



# Developing a trilingual glossary for the physico-chemical properties of alternative sources of edible potash (culiash) from unripe plantain peelings (*UPP*)

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## Abstract

*Due to the rising correlation between food additives and several health disorders, it is important that researchers in this area disseminate their findings to rural artisans, translators, indigenous newscasters and consumers. This will promote healthy living and consequently reduce health risks which may be associated with artificial food additives. However, this has been quite challenging in that it has been hampered by the lack of indigenous technical terms, especially in the Igbo language. Against this backdrop, this study develops a trilingual glossary for the physico-chemical properties of alternative sources of edible potash (UPP). The convenience sampling technique was employed in selecting twenty female participants who were not above 50 years of age from the Mbaise community, a town in Imo State of Nigeria. Personal interviews, observation/participation and documentation in the field were the primary sources of data collection, while the secondary sources included textbooks, journals, theses, dissertations, magazines, newspaper articles and the internet. The chemical compositions of the edible ash were ascertained using standard analytical methods. To generate its technical terms, four major linguistic principles (indigenisation, terminologisation, semantic shift, paraphrasing with explanation and compounding) were applied in developing equivalent terms in the Igbo language. Findings show that indigenisation and compounding are more productive in the development of*

terms in the Igbo language for the physico-chemical properties/constituents of alternative sources of edible potash than pure loaming. Terminographers are encouraged to standardise these developed terms while working to fill the gap of terminology scarcity in African languages.

**Keywords:** Health disorders, indigenisation, Linguistic, physico-chemical

## Introduction

There have been reports of electrolyte imbalance attributed to the consumption of some potash, which causes diarrhoea in some subjects and even abortion in pregnant women (Davidson et al., 1974; Bamaiyi & Momoh, 2010; Bankole et al., 2015). This has led to intensified efforts to bridge the gap between the safety and palatability of any potash used for the preparation of local delicacies such as *Nkwobi*, *ugba* and *Abacha* in Nigeria and beyond.

Potash is any mined or manufactured salt that contains potassium in a hydrophilic or water-soluble form; it is broadly categorised into edible and non-edible potash (Mineral Yearbook, 2008). Some of the edible potash occur naturally as geological deposits or lake salts, which are usually hydrated sodium carbonate (Davidson et al., 1974; Oyeleke et al., 1981), while others may be generated from plant-based sources such as unripe plantain and palm fruit stalk. Some of these plants' wastes from burnt palm stalk, unripe plantain peels, maize cobs, wood, and sugar beet waste, among others, contain a good percentage of potash when burnt in the open air (not oven-dried and milled). Some of the

ashes contain oxides of potassium and sodium, which, when dissolved in water, yield the corresponding hydroxides (Onyegbado et al., 2002). Hence, alternative sources of edible potash from plants have been developed and perceived to have some advantages over the geological deposits. While the geological deposits are commonly seen in the northern part of Nigeria near shallow lakes (Makanjuola et al., 1971), the plant-based sources are common in the south-eastern part of Nigeria. Although Uzogara et al. (1988) and Ene-Obong et al. (2013) note that edible potash from plant sources are necessary for the preparation of meals like Mexican beans (*Akidi*), beans, cowpea beans (*Fifofo*), and can serve as a tenderiser to significantly reduce the cooking time of cowpea, and emulsifier during the preparation of some local delicacies like *Nkwobi*, *Abacha* among others. Okpala (2015) adds that edible potash has a lot of health benefits, such as the treatment of constipation and coughs; it is also used as a preservative as it contains antifungal properties. Agama-Acevedo et al. (2016) claim this is found in the unripe plantain peels (UPP), which has been shown to add to

the quality of the usable potash as it contains antioxidants and a high level of ash. Disseminating the components and properties of essential and beneficial information from

the findings of chemical analysis is especially important due to the rising correlation between food additives and several health disorders (Smith, 1991; Sharma, 2015).

