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Indigenous vegetables consumed as *lalapan* by Sundanese ethnic group in West Java, Indonesia: Potential, traditions, local knowledge, and it's future

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ABSTRACT

The local knowledge of indigenous people about traditional vegetables has been well documented. However, there is little conventional plant documentation biodiversity on indigenous vegetables used as lalapan in West Java, Indonesia. The method used in this study was a qualitative method using an exploratory approach. Informants, including traditional leaders, indigenous people, and the Sundanese younger generation, provided data. Credibility, transferability, dependability, and confirmability tests were used to determine the data validity. The data were evaluated using data reduction, visualization, and verification techniques. Then, to show the local importance of each species, Relative Frequency of Citation (RFC) analysis was conducted, and The usage value (UV) analysis was used to determine the relative usefulness of plants in a given location. There were 86 species of edible indigenous vegetables consumed as lalapan, which belong to 32 families. The vegetables were accumulated from four traditional villages. The implication of indigenous vegetables as lalapan is a top priority to ensure nutrition, public health, and food security.

1. Introduction

Lalapan is a term used for indigenous vegetables consumed raw (Hendariningrum, 2018; Purba et al., 2013), especially by the Sundanese ethnic group of West Java. Edible plants that become lalapan or "fresh vegetables" may be certain wild plants eaten by humans or deliberately taken to become cultivated plants (Guerrero, 2015). Lalapan is usually served with rice and other side dishes. Lalapan is similar to salads, and some varieties are raw or fresh; others must be cooked before consumption. The Sundanese people's everyday diet is nearly inseparable from lalapan (Hendariningrum, 2018). Even when the main dish is not available, lalapan is used to substitute for the main dish by adding some sauce. Such presentation of food has become a tradition and habit of the Sundanese people, especially Sundanese people who live in traditional villages, which are rural areas whose people still maintain and uphold the customs of their ancestors.

Various kinds of plants used by the Sundanese people as salad plants are scattered in every area, especially West Java which the Sundanese people dominate. As researched by Cahyanto et al. (2018), 50 species of plants are used by the Sundanese people in the Subang Regency, grouped into 19 tribes. Then, the results of Cita's research (2020) show that people in Nyangkewok Village, Sukabumi Regency, consume various types of lalap plants consisting of 101 plant species, most of which are dominated by plants with the Cucurbitaceae tribe. Based on the types of plants used in the two areas, there are some similarities to several kinds of plants used in the two regions, namely the number of 27 types of vegetables that are the same between the results of the research by Cahyanto et al. (2018) and Cita (2020).

Then, similar research in addition to those carried out in the two regions has also been carried out in Kampung Gunung Walang and Kampung Leuweung Kolot, Bogor Regency (Amrinanto et al., 2019). The results of the research by Amrinanto et al. (2019) explained that in the two villages, there are 21 types of plants about the number of plants used as salads. The most consumed vegetables were: Cucumbers (Cucumis sativus); Long beans (Vigna unguiculata); Cassava (Manihot esculenta); Cabbage (Brassica oleracea); Poh-pohan (Pilea melastomoides); and Petai (Parkia speciosa). Consumption of fresh vegetables in these two villages is quite intense, carried out by both children and adults. Therefore, the examination results of the respondent's blood samples showed the high content of carotene in the blood, which is very important to support and protect human health; this is one of the factors driving the consumption of fresh vegetables among children adults.

The Sundanese people's consumption of fresh vegetables is a positive habit in maintaining health through a healthy diet. The fitness supported by consuming fresh vegetables cannot be separated from

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the active ingredients of these vegetables. The content of active ingredients in general in the form of flavonoids, terpenoids, antioxidants, and masterols have been identified in petai (P. speciosa) (Buanasari et al., 2017; Chhikara et al., 2018; Saleh et al., 2021; Singhania et al., 2021) and cucumber (C. sativus) (Uthpala et al., 2020; Uzuazokaro et al., 2018) which have anti-inflammatory, anti-hyperglycemic, and anti-microbial properties. Then, similar compounds were also found in cabbage (B. oleracea) (Cartea et al., 2011) and long beans (V. unguiculata) in addition to -sitosterol, ethanolamine, phytol, and phytosphingosine (Perchuk et al., 2020). In other indigenous communities, such as Pakistan, Paeonia emodi has antioxidants (Ahmad et al., 2018b).

