

Full Length Research Paper

The “Doctrine of Signatures” in herbal prescriptions in Ikale and Ilaje communities of Ondo State, Southwestern Nigeria

Aworinde David Olaniran¹, Erinoso Sakiru Morenikeji^{1*}, Ogundele Alimi Adeyemi², Teniola Olasimbo Anuoluwapo¹ and Ojo Samuel Omoniyi¹

¹Department of Biological Sciences, Ondo State University of Science and Technology, Okitipupa, Nigeria.

²Department of Biology, Federal College of Education (Special), Oyo, Nigeria.

Received 2 March, 2018; Accepted 20 April, 2018

The knowledge and application of the notion of “doctrine of signatures or correspondences” was evaluated among the Ikale and Ilaje people of Ondo State, Southwestern Nigeria. Information was solicited by administering questionnaires to one hundred and five (105) informants. Periodic field observations were also made. The research yielded 60 plants belonging to 37 families. The plants have characteristics such as colour, taste, habit, structure, and appellation which are suggestive of their trado-medical uses. *Azadirachtha indica*, *Petivera alliaceae*, *Vernonia amygdalina*, and *Morinda lucida* commonly known as “bitters” are used as antimalarial plants. Due to the shape of their fruits/tubers, *Kigelia africana* and *Ipomoea batatas* formed part of recipes used in the treatment of breast disorders while others such as *Carica papaya* and *Alstonia boonei* are useful as botanical galactogogues. Plants used for magical preparations are also documented. This study confirms the application of the doctrine in plant knowledge and uses. This doctrine can be applied in future bio-prospect and drug development.

Key words: Traditional medicine, Doctrine of Signatures, ethnobotany, Ondo State, Nigeria.

INTRODUCTION

The “doctrine of signatures or correspondences” developed in Europe in the 16th and 17th centuries, following the collation and consolidation of the body of material that comprised it, asserts that the way plants look, taste, react or are shaped offers strong clues to their medicinal applications (Lev, 2002). This ancient

pharmacological theory maintains that similarity between plant habitat or appellation and human features is suggestive of their trado-medical uses. It is believed that these characteristics, commonly called “signatures”, are God-given and have possible implications for classification of medicinal plants as well as uses and

*Corresponding author. E-mail: kejieconbotunaab@yahoo.com Tel: +234 8138986616; +234 8176124327.

other properties (Saifullahi et al., 2017). Major categories of this doctrine are: 1.) similarity between the shape of the plant organ and the ailing human organ; 2.) similarity between animal shape or behavior to human organ; 3.) similarity of plant colour to the colour of the disease's symptoms; and 4.) similarity of plant characters to human features (Dafni and Lev, 2002). Earlier, Hocking (1977) submitted that the doctrine could be broken down into two chief components which are: 1.) nature has provided in every region plants for remedies which the diseases common to that region require for treatment; and 2.) nature has also provided signs or symbols to indicate by physical characteristics of the drug (colour, shape, taste etc.) the diseases/disorders for which the plant is a remedy.

The Southwestern region of Nigeria is inhabited by people who are particularly rich in customs and traditions. Hence, the Yoruba mythology explains the origin and belief of many cultural concepts in the daily life and practices of the Yorubas (Oso, 1977). This includes the use of plants for the prevention or cure of mild or chronic ailments. Few studies have been conducted in Israel, India, China, and USA (Dafni et al., 1984; Richardson-Boedler, 1999; Dafni and Lev, 2002; Lev, 2002; Bennett, 2007; Kumath, 2015); published information, however, on this concept in Nigeria is scarce and fragmentary.

The aim of this study, being part of a conjunctive focus on indigenous medicines and their furtherance, was to evaluate the knowledge and application of the "doctrine of signatures" among the Ikale and Ilaje people of Ondo State with a view to presenting the plants for biological screening. The doctrine could serve as a reliable basis for future bio-prospect and drug development.

