



Lesser known underutilized seed oils: Potential source of food for African Communities

ADEWALE ADEWUYI



Department of Chemical Sciences,
Faculty of Natural Sciences,
Redeemer's University,
Mowe, Ogun State,
Nigeria.



INTRODUCTION



What is the issue?

- ✓ **Food:** A major source of raw materials for the agro-allied industries and a potent source of the much needed foreign exchange.
- **Insecurity/Security!**
- ✓ Access to adequate and nutritious food is limited by low income / poverty, because nutritious foods are sometimes expensive as a result of industrial demand of food as feed stock for the production of other products.
- **Why seed oil?**
- ✓ Seed oils have superb environmental credentials, such as being inherently biodegradable, having low ecotoxicity and low toxicity towards human, being derived from renewable resources and contributing no volatile organic chemicals.
- **Concept**
- ✓ Oil bearing seeds studied are discarded as waste in Nigeria and up till now there is no specific usage of the seeds or the oils from them. There is scanty information on the properties and the composition of the oils.

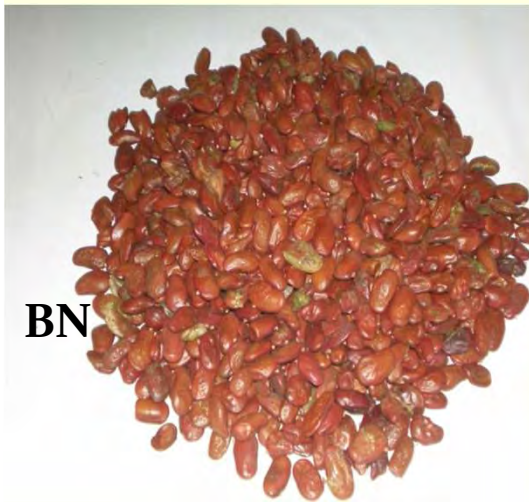




SEEDS STUDIED



S/N	NAME	FAMILY	CODE	COMMON NAMES
1	<i>Baphia nitida</i>	<i>Leguminosae (Papilionaceae)</i>	BN	Camwood
2	<i>Gliricidia sepium</i>	<i>Leguminosae (Papilionaceae)</i>	GS	Mother of cocoa
3	<i>Lonchocarpus sericeus</i>	<i>Leguminosae (Papilionaceae)</i>	LS	Cube root
4	<i>Lonchocarpus cyanescens</i>	<i>Leguminosae (Papilionaceae)</i>	LC	Indigo