In Indonesia, there are traditional ethnic groups that have clearly-defined cultural characteristics and identities, so, likely, people's perceptions and conceptions of natural resources in their environment are different (Dewi et al., 2017). The cultural diversity of the Indonesian people is evident in kampung or villages, as well as within ethnic groups. Each region has an identity that characterizes its uniqueness (Hidayat et al., 2010). East Priangan, which is part of the West Java region, has traditional villages well known by the public and have been recognized by the government. A traditional village is a village that has ethnic characteristics with its own local culture and customs. The traditional villages in East Priangan include Naga Village in Tasikmalaya Regency (Harashani, 2018; Sudjatnika, 2018), Kuta Village in Ciamis Regency (Illiyani, 2018), and Pulo Village and Dukuh Village that are both in Garut Regency (Hidayat et al., 2010). The traditional villages in the East Priangan area are well-known for their local communities, still strong in their time-honored traditions and local knowledge (Harashani, 2018). West Java Province itself is also known as 'Tatar Sunda'. 'Tatar' has the meaning of a region with a strong culture that is still adhered to by it's people.

The existence of a traditional village is always synonymous with the ties between ancestral origins, ceremonies, arts, and its organizational system, making traditional villages in each region different (Hidayat et al., 2010; Qodariah and Armiyati, 2013). The difference includes the utilization and relationships between plants, animals, and nature as part of their life. The traditional villages in East Priangan are Sundanese local identity, thus making these villages different from traditional villages in other regions. One of the distinguishing elements lies in natural resources and human resources (Alves, 2016; Hadi and Takaoka, 2018). Geographically, Tatar Sunda, located in the West Java region, is surrounded by mountains and mountains that make the land of Sunda so fertile and overgrown with various types of plants (Hendariningrum, 2018).

The biodiversity in Tatar Sunda is a local resource for the surrounding community. The reciprocal interaction between humans and nature or their local ecosystem makes humans indigenous people (Harashani, 2018; King et al., 1996), humans who utilize and manage indigenous natural resources. Human action in treating nature depends on various individuals or communities understanding or perceiving nature. In general, indigenous people or traditional communities utilize and manage natural resources always based on a local knowledge system, commonly known as indigenous knowledge (Hidayat et al., 2010; Sujarwo and Caneva, 2016b). The local genius of local people with a belief system called 'worldview' can create an adaptive management system to utilize natural resources sustainably (Padhy et al., 2017; Wilson et al., 2017).

Therefore, there is a great need to integrate the people's knowledge in traditional villages with indigenous expertise from generation to generation. It remains a common challenge when indigenous knowledge can advance and improvise the quality of human life and the quality of the surrounding environment (Sujarwo et al., 2016a). For this reason, it is considered essential to develop adaptive skills and the ability to apply knowledge and skills flexibly and creatively in different situations. It is hoped that the indigenous knowledge of local communities, especially indigenous people, can be followed up through social interaction, reflection, and learning (Mokgaya, Mushaphi, and Tshikhawe, 2019; Negi et al., 2017).

Several countries, such as Japan, Pakistan, Kenya, China, India, Italy, Thailand, and Turkey, have documented indigenous vegetables (medicinal plants, edible wild plants, and green vegetables (Abbasi et al., 2013; Tufts et al., 2015; Uchiyama et al., 2017; Dalar et al., 2016; Bhatia et al., 2018; Guarrera and Savo, 2016; Kang et al., 2014; Birjees et al., 2020; Nazish et al., 2020; Majeed et al., 2021). Many studies have shown that ethnic food sources can diversify diets and improve health attributes (Dansi et al., 2016; Saba et al., 2018; Rehman et al., 2014). However, there is still little documentation of the biodiversity of traditional plants, especially indigenous vegetables, which are used as lalapan in Tatar Sunda, Indonesia. The implications of indigenous vegetables as lalapan as a top priority to ensure nutrition, public health, and food security are still not widely documented. For this reason, it is essential to provide information about indigenous vegetables consumed as lalapan as material to study the local potential of the local knowledge in traditional villages and about their future.