METHODS

Region and study area

The study was conducted in Ondo State, Southwestern region of Nigeria. Twelve (12) localities in Ikale and Ilaje communities were visited periodically. These areas are occupied majorly by the Ikale and Ilaje-speaking people, other Yorubas (Oyo, Osun, and Ekiti) and Igbira (Edo). The primary economic activity is agriculture. The principal crops are oil palm, plantain and cassava (processed into different food products). Other human activities include fish and vegetable business. Civil servants also inhabit the areas.

Administration of questionnaires

Information about plants was elicited from residents in the areas with the aid of structured questionnaires and personal interview. The purpose of the study was explained to the respondents and informed consent was sought. Only information from willing informants was documented. The questionnaire was divided into two sections. Section 1 was on the demographic variables of respondents while section 2 evaluated informants' knowledge on the characteristics of plants vis-à-vis their supposed uses.

Respondents were cross-questioned to confirm the authenticity of information given. Interview was conducted in the local language (Yoruba, and where necessary the service of an Ikale/Ilaje speaking person was employed). Responses were filled into the questionnaires after each fielded question. The identities of the plants were confirmed using live specimens and reference text (Gbile, 2002); OSUSTECH Herbarium was also consulted. Voucher specimens were deposited in the same herbarium.

RESULTS AND DISCUSSION

Twelve (12) localities were visited. The number of respondents interviewed in the localities was not even because only complete data from willing informants in each locality were documented. The demographic variables of respondents are presented in Table 1. Out of the 105 informants interviewed, 73.33% were males while 26.67% were females. The age of the informants ranged from 30 to 70 years; 56.19% of the informants were between 50 and 60 years. Twenty-seven (27) of the 105 respondents were illiterate, 59 had first school leaving certificate (FSLC), 12 possessed Senior School Certificate (SSC), 5 obtained Ordinary National Diploma (OND) or National Certificate in Education (NCE) while the remaining 2 held higher national diploma (HND) or a first degree (B.Sc./B.A.). Only one (1) respondent, by marital status, was single. Others were married (99.29%), divorced (2.86%) or widowed (1.90%). A large percentage (68.57%) of the respondents practiced Christianity, 14.29% practiced Islam while 17.14% practiced African traditional religion. Ninety-seven (97) of the informants are native of the study area; eight (8) respondents informed that they migrated to the area and had been residing for 10-15 years in the communities. Clearly, majority of the informants had been residing in the study area for more than 15 years. The respondents were herb sellers (25.71%), herbalist (34.29%), farmers (20%), artisan (5.71%), traders (1.90%), birth attendants (2.86%), and civil servant (9.52%).

Table 2 shows the profile of the plants used for medicinal purposes based on the "doctrine of signatures". Sixty (60) plants belonging to 37 families having characteristics that relate to the medicinal uses are documented. The characteristics/signatures mentioned are shape/structure of fruit/pod and leaf, colour of stem bark and root, colour of latex from leaf/leaf extract, seed set, taste of leaf extract, texture of stem bark, and local/vernacular names of the plants. The medicinal applications vary and include anti-malaria, blood tonic/booster, personal protection, favour of the elders, maternal issues, and ease of delivery etc. In majority of traditional cultures or illiterate societies or educationally less-privileged communities, this "law of similitude" serves a symbolic purpose and helps to transfer medicinal information from generation to generation; it also serves as a mnemonic aid for apprentice learning by

Table 1. Demographic variables of respondents on the "Doctrine of Signatures in Herbal Prescriptions" in Ikale and Ilaje Communities of Ondo State, Southwestern Nigeria