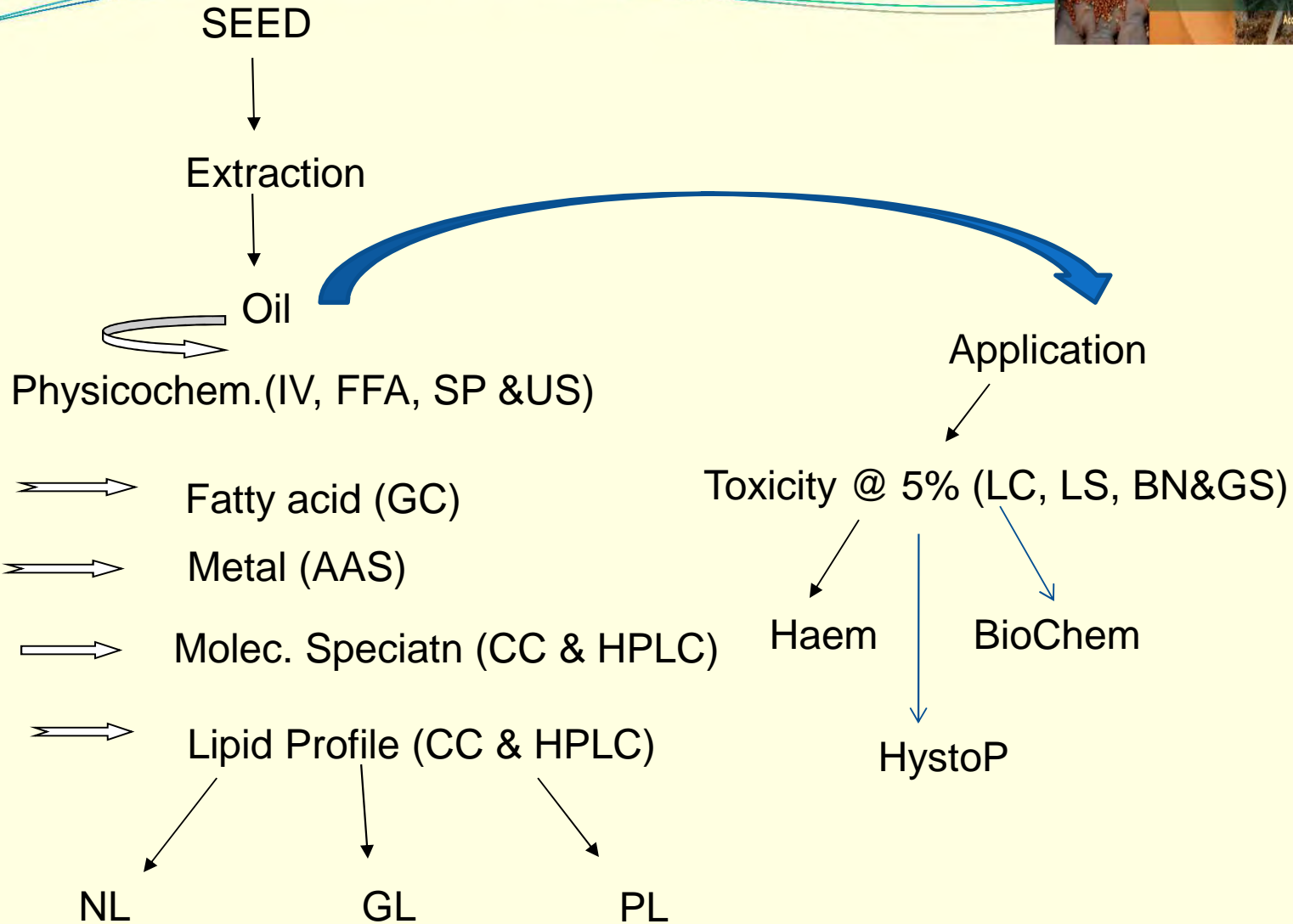
SPECIFIC OBJECTIVES



- Characterization of these lesser known seed oils from Nigeria.
- Determination of the fatty acid composition of the seed oils.
- Mineral composition of the seed oils.
- Separation and quantification of the different lipid classes of the seed oils and the determination of the distribution of fatty acids in the different lipid classes.
- Identification of the molecular species of the triglycerides, glycolipids and phospholipids of the oils.
- Identification of the unsaponifiable matters present in the oils.
- Application of the oils as food (preliminary study).