2. Methods

The study's data gathering methodologies include data validation, observation, and interviews (Creswell and Creswell, 2018; Sugiyono, 2017). Credibility, transferability, dependability, and confirmability tests are all included in the data validity test (Lincoln and Guba, 1985; Thomas and Magilvy, 2011). Triangulation is used to determine the authenticity of data sources, data collection procedures, and data collection. Then examined findings for transferability to ensure that the research findings were thorough, precise, organized, and correct. Then, we undertook the dependability test by auditing the entire study process. Thus, specialists might conduct confirmability tests to strengthen the objectivity of the research (Moran-Ellis et al., 2006). The observation step entails making direct observations of data sources in the four traditional villages of eastern Priangan in the form of flora present in the surrounding environment (Sugiyono, 2017). Interviews were done utilizing a semi-structured technique with informants comprising traditional leaders, indigenous peoples, and the younger generation who live in the four traditional villages of eastern Priangan (Sugiyono, 2017). The interview sample was chosen using a technique known as purposive sampling (Creswell and Creswell, 2018). They consider that the informants in the model are familiar with the use of edible plants as salads in East Priangan's four traditional villages. Additionally, researchers collected plant samples for laboratory morphological identification.

We carried out data analysis techniques, including data reduction, presentation, and verification. Data reduction is made by summarizing, selecting the main parts, focusing on the essential things, looking for themes and patterns, and discarding unnecessary ones. After the data is reduced, the next step is to present the data in this study; the information is presented in tables, pictures, and narrative text. Finally, according to Miles and Huberman in Sugiyono (2015), the third step in qualitative data analysis is drawing conclusions and verification. And then, we will present the findings in this study after the data analysis stage has been completed and the data collected has been saturated. Then, to show the local importance of each species, Relative Frequency of Citation (RFC) analysis was carried out, and to determine a quantitative index to evaluate the relative usefulness of plants in an area, conducted use value (UV) analysis (Tardio and Pardo-de-Santayana, 2008; Ahmad et al., al.,2020; Bahadur et al., 2020). Relative frequency of citation (RFC) (Bahadur et al., 2020), which shows the local importance of each species, results from the equation:

$$RFC = \frac{Fc}{N}$$

Fc is the number of informants who mentioned the use of the species; *N* is the number of informants. The RFC has a value of 0–1.

Use value (UV) is a quantitative index to evaluate the relative usefulness in an area. It helps show which plants are most widely used to treat diseases in that area. High UV values indicate the main types of plants that are used as medicinal plants (Tardío and Pardo-de-Santayana, 2008; Fatima et al., 2018; Yaseen et al., 2019; Hussain et al., 2021). The following formula can calculate use value (UV):

$$UV = \frac{\Sigma Ui}{N}$$

Ui denotes the specific use of a plant species; *N* is the number of informants involved.

We also conducted correlation analysis to discover the correlation between the level of knowledge about indigenous vegetables and the age of indigenous people in indigenous villages in the East Priangan region (Chen and Popovich, 2011). To know the prospects of indigenous vegetables, an analysis using VOSviewer includes determining keywords, searching data in databases, selecting articles, validating data, and analyzing data (Van Eck and Waltman, 2010). Meanwhile, plant nomenclature was based on Flora Van Java (Backer and Bakhuizen Van Den Brink, 1968), with the author abbreviation following the Integrated Taxonomic Information System (ITIS, 2012).

3. Result and discussion

Indigenous knowledge found in indigenous village communities in East Priangan included local knowledge, understanding of customs and habits, nature, and how to build good relationships with all of them. Geographically, Kuta Village is located at the coordinates of 7° 1613S, 108°3348E. Kuta Village is located separately from other villages because it is situated in a valley surrounded by perpendicular cliffs, which at the same time separate the village or become a boundary with other villages. The cliffs surrounding Kuta Village in the north, west, and south look like a fort that protects the village if you look from the inside of Kuta Village. As a valley area, Kuta Village is a fertile area with hilly and valley relief forms.

Meanwhile, Dukuh Village is at the coordinates of 7°3380S, 107° 41762E. The topography of this traditional village is a valley bordering the Cimangke River to the east and the Cisarangan River to the west; to the north, the village is bordered by Tutupan Forest and Titipan For Pulo Village is located at the coordinates of 7°611S, 107°557E, on a small island that extends from west to east with 16.5 ha. Naga Village is in a fertile valley flanked by hills and is traversed by a river that has spring on the mountains, with coordinates 7°2142S, 107°5935E. In terms of topography, Naga Village has highlands and lowlands.