**Table : Important minerals in health**

Mineral	Class of Mineral	Function
Calcium	Macro-mineral	Important for healthy bones and teeth, blood pressure maintenance, regulation of muscle contraction, nerve impulse transmission, hormonal secretion and activation of some enzymes
Chloride	Macro-mineral	Maintenance of fluid balance
Copper	Micro-mineral	The structural component of many enzymes helps in red blood cell formation, stimulates the immune system and provides an innate defence against free radicals.
Fluoride	Micro-mineral	Prevents tooth decay and maintains bone structure
Iron	Micro-mineral	A key component of haemoglobin and redox enzymes for the transport of oxygen and electrons respectively
Iodine	Micro-mineral	An important component of thyroid hormones, which regulate temperature, several metabolic activities and growth
Magnesium	Macro-mineral	Plays a key role in the synthesis of genetic materials and is also needed in immune system health, muscle contraction and nerve transmission. It also aids in proper stomach emptying.
Phosphorus	Macro-mineral	It is important for healthy bones and teeth and is required for ATP synthesis, a component of the buffer system that maintains pH and is also required for proper kidney function and heartbeat.
Potassium	Macro-mineral	Maintenance of blood pressure, nerve impulse transmission and maintenance of fluid balance
Selenium	Micro-mineral	Reduction of free radicals
Sodium	Macro-mineral	Maintenance of fluid balance, blood pressure control and important in nerve impulse transmission
Zinc	Micro-mineral	Co-factor for many enzymes, essential for taste perception, wound healing, sperm production, fetal development and sexual transformations

Source: Fairweather-Tait and Cashman (2015); Gharibzahedi and Jafari (2017)

For good health, essential micronutrients play diverse roles in ensuring healthy living. They are broadly classified into macro and micro-minerals. Unlike other classes of food (proteins, carbohydrates, fats, and vitamins), these minerals are indestructible. Some of the common minerals and their physiological roles, according to Fairweather-Tait et al. (2015) and Gharibzahedi et al. (2017), are summarised in Table 1.

Researchers, therefore, need to properly disseminate this information to rural communities, local artisans, translators, indigenous newscasters and consumers to promote healthy living and consequently reduce health risks which may be associated with artificial food additives. However, this has been quite challenging in that the efforts to achieve this have been hindered by the lack of indigenous technical terms.

Nwosu (2014) argues that carrying out research and communicating the findings in Nigeria (and in Sub-Saharan Africa) may be easier if the researcher is fluent in the mastery of the lexicon, which gives him access to "knowledge categories". This, in essence, necessitates the development of indigenous specialised terms to accelerate the dissemination of healthy, locally produced preservatives and emulsifiers. According to Essien (2006), technical/specialised terms are those special terms of languages used in specific fields, such as science, medicine, and architecture, to convey distinctly formed ideas, especially

in research generation and application across sources to achieve diverse purposes.

Consequently, this study aims to develop specialised terms for the physico-chemical properties/constituents of alternative sources of edible potash in the Igbo language while providing their equivalents in French and English languages using the under-listed objectives.

1. To conduct a chemical analysis on potash raw materials (mineral, vitamin, phytochemical, and proximate)
2. To find out step by step approach on how to prepare edible potash from alternative sources
3. To create from English to the Igbo language the terms and glossary for the physico-chemical properties/constituents of edible potash.
4. To create from English to French, the terms and glossary for the physico-chemical properties/constituents of edible potash
5. To find out the local uses of edible potash in Igbo-land.

From a multidisciplinary perspective, this collaborative research between Biochemistry and Linguistics will provide a repertoire of chemical glossaries from chemical analyses to create a synergy between research works in the sciences and humanities while serving as a term repository in the French and Igbo languages to enhance global communication that will promote and encourage small and medium scale enterprises.

### **The concept of terminology and term development**

Terminology as a branch of study deals with principles and methods of collecting, processing, and managing relevant data for studying concepts and their terms, or the set of terms associated with the special use of the language of an individual subject field. Although terminology is multifaceted as it incorporates several other fields as tools for achieving its communicative goal, Sager (1990) states that the theory of terminology borders on three major aspects: the cognitive, the linguistic, and the communicative features. In other words, Sager is of the view that terminology examines how concepts constitute structured sets of knowledge units or systems in every area of human knowledge, as well as the terms of representations of these concepts. To this claim, Temmerman (2013) suggests that knowledge units and representation of concepts must be based on linguistic possibilities to establish varieties and indefiniteness in human understanding. This implies that it is the linguistic features and devices within a language that set the structures for the use of terms. This linguistic aspect of terminology predisposes language to the different phonological, morpho-syntactic and lexical structures of the language, in which the new concept finds its linguistic expression and representations.