METHODOLOGY





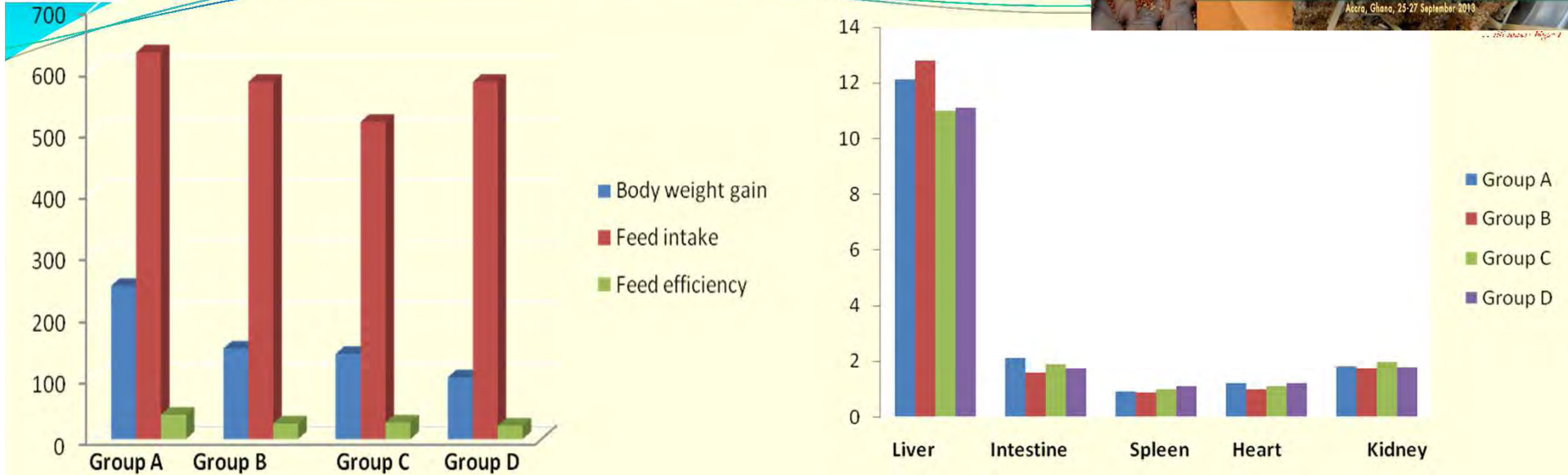
RESULTS AND DISCUSSION



Table 1: Chemical Characterization of the oils

Sample	Yield (%)	Iodine value (g iodine/100g)	Free fatty acid (%)	Saponification value (mgKOH/g)	Unsaponifiable matter (%)
BN	24.70	138.38 ± 0.50	1.23 ± 0.01	184.80 ± 0.60	2.48 ± 0.06
GS	27.14	128.60 ± 0.40	0.70 ± 0.40	197.90 ± 0.70	1.00 ± 0.20
LS	28.00	166.88 ± 0.80	1.61 ± 0.10	195.20 ± 0.50	1.70 ± 0.50
LC	29.71	170.46 ± 1.00	1.41 ± 0.50	198.35 ± 0.30	1.90 ± 0.50

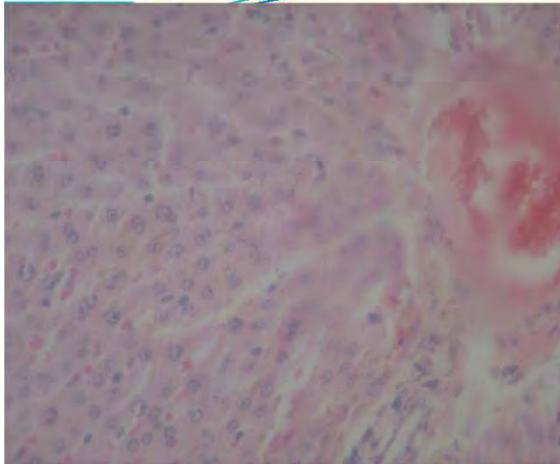
- C18:1 & C18:3 were dominantly present in the Legumes (C18:3 = GS and BN)
- Neutral lipids were the dominant lipid class
- Fatty acids were distributed along the classes with the saturated fatty acids highly accumulated in the phospholipids
- For glycolipids MGDG , DGDG , DGMG & MGMG were detected. DGDG was found most abundant.
- Molecular species with ECN C₄₈ has being predominantly present in the oils
- Phosphatidylethanol amine was the most abundant phospholipid in the oils
- Na was the most abundant in the oils



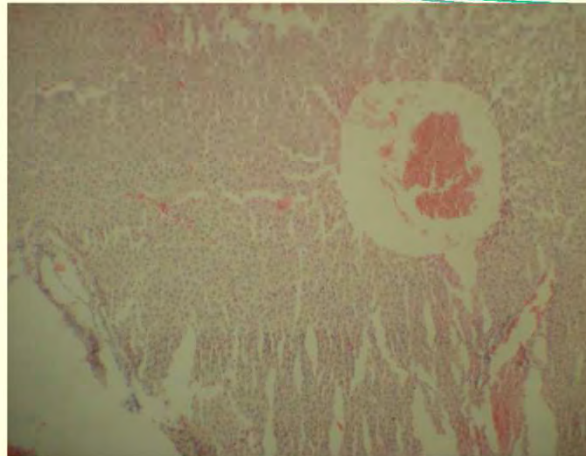
Group A = BN, Group B = GS, Group C = No oil D = G. nut