Nearly 72 percent of all indigenous people in East Priangan belong to a lower-middle-income group. They live depending on the agricultural sector as their primary source of income. The location of the traditional villages near or directly adjacent to the forest and rice fields is strongly tied to their employment as a farmer. The following is a general description of the area and community of Naga Village, which is presented in Fig. 1.

Edible plants that are consumed as lalapan are broadly divided into two groups. The first group is a type of vegetable deliberately planted as the property boundary, living fence, landslide barrier, green manure, ornamental plant, or medicinal plants in the garden. The second group is indigenous vegetables consumed as lalapan that grow wild, including plants that grow in the wild, such as mountains or forests, rice fields, gardens, or grasslands.

Sujarwo et al. (2016a) classified edible plants into wild edible plants, semi-wild edible plants, and cultivated edible plants. The status of wild plants changed to cultivated plants when the indigenous villagers deliberately planted them in their house yards. The good practice of local people in the four traditional villages in East Priangan is cooperation in a family manner. Each family makes it a habit of planting different types of plants in the garden or yard to complement the diverse needs of plants. The local people in the traditional villages also make it a habit to share information when they have experiences obtained by trial and error, such as experiences regarding processing meth benefits, and specific recipes of herbal concoctions. This habit is passed down from generation to generation from their ancestors. The knowledge of plant usage, on the other hand, emerged in tandem with human civilization as a result of generations of hands-on experience with plants (Jan et al., 2011). Based on the interviews, the majority of informants had a positive response to indigenous vegetables in the form of wild plants that can be eaten

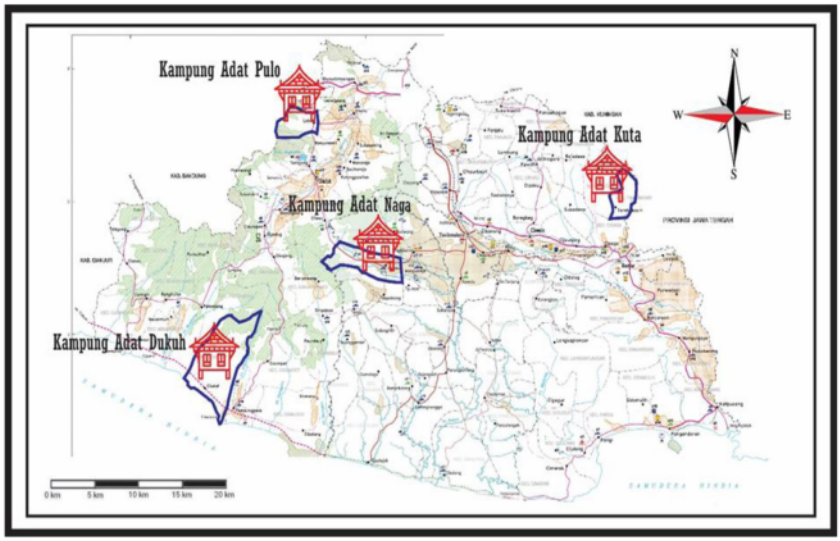

Fig. 1. Map of the area of Pulo Village, Kuta Village, Naga Village, and Dukuh Village in Priangan Timur, West Java.

as healthy and safe food, which is part of traditional food culture. Traditional knowledge in East Priangan is similar to Kaghan Valley; Mansehra, Pakistan, believes that plants are essential for their life (Jamal et al., 2012).

3.1. Potency

The data collected from the four traditional villages, Pulo Village, Kuta Village, Naga Village, and Dukuh village, are presented in Table 1. Identified the collected specimen data morphologically to determine some of the characteristics of the specimens, including family, species name, local name, edible parts of plant organs, its benefits based on the local knowledge of indigenous people, how to eat it, whether it can be eaten fresh or requires prior processing, habitus, the status of the plant whether it is obtained from the wild or has been cultivated by local people, and habitat type. The use-value (UV) and RFC (Relative Frequency of Citation) were calculated from these results.

The collection of data on edible indigenous vegetables consumed as lalapan at the four traditional villages showed the result of 86 species belonging to 32 families. Five species were intensively consumed as lalapan by the local people of the traditional villages in East Priangan based on the RFC value. The five plants were bonteng or cucumber (Cucumis sativus L.), whose fruit was consumed with RFC value = 0.90; sampeu or cassava (Manihot esculenta Crantz) whose leaves were consumed with RFC value = 0.86; papaya (Carica papaya L.) with RFC value = 0.83; genjer or yellow velvetleaf (Limnocharis flava L.) with RFC value = 0.71; and surawung or basil (Ocimum basilicum L.) with RFC value = 0.61. Some traditional vegetables had no clear definition due to their ambiguity. It was rather difficult to count and include them in the list of existing indigenous vegetables.