Previously, some theories of terminology used a restricted term creation approach to creating one term for one concept, which

made the rule rigid. However, a recent theory permits synonymic expressions and term variations, which incorporates the practical tools of modern linguistics as well as those of information science and technology. Linguistic tools examine existing linguistic forms, as well as possible linguistic forms that can be created in future to name new concepts. Sager (1990) notes that this modern theory also permits the transfer of information of various kinds in communicative situations, thus covering the activities of compilation, processing and dissemination of terminological data in the form of specialised dictionaries, glossaries or terminological databases, etc. In other words, it is the linguistic features and devices that set the structures for term development and procedures. Sager (1990) specifies the primary and secondary processes as two broad approaches to term development. The primary term development is part of a process of understanding the use of language in a specific domain. It complements the creation of concepts, which are usually monolingual but have no pre-existing linguistic object, whereas the secondary term development process derives from equivalence to correspond to the term to be created for an already existing term. Accordingly, terminology tends to be subject-field specific and, most importantly, reflects flexibility for creating or developing new terms for emerging trends in knowledge management. In view of this, this study defines the term development as the

systematic approach through which any language applies specified linguistic rules to precisely refer to concepts. This will certainly require the disposition of the persons involved in the process of designation and the motivation for the term development.

### Term development in Linguistics

Linguistic requirements for term creation are of major interest to subject field specialists such as linguists, terminologists, terminographers, translators, interpreters and technical writers. This encourages them to work with less widely used languages such as Igbo, where the lack of adequately developed reference tools such as specialised dictionaries and glossaries very often compel them to become neologists. Some of such linguistic requirements include linguistic appropriateness, economy and derivability. In linguistic appropriateness, suggested terms follow well-known and verified usages of meaning which are in use. For example, developing an Igbo term for potassium as *nnú mpurubi* is verified from existing terms such as *nnu* and *mpurubi* because there is a saline element that circulates to the heart. On the other hand, linguistic economy entails using concise terms to expedite communication in situations which are not purely scientific. For instance, *nnú ákwàrà* can semantically and scientifically be said to be more precise contrary to the term *nnú mgbasa ọbàrà n'ákwàrà* (calcium) since there is circulation of blood to the veins. Derivability requires choosing what is

possible in a given language to systematically develop an equivalent.

### Processes of term development

Valeontis and Mantzari (2006) hold the view that the processes of designating a concept in a target language must follow an integrated systematised naming mechanism ("analogue rule") to account for the corresponding approaches existing in the source language. The analogue rule states that when forming a term in a target language, the creator's first choice should be to apply a term creation tool equivalent to the source language term. As a result, existing processes should be applied to develop new concepts.

Besides the use of neologism, which entails coining new but non-standardised terms, translators and terminologists employ different strategies in the development of specialised terms. These include borrowing of words, acronyms and abbreviations; paraphrasing abbreviations and acronyms; pure loaning, abbreviation of indigenisation; paraphrasing; synonyms; semantic shift; compounding and coinage.

**i. Indigenisation of loan words:** In the strategies used to create terms in ten (10) South African languages, Gauton et al. (2003) note that African languages form terms through transliteration- a process of adapting the phonological structure of the loan word to the sound system of a borrowing language. For instance, some Igbo

speakers adopt the pronunciation of thermometer as /tamomita/, computer as /kɔmputa/, and data as /data/, among others. This, Ndhlovu (2012) refers to as indigenisation. Indigenisation, according to Ndhlovu (2012), has to do with changing the structure, spelling and pronunciation of the borrowed terms to suit the target language; the meaning, however, remains the same. This study adopts indigenisation in line with Ndhlovu (2012).

**ii. Trans-disciplinary borrowing:** Trans-disciplinary borrowing is another process of term development. It is also known as internal borrowing and represents a circumstance where a term from one special subject field is used in another to stand for a different concept. For instance, borrowing terms from business to explain concepts in the health sector, one can use 'fluctuation' (which means to vary in level or degree in business) to explain the degree of hotness or coldness in temperature since there are similar features, making up the intention of both concepts in both subject fields.