Fig 1: Graphical representation of Feed intake, body weight gain and feed efficiency of rats

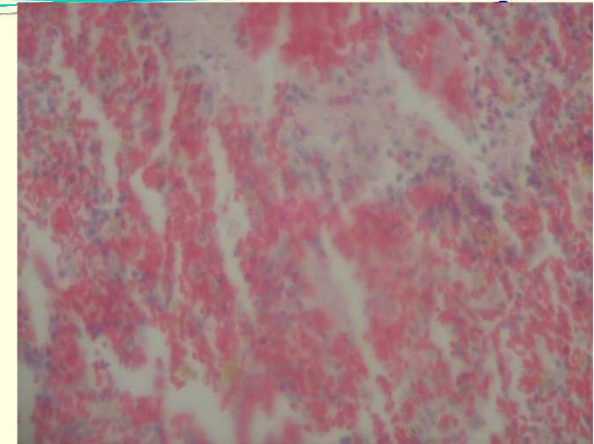




Heart of A (mild haemorrhage)



Spleen of A (Mild congestion)



Spleen of B (Very severe congestion)



Heart of B (Moderate myofibre haemorrhage)

Group A:

Highest PCV 40.10 ± 0.50 %

Hb = 13.20 ± 3.00 g/dl

Urea = 85.00 ± 5.00 mmol/l

Gp A&B

AST(ui/l) Aspartate Transaminase

ALT(ui/l) Alanine Transaminase

GGT(ui/l) Gamma Glutamyl Transferase

Total bilirubin

LDL (mg/L) High in B

What do we do?



Efficiency and Cost implication

- Presently 1 kg of grape seed oil is approximately \$ 8.00
- 1 kg of *BN and GS* cost approximately \$ 0.40



CONCLUSIONS



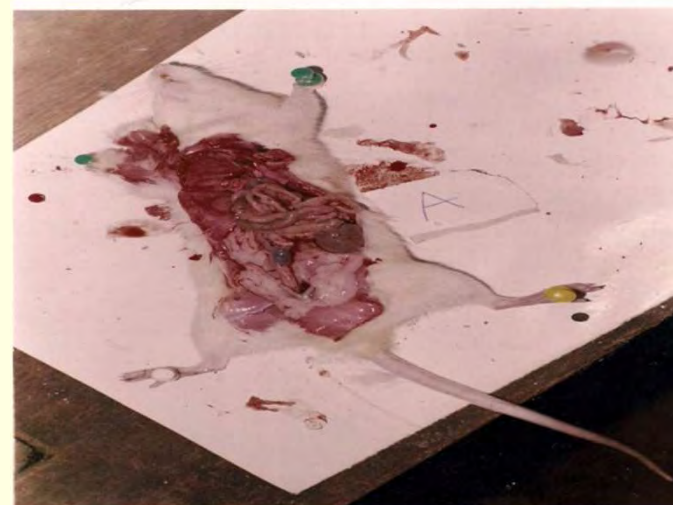
The physico-chemical characterization as well as the fatty acid profile of these evaluated oils suggested them as potential industrial resources.

Seed oils such as *Baphia nitida* and *Gliricidia sepium* from this study have the potential of serving as replacement for other well known seed oils of similar composition.

Seed oil of underutilized plants are potential raw materials for local food industries.



What about edibility?



What about the seed cakes left?

Waste water treatment!

✓ Polyaromatics

Animal feed

✓ Pesticides



ACKNOWLEDGMENT



- God Almighty
- Dr. RBN Prasad and Dr. BVSK Rao: IICT, Hyderabad
- Prof. Thomas Wolff: Technical University of Dresden, Germany
- Prof. Gennaro Armando: University of Padova, Italy
- Dr Aina: University of Ibadan, Nigeria