Parameter	Specification	Frequency (%)
Community	Ayeka	13 (12.38)
	Erinje	12 (11.43)
	Idepe	9 (8.57)
	Igbodigo	8 (7.62)
	Igbokoda	10 (9.52)
	Igbotako	8 (7.62)
	Igodan	3 (2.86)
	Ikoya	2 (1.90)
	Ilutuntun	7 (6.67)
	Irele	10 (9.52)
	Ode-Aye	9 (8.57)
	Okitipupa	14 (13.33)
Gender	Male	77 (73.33)
	Female	28 (26.67)
Age (years)	>30≤40	3 (2.86)
	>40≤50	18 (17.14)
	>50≤60	59 (56.19)
	>60≤70	25 (24.81)
Level of Education	Unlettered	27 (25.71)
	FSLC	59 (56.19)
	SSCE	12 (11.43)
	OND/NCE	5 (4.76)
	HND/First Degree	2 (1.90)
Marital Status	Single	1 (0.95)
	Married	99 (94.29)
	Widow	2 (1.90)
	Divorced	3 (2.86)
Religion	Christianity	72 (68.57)
	Islam	15 (14.29)
	Traditional	18 (17.14)
Nativity	Yes	97 (92.38)
	No	8 (7.62)
Length of Residency (years)	>10≤15 yrs	8 (7.62)
	>15≤20 yrs	35 (33.33)
	>20 yrs	62 (59.05)
Profession	Herb seller	27 (25.71)
	Herbalist	36 (34.29)
	Farmer	21 (20.00)
	Artisan	6 (5.71)
	Trader	2 (1.90)
	Birth Attendant	3 (2.86)
	Civil Servant	10 (9.52)

N = 105.

observation (Bennett, 2007).

It is believed, traditionally in Nigeria, that food and drinks which are sweet or sugary are not good for the

body as they increase the sugar content of the body, and if not checked could probably result in pile or hemorrhoid. This lends some credence to the use of plants like

Azadirachtha indica, *Petivera alliaceae*, *Vernonia amygdalina*, and *Morinda lucida* as anti-malarial plants. These plants are generally called “bitters” and are common trade medicines hawked by herb vendors in Nigeria. Others such as *Kigelia africana* and *Ipomoea batatas* formed part of recipes used in the treatment of breast disorders. Majority of the human populations in the world have employed this concept of signatures to prevent or cure diseases, or to bring physic to a particular body organ (Lev, 2002).

The colour of extracts from leaves/stem bark/root/rhizomes or latex/juices of some plant parts confers the “signature” and suggests their medicinal applications. In this category are: decoction of *Sorghum bicolor* (blood supplement), and latex of *Euphorbia laterifolia* (to manage ear ache). This finding is in agreement with Richardson-Boedler (1999) who reported the significance of colour and form of the leaves of *Hepatica triloba* (liverwort) to its healing powers on human liver. Also, Dafni et al. (1984) noted that the doctrine reflected in the use of the yellow decoction obtained from leaves of *Rhamnus alaternus* and the yellowish juices from fruits of *Ecbalium elaterium* for jaundice. Oil from roasted leaf of *Bryophyllum pinnatum* is used to alleviate ear ache while seeds of *Garcinia kola* are stimulants for the hepatic duct.

The local names (Yoruba: Nigeria) of some plants e.g. *Ato*, capable of mending (*Chasmanthera dependens* to remedy bone fractures), *jokoje*, sit down quietly (*Cissampelos owariensis* to manipulate people and make them apathetic), *ewe aje*, lucrativeness (*Myrianthus arboreus* to attract customers and boost business), *abiwere*, deliver with ease (*Hybanthus enneaspermus* for easy delivery) fit the “doctrine of signature” and influence to a large extent the application of these plants. Others are: *Petiveria alliaceae* – *awogba* (awo, cure; igba, 200) (to cure ca. 200 ailments), *Anthocleista vogelli* – *anikanwogbarun* (anikan, alone; wo, cure; igba, 200; arun, disease) (exclusively capable of curing ca. 200 diseases). Kumath (2015) informed that plants with prominently jointed stems help cure bone fractures or dislocations.

