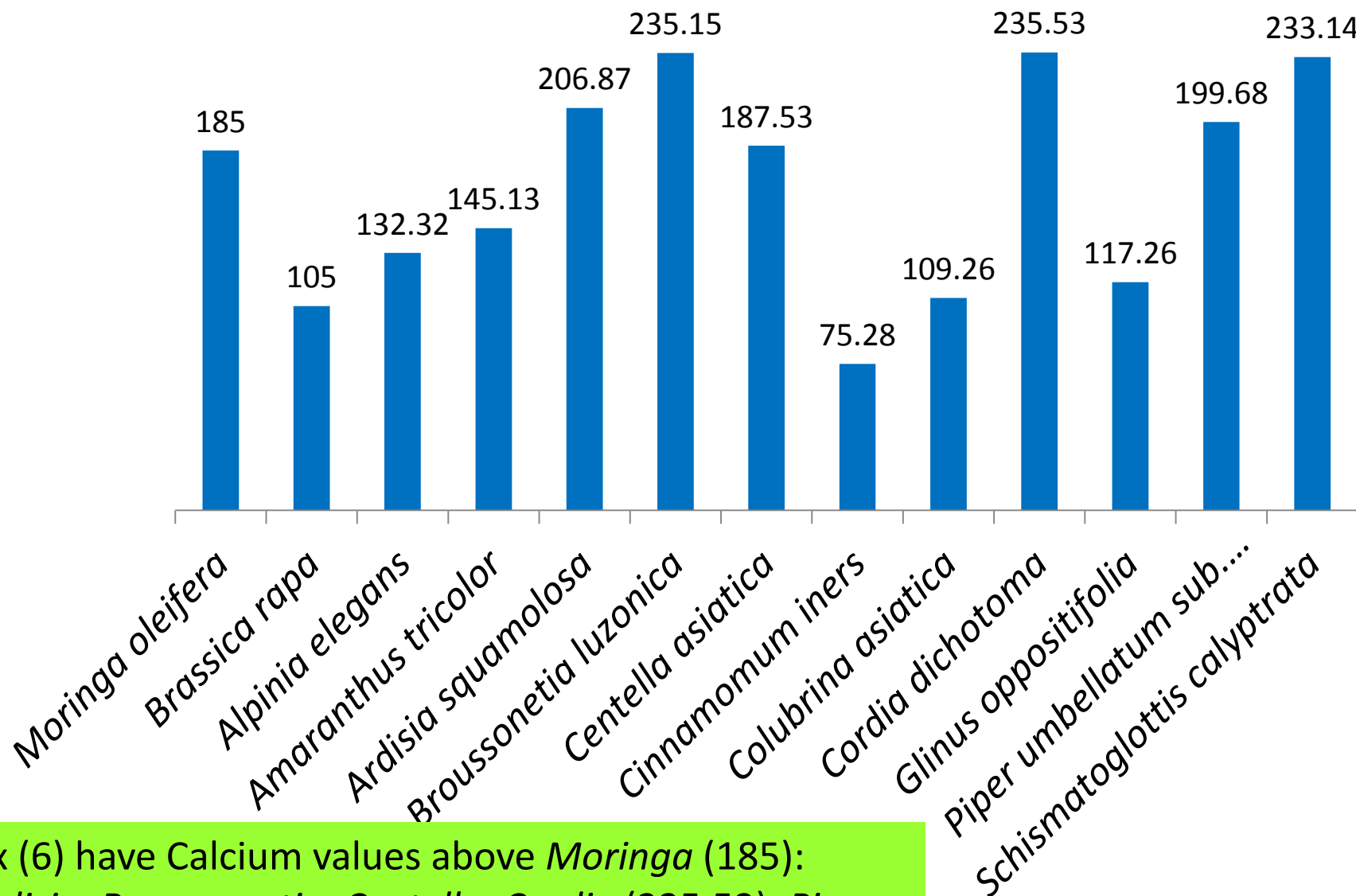
Three (3) have Vitamin A values above *Moringa* (378): *Amaranthus* (415.1), *Broussonetia* and *Glinus*. Ten (10) have values above *Brassica* (51.7)

Vitamin C (mg/100g)