**iii. Compounding:** The process of compounding is a formation effected by combining two or more existing words or lexical elements to have a new lexical item. Compounds can be complex terms, phrases or blends. For example, two different words having different individual meanings are combined to give another meaning.

A) Computer: a machine that processes data.

B) Literate: To be knowledgeable.

A new lexical form is derived as Computer+ literate = Computer literate, meaning to be knowledgeable in the use of the data processing machine.

C. Cock: adult male chicken.

D. tail: the rear part of an animal

Cock + tail= A mixture of several things like drinks, fruits, sauce etc.

E. Blood +Pressure =blood pressure

**iv. Terminologisation:** According to Valeontis and Mantzari (2006), terminologisation is a general procedure through which a word or phrase from general language is altered to describe a concept in a special language, e.g. English: circuit (general language): a line enclosing a surface extended to electro-technology which is an arrangement of devices or media through which electric current can flow.

**v. Semantic shift:** Hadebe (2000) defines this process as that process which permits a shift in reference but not in a sense such that the coined term is used in the specialised field. Satyo (as cited in Moropa, 2004) adds that "the new meaning springs from the original meaning and the relationship between these two does not fade. Registrar (general language): one who writes/sends summons through the court bailiff is shifted to a specific administrative function in a university (University Registrar) to write/ circulate memos and correspondences for the university.

### Terminological challenges and the Igbo language:

Ndhlovu (2014) cites scholars such as Mtintsilana et al. (1988), Trew (1994), Hadebe (2000, 2006), Kruger and Wallmach (1999), Van Huyssteen (1999), Gauton et al. (2003), Moropa (2005), Kruger (2010) and Ndhlovu (2012), among others, as having documented many African languages and claim that there are little contacts in the scientific and technical fields. This, according to them, seems to have compounded the terminology development challenge for indigenous speech communities in Africa. This present study agrees with the claims of these authors on terminological challenges, as many African languages which are less resourced today are still struggling to develop indigenous terms for scientific concepts. Some of such languages include the Igbo language, which does not have a monolingual specialised and non-specialised dictionary to support linguists, terminographers and translators during the process of translation and term development.

To the best of the researcher's knowledge NERDC,(1991), *quadrilingual glossary of legislative terms* (English, Hausa, Igbo, Yoruba), Oli, Nwaozuzu and Mbah (2013), English-Igbo Medical Dictionary, Mbah et al. (2013) *Igbo Adi; Igbo-English/English-Igbo Dictionary of Linguistics / Literary Terms*, Igboanusu et al. (2017) English-Igbo Glossary of HIV, AIDS and Ebola-related Terms and Nwankwo (2018) Lexicographic

*documentation of agricultural terms in selected Igbo dialects*, are the few technical works in the Igbo language. There is, therefore, a need to develop more technical terms to cover the wide gap in scientific knowledge in the Igbo language, thus the significance of this study.

Anchoring on the multilingual primary term creation of Sager (1990), the researchers adopted indigenisation, terminologisation, semantic shift, paraphrasing with explanation and compounding to develop Igbo terms for these repertoires of analysed chemical properties. Sager's model specifies three actions, which include the monolingual creation of a new term, the monolingual revision of an existing term and the intra-disciplinary transfer of an existing term.

### Methodology

The convenience sampling technique was adopted in selecting twenty participants from the Mbaise speech community, a town in Imo State, Nigeria, which constitutes the population of the study. These participants were married females ( $\leq 50$  years) and had received education up to secondary school level. This facilitated a background understanding of the process of producing the UPP ash to ensure the derivation of appropriate chemical components. The participants listed the special terms of required ingredients for the processing of edible potash from the plant (UPP) to generate a repertoire of the chemical glossary in the field. This provided the



primary source of data for this study. Other sources included personal interviews, observation/participation and documentation on the preparation of dried raw materials and aqueous samples of the ash for the chemical analysis, while the secondary sources included textbooks, journals, theses, dissertations, magazines, newspaper articles and materials from the internet. The phytochemical analysis was performed using the method described by Harbone (1973), while the mineral, vitamin and proximate

analysis were done using the methods described by AOAC (1995).

