

# **Antioxidants in Pumpkin plant parts as influenced by Agronomic practices**

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# INTRODUCTION

Scientific name: *Cucurbita pepo* L.

Family: Cucurbitaceae

Common name: Pumpkin

Local name: Elegege/Gboro/Kundu

Origin: North and Central Americas

Plant parts consumed: Young vines, young fruits, mature fruits and seeds



**“Gboro” (young leaves/vine):  
Used as potherb.**



“Kundu” (Young fruit-14 days old)



**Mature fruit-12-14 weeks old**



**“Egunsi” (Pumpkin seeds)- used  
as soup thickener.**

# Some Agronomical factors influencing bioactive compounds in crops

- the choice of cultivars
- planting seasons/dates
- the type and level of fertilizer application
- harvesting time
- soil type

# MATERIAL AND METHODS

## ***Field study:***

Location: Teaching and Research Farm, OAU, Ile-Ife, Nigeria.

- Two planting seasons( May/Aug; Aug/Nov)
- Treatments: 6 fertilizer rates (0, 50, 100, 150,200 and 250 kg/ha NPK 15:15:15)

## **Experimental Design:**

- RCBD with 6 replications
- Plot size: 10 m x 12 m.



# MATERIALS AND METHODS (CONTD)

➤ **Laboratory study:** Plant parts such as:

- young leaves,
- young fruits (14-day old)
- mature fruits and
- seeds

were analysed for antioxidant activities and phenolic antioxidants.

**Table 1: Antioxidant Activities (%) in Pumpkin plant parts as influenced by NPK Fertilizer**

| <b>NPK level (kg /ha)</b> | <b>Young vines</b> | <b>Young fruit</b> | <b>Mature fruit</b> | <b>Seed</b> |
|---------------------------|--------------------|--------------------|---------------------|-------------|
| 0                         | 94.5a              | 94.1a              | 96.6a               | 90.4a       |
| 50                        | 94.5a              | 93.4a              | 96.8a               | 89.9a       |
| 100                       | 94.9a              | 94.0a              | 97.0a               | 89.9a       |
| 150                       | 86.3b              | 84.3b              | 93.9b               | 77.0b       |
| 200                       | 85.7b              | 76.3c              | 88.5c               | 61.3c       |

**Table 2: Total Phenol (mg/100g)in Pumpkin plant parts as influenced by NPK Fertilizer**

| <b>NPK level (kg /ha)</b> | <b>Young vines</b> | <b>Young fruit</b> | <b>Mature fruit</b> | <b>Seed</b> |
|---------------------------|--------------------|--------------------|---------------------|-------------|
| 0                         | 32.59a             | 10.32a             | 33.49a              | 47.45a      |
| 50                        | 32.22a             | 10.23a             | 33.34a              | 47.12a      |
| 100                       | 32.64a             | 10.35a             | 33.34a              | 46.38a      |
| 150                       | 21.54b             | 7.71b              | 20.41b              | 33.38b      |
| 200                       | 18.27bc            | 6.65c              | 14.74b              | 10.02c      |
| 250                       | 13.96c             | 4.94d              | 7.08c               | 6.69c       |

**Table 3: Antioxidant Activities (%) in Pumpkin plant parts as influenced by planting Season**

| <b>Planting Season</b> | <b>Young vines</b> | <b>Young fruit</b> | <b>Mature fruit</b> | <b>Seed</b> |
|------------------------|--------------------|--------------------|---------------------|-------------|
| Early                  | 92.2               | 92.0               | 93.6                | 86.5        |
| Late                   | 85.2               | 79.0               | 92.1                | 67.2        |
| LSD<br>(0.05)          | 1.2                | 4.6                | 1.14                | 3.9         |

**Table 4: Total Phenol (mg/100g)in Pumpkin plant parts as influenced by planting Season**

| <b>Planting Season</b> | <b>Young vines</b> | <b>Young fruit</b> | <b>Mature fruit</b> | <b>Seed</b> |
|------------------------|--------------------|--------------------|---------------------|-------------|
| Early                  | 33.22              | 9.46               | 93.6                | 36.70       |
| Late                   | 17.18              | 7.28               | 92.1                | 26.97       |
| LSD (0.05)             | 0.89               | 0.17               | 1.14                | 6.94        |

# Discussion

- Excessive nitrogen decreased antioxidant activity and total phenolic concentrations of vegetables (Mitchell *et al.*, 2007; Juan *et al.*, 2008; Pant *et al.*, 2009; Oloyede *et al.*, 2012).
- Less rainfall, higher average temperature and higher sunshine hour favored antioxidant activities of pumpkin fruit. This corroborates findings by Matsuzoe *et al.* (1998); Leskovar *et al.* (2004); Oloyede *et al.* (2013).

# CONCLUSION

- 1.) The antioxidant activities of pumpkin plant parts decreased as the fertilizer application increased beyond 100 kg/ha.
- 2.) The concentration of phenolic antioxidant also drastically reduced at higher NPK fertilizer applications.
- 3.) Early sowing (less rainfall, higher temperature and more sunshine favored accumulation of antioxidants in pumpkin plant parts.

# Future Recommendation

- If pumpkin is given more research attention, it is one of the crops that can meet up with the challenges of climate change, malnutrition and poverty in Africa: It has a shelf life of 3-6 months, it is drought resistant, it is very high in bioactive and nutritional properties, the fruit is bulky, almost all its parts are useful.
- It's value chains development is highly recommended.





**THANK YOU FOR WATCHING**