The texture and/or appearance of some plant parts (leaf surface and stem bark indentation) complied with the signature concept. For example, *Trema orientalis* and *Dalbergia lactea* are used in the management of measles and skin diseases respectively. The fruit shape of *K. africana*, the stem latex of *Alstonia boonei*, and the fruit and stem latex of *Carica papaya* make the plants important botanical galactogogues; these plants are also used to treat ailments relating to the mammary glands. Kumath (2015) informed that yellow flowers, latex, and dyes are used to treat jaundice while plants that have white latex are used as galactogogues.

Plants such as *Cissampelos owariensis* (*jokoje*, sit down quietly) and *Uvaria picta* (*alupayida*, sleight-of-hand) feature in magical traditions. These plants are used

to work on people’s emotions and make them apathetic, and to impress invisibility respectively. The compact arrangement of the seeds of *Aframomum melegueta* (atare) informs its use by pregnant women to prevent miscarriage. Richardson-Boedler (1999) described the correlation between plant characters and human symptoms. Hocking (1977) reported that the surface sculpture of nutmeg kernel (*Myristica fragrans*) has a similitude to the superficies of the brain; hence its use as a cerebral or neural medicinal agent.

Animals, minerals, and chemicals have also found a place in the “law of correspondence” (Richardson-Boedler, 1999). Pliny (Gaius Plinius Secundus, AD 23-79) correlated the lungs, liver, and stomach of lower animals with human organs and used these in treating the diseases of these organs in man (Hocking, 1977). Plant chemical investigations have shown that phytochemicals such as monoterpenes and bitter principles (in *V. amygdalina*, *Ocimum gratissimum* etc.) correlate with physical properties and healing potentials of the plants (Bennett, 2007). A similar study was conducted in Zimbabwe by Nyazema et al. (1994). Although the authors compared the efficacy of praziquantel and some medicinal plants based on the doctrine, it was established that the plants complied with the signature concept. The findings of the present study are in line with our previous reports (Erinoso and Aworinde, 2012; Aworinde and Erinoso, 2015).

The proponent of the “law of similes”, Paracelsus (Theophrastus Bombastus von Hohenheim, 1493-1591) and his followers have received heavy criticisms after the concept was introduced into the herbal lexicon, and as such the concept has been regarded as fanciful, far-fetched, pre-modern, pre-scientific, primitive, unreliable, and unscientific (Bennett, 2007; see Table 2 for recent assessments and sources). Nonetheless, association with a signature makes it easier to remember a plant and transmit knowledge about its use (Bennett et al., 2002). This association also has physical as well as psychological/spiritual undertones.

CONCLUSION AND APPLICATION OF FINDINGS

This study confirms the knowledge and application of the “doctrine of signatures” in plant uses among the I kale and I laje people of Ondo State. In the “art of signs” or “law of correspondence”, plant characters such as colour of extracts/latex, taste of decoctions, shape of plant organs as well as the local name of plants serve as guides in the use of these plants for medical purposes. In other words, like colours, shapes, and characteristics in plants cure those same or corresponding colours, shapes, and other characteristics in the body part or disease in animals and humans. This research finds application in future plant exploration and the development of new drugs to combat

Table 2. Profile of plants used for different ailments based on the “Doctrine of Signatures” in I kale and Ilaje Communities of Ondo State, Southwestern Nigeria.