#### Data presentation and analysis

In the process of conducting the chemical analysis of potash, the unripe plantain peels were burnt in the open, and its ashes soaked in water from two different sources: rain and distilled water. From these contents, the required glossary of the chemical components was generated, as presented below.

### Chemical composition of dried UPP, UPP ash and Culiash

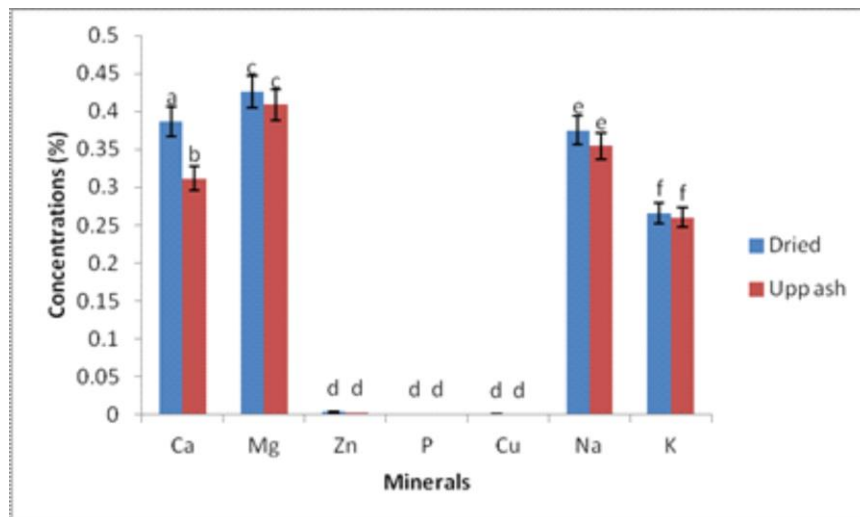
**Table 2: The Summary of mineral composition in dried UPP, UPP ash**

S/n	Mineral composition	Mmeju ngwa ndoziàhụ
1.	The dried UPP, the UPP ash and culiash from the two different water sources all contained the same number of minerals. The method of processing did not affect the number of elements, as shown in the tables below, and the burning technique did not affect the mineral concentration.	agbugbọ ụkam/mkpokoro ụkam/abịrịka ọkpọ, ntụ-ya, ntungụ e jiri mmiri-ozizo mee na nke e jiri mmiri ngwugwu-akpa mee, nwere otu ụdịrị ngwa. Usoro mmeputa ha e metụtaghịkwa ngwa ole ma ole dị n'ime ya.

Generating the terms in the glossary above was done during the practical session. As a result, the above dried UPP, UPP ash and culiash mineral composition were presented in a communicative context. The monolingual revision of existing terms was adopted here as it was apt and more appropriate.

Dried UPP (*agbugbo/mkpokoroukam/abirikaokporo*)

Figure 1 : Mineral Composition of Dried UPP and UPP Ash



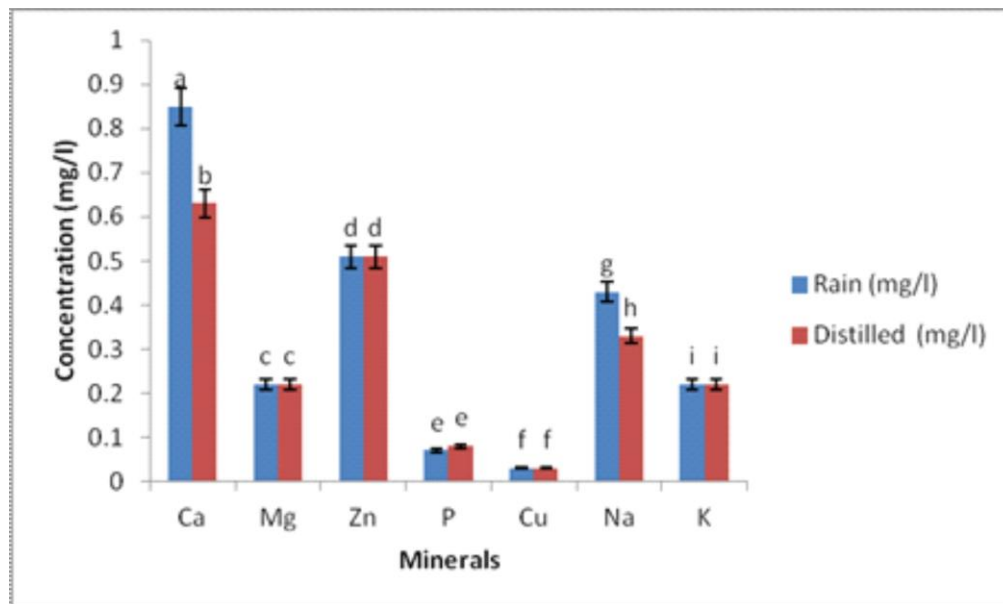
Bars with different alphabets are statistically different.