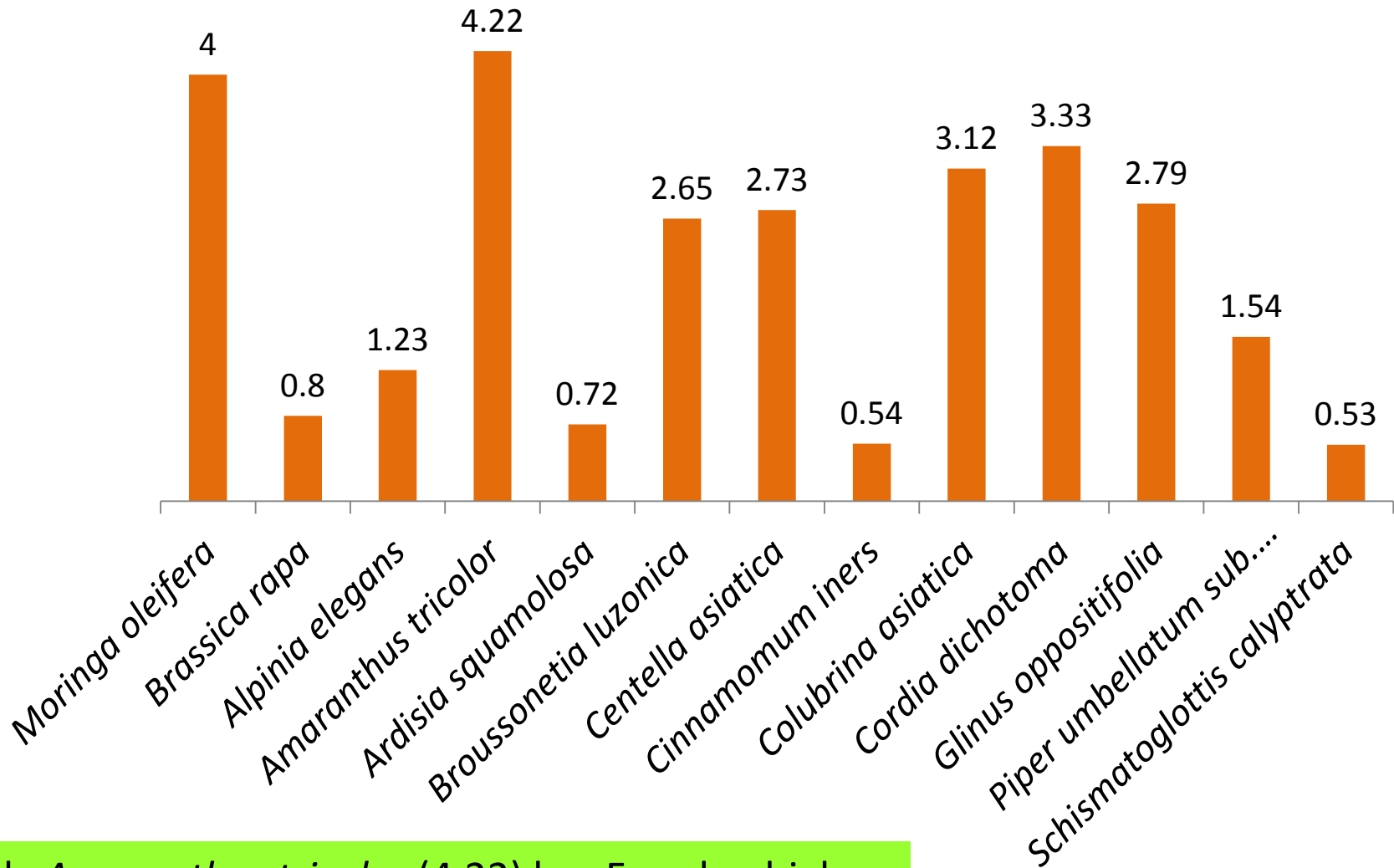
Five (5) have Vitamin C values above *Moringa* (243): *Amaranthus* (403.7), *Broussonetia*, *Centella*, *Colubrina* and *Glinus*. Eleven (11) have values above *Brassica* (45)

Calcium (mg/kg)