S/N	Local Name (Nigeria: Yoruba)	Botanical Name	Common Name	Family	Part Used	Signature	Medicinal Use
1.	Dongoyaro	<i>Azadirachtha indica</i> A. Juss	Neem tree	Meliaceae	Leaf, Bark	Taste	Malaria
2.	Awogba arun	<i>Petiveria alliacea</i> L.	Congo root	Phytolacaceae	Stem bark	Taste	Malaria
3.	Ewe tea	<i>Cymbopogon citratus</i> (DC.) Stapf	Lemon grass	Poaceae	Leaf	Taste	Malaria
4.	Ogbe akuko	<i>Heliotropicum indicum</i> L.	Cock's comb	Boraginaceae	Fruit	Shape	Mouth wash
5.	Aran	<i>Spigelia anthelmia</i> L.	Worm weed	Loganiaceae	Whole plant	Name	Memory enhancer
6.	Alupayida	<i>Uvaria picta</i> (Jacq.) Desv.	Dabra	Fabaceae	Leaf	Name	Magic/Voodoo
7.	Anikanwogbarun	<i>Anthocleista vogelli</i> Planch.	Cabbage tree	Gentianaceae	Leaf, Bark	Name	General remedy
8.	Ewuro	<i>Vernonia amygdalina</i> Delile	Bitter leaf	Asteraceae	Leaf	Taste	Malaria
9.	Afon	<i>Treculia africana</i> Decne.	Afr. breadfruit	Moraceae	Fruit	Shape	Miscarriage
10.	Jogbo	<i>Hyptis suaveolens</i> (L.) Poit	Bush tea	Lamiaceae	Whole plant	Taste	Malaria
11.	Eri-i-ljebu	<i>Vernonia colorata</i> (Wild.) Drake	Bitter tree	Asteraceae	Leaf, Root	Name	Poison antidote
12.	Oju ologbo	<i>Abrus precatorius</i> L.	Precatory-bean	Fabaceae	Leaf	Minty leaf tip	Cough/Expectorant
13.	Ose	<i>Adansonia digitata</i> L.	Baobab	Malvaceae	Fruit	Shape	Bladder disease
14.	Ato	<i>Chasmanthera dependens</i> Hochst.	Chasmanthera	Menispermaceae	Stem	Name	Bone fractures
15.	Ewe jokoje	<i>Cissampelos owariensis</i> P.Beauv. e)	Cissampelos	Menispermaceae	Leaf	Name	Magic/Voodoo
16.	Ewe aje	<i>Myrianthus arboreus</i> P. Beauv.	Cork wood	Urticaceae	Leaf	Name	Business booster
17.	Eegun eja	<i>Phyllanthus muellarianus</i> (Kuntze) E	Myrobalan	Phyllanthaceae	Stem, Leaf	Thorns	Skin diseases
18.	Abiwere	<i>Hybanthus enneaspermus</i> (L.) F. M	Spade flower	Violaceae	Whole plant	Name	Easy delivery
19.	Ijebo	<i>Entandrophragma utile</i> Dawe & Spra	Utile	Meliaceae	Bark, Root	Colour	Blood tonic
20.	Emi	<i>Vitellaria paradoxa</i> C.F. Gaertn.	Shea butter	Sapotaceae	Seed	Colour	Nasal congestion
21.	Gbogbonse	<i>Uvaria afzelii</i> Scott-Elliot	Cluster pear	Annonaceae	Root, Fruit	Name	General remedy
22.	Irosun	<i>Baphia nitida</i> Lodd.	Cam wood	Fabaceae	Leaf	Name	Tooth decay
23.	Ira-Odan	<i>Bridellia ferruginea</i> Benth	-	Phyllanthaceae	Stem	Name	Mouth wash
24.	Abeere-oloko	<i>Bidens bipinnata</i> L.	Marigold	Asteraceae	Fruit	Name	Easy delivery
25.	Owo	<i>Lophira alata</i> Banks ex C.F. Gaertn	Iron wood	Ochnaceae	Leaf	Name	Respect/Favour
26.	Sawerepepe	<i>Cyathula prostata</i> (L.) Blume	Pasture weed	Amaranthaceae	Whole plant	Name	Pain relief
27.	Odundun-owo	<i>Emilia coccinea</i> (Sims) G. Don.	Emilia	Asteraceae	Leaf	Name	Malaria/Jaundice
28.	Oro-wewe	<i>Euphorbia laterifolia</i> Schum & Thonn	-	Euphorbiaceae	Leaf, Root	Colour of late:	Ear infections
29.	Fuyafuya	<i>Lapartea aestuans</i> (L.) Chew.	Indian woodnette	Urticaceae	Whole plant	Name	Stops bedwetting
30.	Ibo	<i>Landophia hirsuta</i> (Hua) Pichon	Ibo tree	Apocynaceae	Stem	Name	Erectile dysfunction
31.	Okikan	<i>Spondias mombin</i> L.	Yellow mombin	Anacardiaceae	Leaf	Name	Placenta evacuation
32.	Abere	<i>Parinari</i> sp. Aubl.	-	Chrysobalanaceae	Fruit	Name	General favour
33.	Isirigun	<i>Carica papaya</i> L.	Pawpaw	Caricaceae	Leaf, Latex	Colour	Lactation
34.	Patanmo	<i>Mimosa pudica</i> L.	Sensitive plant	Fabaceae	Whole plant	Name	To prevent wastefulness
35.	Akomu	<i>Pycnanthus angolensis</i> (Welw.) Warl	Wild nutmeg	Myristicaceae	Bark	Name	To prevent sore gum
36.	Ojiji	<i>Dalbergia lactea</i> Vatke	-	Fabaceae	Stem	Shape	Skin diseases
37.	Alawefon	<i>Sterculia tragacantha</i> Lindl	-	Malvaceae	Leaf	Sticky leaves	Dysentery/Pile
38.	Odundun	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Resurrection plant	Crassulaceae	Leaf	Shape	Fever/Ear ache
39.	Sagere	<i>Strophanthus hispidus</i> DC.	Br. Strophanthus	Apocynaceae	Stem	Name	Rheumatism/Stroke
40.	Atare	<i>Aframomum melegueta</i> K. Schum	Alligator pepper	Zingiberaceae	Fruit	Seed set	Prevents miscarriage
41.	Apata	<i>Microdesmis puberula</i> Hook. F. Planch	Microdesmis	Pandaceae	Pod	Shape	General weakness
42.	Afefe	<i>Trema orientalis</i> (L.) Blume	Charcoal tree	Cannabaceae	Stem bark	Texture	Measles
43.	Pandoro	<i>Kigelia africana</i> (Lam.) Benth.	Sausage tree	Bignoniaceae	Fruit	Shape	Breast cancer
44.	Worowo	<i>Senecio biafrae</i> Oliv. & Hien	English spinach	Asteraceae	Leaf	Name	Blood tonic
45.	Oruwo	<i>Morinda lucida</i> Benth.	Indian mulberry	Rubiaceae	Leaf	Taste	Malaria
46.	Eekan ehoro	<i>Allophylus africanus</i> P. Beauv.	Afr. false currant	Sapindaceae	Leaf	Shape	Skin rashes
47.	Kankan ayaba	<i>Luffa cylindrica</i> M. Roem	Loofah	Cucurbitaceae	Fruit	Structure	Sponge