Values represent the means of the data.

Table 3: Mineral composition of dried unripe plantain peels (UPP) and UPP ash (*ngwa ndozi ahụ e nwere na agbugboukam/abirika okporo na ntu UPP*)

English	Igbo	French
Name of mineral	Aha ngwa ndozi ahụ	Nom du mineral
Calcium	nnú ákwára	Calcium
Magnesium	nnú ákwàràikē	Magnesium
Zinc	nnú zink	Zinc
Phosphorus	nnú okpukpu	Phosphore
Copper	nnú kopa	Cuivre
Sodium	nnú soda	Sodium
Potassium	nnú mkpurubì	Potassium

Figure 2 : Mineral composition of aqueous solution of UPP ash (Culiash)



Bars with different alphabets are statistically different.

Values represent the means of the data.

Table 4: Mineral content of UPP from rain and distilled water (Culiash–from rain and distilled water)

	English	Igbo	French
S/n	Name of mineral	Aha ngwa ndoziahụ	Nom du mineral
1.	Calcium	nnú mgbasa ọ̀bàrà n’ ákwàrà	Calcium
2.	Magnesium	nnú ákwàràikē	Magnesium
3.	Zinc	nnú zink	Zinc
4.	Phosphorus	nnú ọ̀kpụ̀kpụ́	Phosphore
5.	Copper	nnú kọpa	Cuivre
6.	Sodium	nnú sọda	Sodium
7.	Potassium	nnú mkpụ̀rụ̀bì	Potassium

The generated terms in Tables 2, 3 and 4 show that there is uniformity in the contents of the three samples.

As a result, developing the Igbo terms will adopt the analogue rule of applying the creator's first choice to an equivalent tool in the source language. Therefore, terminologisation and compounding were the morphological processes utilised in the term development processes. In the above tables, all the Igbo terms were derived by terminologisation. That means they were already in general use and became adopted to describe health situations. For example, calcium (*nnú mgbasa ọbàrà n'ákwárà*) was coined from salt (*nnú*), a vital substance for life and *mgbasa* (spread) to describe calcium as an essentiality for muscular development and its role in blood clotting. This implies that calcium consists of saline. This makes the term *nnú* (salt), which is essential for the continued functionality of the human system, most appropriate. The transferred existing terms were combined to have *nnú + mgbasa + ọbàrà + n' + ákwárà* = salt+ spread+ blood+ in +vein for linguistic appropriateness; however, with reference to the linguistic economy, compounding seems most appropriate to develop this term calcium as

*nnú ákwárà*. Similarly, the circulation of the brackish component in the arteries, bones and heart were formed as *nnú ákwáràikē* (magnesium), *nnú ọkpụkpụ* (phosphorus) and *nnú mkpụrụobi* (potassium).

For term numbers 4, 5, 6, *nnú zink*, *nnú kọpa* and *nnú sọda*, indigenisation was adopted. This means that the terms were indigenised to change the structure and spelling while retaining the pronunciation of these terms to suit the target language; however, the meaning of each of these terms remains the same.