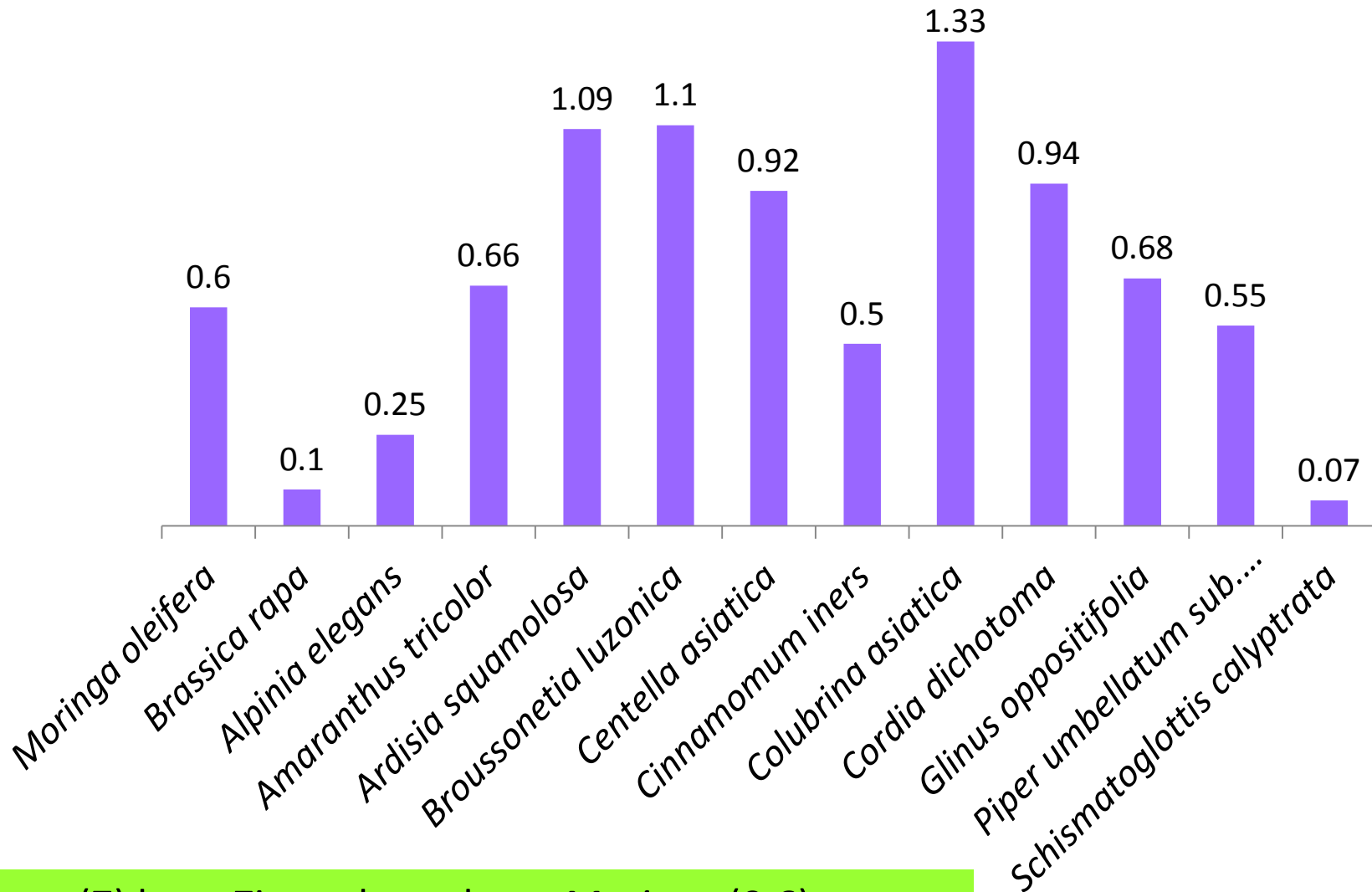
Six (6) have Calcium values above *Moringa* (185): *Ardisia*, *Broussonetia*, *Centella*, *Cordia* (235.53), *Piper umbellatum* and *Schismatoglottis*. Ten (10) have values above *Brassica* (105)

Iron (mg/kg)



Only *Amaranthus tricolor* (4.22) has Fe value higher than *Moringa* (4.0) and eight (8) have Fe value higher than *Brassica rapa* (0.8).

Zinc (mg/kg)



Seven (7) have Zinc values above *Moringa* (0.6):
Amaranthus *Ardisia*, *Broussonetia*, *Centella*, *Colubrina* (1.33), *Cordia* and *Glinus*. The rest, except *Schismatoglottis* have values above *Brassica* (0.1)

Conclusion

- Exhibits the intersect between agriculture (food), environment and culture
- The plants are positive sources of **phytochemicals**, which are considered as plants' nutraceuticals (Dillard & German, 2000)
- Majority of the plants are rich in **flavonoids** and **terpenoids** which are known for their antioxidant properties, anticancer, anti-osteoporotic, anti-ulcer, anti-platelet aggregation, anti-arthritis, immuno-stimulant, antidiabetic, anti-inflammatory, antibacterial, cardiostimulant, analgesic, hepato-protective and chemopreventive (Grassman, 2005)
- Majority have **alkaloids** that are antitumor analgesic antipyretic antihypertensive (Hesse, 2002)
- They have **saponin** that are anti-obesity anticolon cancer immunostimulant
- Majority of them are rich in Vit. A & C, Ca, Fe and Zn that are **phytonutrients** generally higher than that found in malunggay

Thank you and good day!