Table 2. Cont'd.

48.	Iseketu	<i>Sida acuta</i> Burm.f.	Wire weed	Malvaceae	Whole plan	Name	Treatment of ulcer
49.	Kukunduku	<i>Ipomoea batatas</i> (L.) Lam.	Sweet potato	Convolvulaceae	Tuber	Shape	Breast cancer
50.	Iyere	<i>Piper guineense</i> Schum. & Thonn.	Afr. black pepper	Piperaceae	Fruit	Taste	Treatment of hypertension
51.	Akerejupon	<i>Sphenocentrum jollyanum</i> Pierre	Sphenocentrum	Menispermaceae	Root	Colour	Pile
52.	Iru	<i>Parkia biglobosa</i> (Jacq.) R.Br.ex Dor	Afr. locust bean	Fabaceae	Seed	Shape	Visual modality
53.	Eyin olobe	<i>Phyllanthus amarus</i> Schum. & Thonn	Phyllanthus	Phyllanthaceae	Leaf	Shape	Kidney stones
54.	Emi-ile	<i>Euphorbia hirta</i> L.	Asthma herb	Euphorbiaceae	Whole plan	Latex	Poison anti-dote
55.	Ahun	<i>Alstonia boonei</i> De Wild.	Pattern wood	Apocynaceae	Stem latex	Colour	Galactogogue
56.	Awusa/Asala	<i>Plukenetia conophora</i> Mull. Arg.	Afr. walnut	Euphorbiaceae	Root	Taste	Snake bite anti-dote
57.	Agbayun	<i>Synsepalum dulcificum</i> (Sch. & Th.)	Miracle plant	Sapotaceae	Fruit	Shape	Weight loss
58.	Oka-baba	<i>Sorghum bicolor</i> (L.) Moench.	Sorghum	Poaceae	Stem, Leaf	Colour	Blood tonic
59.	Elemi	<i>Dacryodes edulis</i> H.J. Lam	Bush pear	Bursaceae	Fruit	Structure	Kidney stones
60.	Orogbo	<i>Garcinia kola</i> Heckel	Bitter kola	Clusiaceae	Seed	Shape	Hepatoprotective