#### Other preliminary chemical analysis on unripe plantain peels

##### a. Vitamin Content of UPP (*ákpụrụ ngwa nchekwa anụ ahụ n'ime UPP*)

Vitamins were only present in the dried UPP. There were no vitamins in the aqueous solutions, both from rain and distilled water. The vitamin content of the dried UPP is shown in Table 5 below (*ákpụrụ ngwa nchekwa anụ ahụ pụtara ihe na agbụgbọ/mkpokoroụkam/abịrịkaọkpọọ*) mana nke a apụtaghị ihe na ntụ UPP mmiri ozizo na nke akpa)

**Table 5: Vitamin Content of Dried UPP (*ákurụ ngwa nchekwa anụ ahụ agbụgbọụkam/mkpokoroụkam/abịrịkaokpọ*)**

S/N	Name of Vitamin	Aha Akurụ ngwa	Nom du Vitamines
1	Vitamin A	ákurụ ngwa nchekwa ányá	Vitamine A
2.	Vitamin C	ákurụ ngwa nruchi ọnyá	Vitamine C
3.	Vitamin E	ákurụ ngwa mkpùchíté anụ ahụ	Vitamine E
4.	Vitamin D	ákurụ ngwa mgbochi nkwarụ	Vitamine D
5.	Vitamin K	ákurụ ngwa mgbòchí mkpụkọ ọbára	Vitamine K
6.	Vitamin B1	ákurụ ngwa mgbárijá mgbadume	Vitamine B1
7.	Vitamin B6	ákurụ ngwa mgbárijá mkpụrụ/ndụ' ahụ/ ọwọ	Vitamine B6
8.	Vitamin B2	ákurụ ngwa nwúlíté úmé	Vitamine B2
9.	Vitamin B5	ákurụ ngwa mgbárijá ime mkpụrụ/ndụahụ/ọwọ	Vitamine B5
10.	Vitamin B9	ákurụ ngwa nrúputa ndụ ahụ/ọwọ nke ụbụrụ	Vitamine B9
11.	Vitamin B12	ákurụ ngwa nwúlíté ọbàrà	Vitamine B12

Here, an analysis of the functions of each vitamin was carried out to facilitate term development. It was later paraphrased to rename the terms in the Igbo language,

where there is no basic form in existence. This was as a result of the lack of terms to express different technical or specialised terms in the Igbo language.

#### a. Proximate composition

**Table 6: Proximate content of Dried UPP (*mmejuputara UPP ndi ọzọ*)**

S/N	Proximate	Mmejuputara ndi ọzọ	Analyse
1	Moisture	ndà	Humidite
2	Ash	ntụ	Cendre
3	Fat	àbụbàrà	Grasse
4	Protein	nri nruchi àhụ	Proteine

5	Fibre	ávuvvù`	Fibre
6	Carbohydrate	mgbàdóúmé	Glucide

Terminologisation and trans-disciplinary borrowing of the equivalent terms for the proximate content of dried UPP were adopted here. For instance, *nda* (a meteorological

term in the Igbo language) was moved into the health sector. Others from related situations include *ash*, *fat* and *mgbadume*.

**a. Phytochemical composition (mmejuputara ákụkụ UPP)**

**Table 7: Phytochemical composition of dried UPP**

S/N	Phytochemical properties	Aha mmejuputara ákụkụ	Composition
1	Tannins	tanin	Tanin
2	Flavonoid	flavonọdụ	Flavonoides
3	Hydrogen cyanide	haịdrojinsajinaịd	Cyanide d’hydrogene
4	Alkaloids	alkalọd	Alcaloide
5	Steroids	sterọd	Stereoide
7	Phenols	fenọl	Phenols
8	Terpenoids	tepinọd	Terpenoides
9	Saponins	saponin	Saponines
10	Glycosides	glajicosid	Glucosides

Again, we indigenised (i.e., changed the structures and spellings of) these terms to suit the target language while retaining the meaning and sound of the source language. Indigenising borrowed words is advantageous because the words adopt the orthographic structure of the target language, making them easier to pronounce. This is productive here because the above terms are extracts from plant sources, which presently do not have any technical term for it in the Igbo language, and there has been no traditional

awareness of these plant extracts in rural communities.