Where names of plants are cited as signatures, the local names refer to the medicinal applications.

both ancient and new episodes of human diseases.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Aworinde DO, Erinoso SM (2015). Ethnobotanical investigation of indigenous plants used in the management of some infant illnesses in Ibadan, Southwestern Nigeria. *African Journal of Traditional, Complementary and Alternative Medicines*, 12(1):9-16.
- Bennett BC (2007). Doctrine of Signatures: An explanation of medicinal plant discovery or dissemination of knowledge. *Economic Botany*, 61(3):246-255.
- Bennett BC, Baker MA, Gomez P (2002). Ethnobotany of the Shuar of Eastern Ecuador. *Advances Economic Botany*, 14:1-299.
- Dafni A, Lev E (2002). The Doctrine of Signatures in Present-Day Israel. *Economic Botany*, 56(4):328-334.
- Dafni A, Yaniv Z, Palevitch D (1984). Ethnobotanical survey of medicinal plants in Northern Israel. *Journal of Ethnopharmacology*, 10(3):295-310.
- Erinoso SM, Aworinde DO (2012). Ethnobotanical survey of some medicinal plants used in traditional health care in Abeokuta areas of Ogun State, Nigeria. *African Journal of Pharmacy and Pharmacology*, 6(18):1352-1362.
- Gbile ZO (2002). Vernacular names of Nigerian plants (Yoruba), 2nd Edition, Forestry Research Institute of Nigeria, Ibadan. Molukom Press, Ibadan. 101p.
- Hocking GM (1977). The Doctrine of Signatures. *Quarterly Journal of Crude Drug Research*, 15(4):198-200.
- Kumath V (2015). "Doctrine of Signatures": An age old theory with special reference to some Ayurvedic medicinal plants. *Journal of Laboratory and Life Science*, 1(1):45-53. Available at: <http://www.jolsc.com/volume1-first-issue/V1-11-5-45-53.pdf>
- Lev E (2002). The doctrine of signatures in the medieval and Ottoman Levant. *Vesalius*, 8(1):13-22.
- Nyazema NZ, Njdamba J, Anderson C, Makaza N, Kaondera KC (1994). The Doctrine of Signatures or Similitude: A Comparison of the Efficacy of Praziquantel and Traditional Herbal Remedies Used for the Treatment of Urinary Schistosomiasis in Zimbabwe. *International Journal of Pharmacognosy*, 32(2):142-148.
- Oso BA (1977). Mushrooms in Yoruba mythology and medicinal practices. *Economic Botany*, 31(3):367-371.
- Richardson-Boedler C (1999). The Doctrine of Signatures: a historical, philosophical and scientific view (I). *British Homoeopathic Journal*, 88(4):172-177.
- Saifullahi U, Ahmed A, Abdulhamid Z (2017). Hausa plant systematics and doctrine of signature. Book of Abstracts, 25th Annual Conference of the Botanical Society of Nigeria (BOSON), Usman Danfodio University, Sokoto, Nigeria: 2nd - 6th July, 2017. Available at: <http://bosonudus.udusok.edu.ng/#menu3>