**Discussion**

***The Chemical composition of dried UPP and UPP ash***

Both the dried UPP and UPP ash contain several alkali and alkaline earth metals, as shown in Figure 1. The levels of zinc, phosphorus and copper are insignificant when compared to the levels of the alkali and alkaline earth metals (calcium, magnesium,

sodium and potassium). The similar levels of the mineral in both the dried UPP and UPP ash show that the burning technique (unaided burning in the open air) used does not affect the mineral composition. The aqueous solutions (culiash) also contain varying levels of the minerals, as shown in Figure 2. The levels of minerals in both the distilled and rainwater are similar (except for calcium), which means that both waters had similar dissolution effects on the UPP ash. The high levels of the alkali and alkaline earth metals in both the dried UPP and UPP ash position them well for the production of culiash (its aqueous solution) as they form their respective hydroxides on dissolution in water. According to Irvine (1965), agricultural waste materials contain a significant amount of potash, which comes from local palm fruit stalks, banana leaves and plantain peels. When these plant wastes are burnt, the oxides of alkali metals, such as sodium and potassium, are produced, and they produce their corresponding hydroxides when dissolved in water (Onyegbado et al., 2002). The levels of the alkali metals in the UPP ash determine the level of the oxide formation and, consequently, the oil emulsification ability of the potash. Several forms of ash abound, but their differences lie in the ability to trigger emulsification at the lowest concentration and their safety profile.

From the mineral composition of culiash, it will not likely pose any health risk at the level required for cooking and other purposes.

Emulsification of oil by potash is a vital process in the preparation of several African delicacies. This allows the proper mixing of both the hydrophilic and hydrophobic components of the recipe, hence improving the palatability, digestibility and satiety value of African delicacies. Reports show that akanwu, a geological deposit which is often used as an emulsifier/tenderiser in food preparation, has deleterious effects such as peripartum cardiac failure in the foetus, stomach upset and diarrhoea (Davidson et al., 1974; Bamaiyi et al., 2010). Recently, administration of Akanwu to rats led to a negative distortion of liver enzymes and, therefore, may be toxic to the liver (Imafidon et al., 2016). Considering its vast use in cooking, snuff (Utaba) composition and other consumptive purposes (Mosima et al., 2013; Ene-Obong et al., 2013), there is a large exposure of the populace to its toxicity, and this is really worrisome. The call for the use of natural food additives is necessary because of the rising correlation between artificial food additives and health disorders (Smith, 1991; Sharma, 2015). The development of a trilingual glossary will further domesticate and, at the same time, internationalise the use of natural additives as better alternatives to enhance food palatability and promote healthy living.

Beyond the usefulness of culiash in enhancing the quality of food, the constituent minerals play significant health roles and can, therefore, augment the

recommended daily requirements for these minerals. The benefits of the mineral range from serving as co-factors of enzymes, blood pressure control, blood clotting, maintenance of body fluid balance, and muscular function to aiding cell communication (check Table 1 for details) (Gharibzahedi et al., 2017; Fairweather-Tait et al., 2015). Although *culiash* does not contain vitamins, phytochemicals and proximate constituents, their presence in the dried UPP is revealing and could also be useful in animal meal composition and other agricultural purposes.

### ***Trilingual glossary development***

As has been mentioned earlier, edible potash derived from plantain peel has been proven to provide more health benefits than those derived from geological lakes. This makes it imperative that the health information should be disseminated to rural producers, consumers and artisans to prevent health disorders associated with consuming artificial preservatives.

Considering the extant industrial advancements in China, Japan and, most recently, India. Essien (2006) notes that foreign languages were all like our indigenous dialects until they were incorporated into their socio-economic development policies. This means that developing indigenous terms would assist in the circulation of the health benefits of UPP

and increase the demand by small and medium-scale industries. In turn, economic development and empowerment among the younger ones will be motivated. It will also bring the Igbo language to a global level of *culiash*, and other forms of *ntụ-ngu* as a term will begin to sell outside Nigeria in its local name on labels. Subsequently, manufacturing industries within the south-eastern states of Nigeria would begin writing their manuals and labels in the Igbo language as they are done in Chinese, French and Japanese, which will probably help to boost our economic relevance in the global society.

### **Conclusion**

The use of the English language as the dominant language in most African countries has hindered the effective transmission of essential health information to rural people. In worst scenarios, some amateur lexicographers and terminologists employ pure borrowing, assuming their readers will understand borrowed terms even though the structure of these terms is alien to the indigenous language. This has placed such languages as Igbo behind the global scenes for a long time. However, with the recent efforts by Igbo terminographers to work hand-in-hand with other language experts and researchers from other specialised fields, indigenous languages will soon have indigenous terms to express special or scientific knowledge.



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