The edible indigenous plants' vegetable data are consumed as lalapan at the four traditional villages are similar to previous study in indigenous communities in Pakistan (Shaheen et al., 2017; Malik et al., 2018; Bahadur et al., 2020; Tariq et al., 2020;). Meanwhile, in Pakistan, the plants use as medicinal treatment such as to treat musculoskeletal disorders (Malik et al., 2018a), hypertension treatment (Malik et al., 2018b), kidney stones treatment (Ahmad et al., 2018a), diabetes (Mahmood and Mushtaq, 2014; Abidin et al., 2018), herbal drinks (Rashid et al., 2018) or cosmetics (Ahmad et al., 2008) among indigenous communities in Pakistan. In Pakistan, edible plants and weeds are used for medicinal treatment, such as Convolvulaceae (Ashfaq et al., 2018). It is shown that indigenous plants benefit from indigenous knowledge in different communities.

Family classification of edible indigenous vegetables consumed as lalapan in four traditional villages in East Priangan can be seen in Fig. 2. Most of the edible indigenous vegetables consumed as lalapan were from the family Fabaceae, as many as ten species (13%). Nkonki et al. (2013) explained that the species of family Fabaceae are primarily nuts, which are the most nutritious food source. In other scientific studies, it turns out that this family produces a high diversity of secondary metabolites that function as compounds that avert herbivores and microbes and also as signaling compounds to attract pollinators and fruit-eating animals (Wink, 2013). Without them knowing the definition of secondary metabolites, the habit of eating fresh vegetables requires local people to cultivate edible plants as lalapan by planting them around the house or the village to meet their daily food needs.

Meanwhile, the least utilized families included Acanthaceae, Alismataceae, Amaranthaceae, Arecaceae, Portulacaceae, Caricaceae, Gnetaceae, Lecythadaceae, Moringaceae, Musaceae, Primulaceae, Pontederiaceae, Talinaceae, Theaceae, Woodsiaceae, and Xanthorrhoeaceae. The percentage of the use of vegetables from this families was 1%. Only a few people, generally adults and the elderly, ate lalapan from these families. The main reason was to meet daily needs as the primary food supplement and for other benefits such as herbal medicine or other health benefits.

Some parts of the plant that can be used as lalapan include young shoots and leaves, flowers and whorls, raw fruit, ripe fruit and seeds, tuber, bark, and skin of tuber. Lalapan in leaves (especially young leaves) ranked the most, with 62 species. These findings were in line with research by Cahyanto et al. (2018) on the Sundanese people in Subang Regency that at least people used 50 types of plants as lalapan, and 33 types of them were consumed raw or without going through the cooking process first. Furthermore, from 50 types of plants, the leaves of 32 of them were used for lalapan, which are consistently consumed with daily food.

The use of leaf parts of plants is indirectly based on the fact that the leaves of plants used as lalapan contain more essential elements such as vitamin B9, which plays a role in cell growth, prevents anemia, and helps the formation of red blood cells. Apart from containing vitamin B9, green vegetables also contain sufficient amounts of vitamin K, which plays a role in blood coagulation and prevents bleeding. Then, green vegetables contain other nutrients such as inositol (which plays a role in protecting the liver, heart, and digestive system), carotenoids, and provitamins that maintain the health of cells and body tissues (Butnariu and Butu, 2015).

Meanwhile, parts of edible plants used as lalapan include fruit, leaves, and nuts (Madison, 2008). In the Women Jungle Survival Course (2019), the parts of edible plants that can consume generally include leaves and young stems or stalks, which are usually greener and softer. Older plants are generally more bitter and rough. Roots and tubers are recommended to be selected from the larger plant. Especially in vines, there is a part in the root stem that can eat after tasting it first. It is advisable to choose fruits, nuts, seeds, and grains that are ripe, soft, contain less sap, and are bright in color.

3.2. Tradition

Classically, indigenous villagers in Priangan Timur, West Java, are familiar with lalapan (Amrinanto et al., 2019b; Hendariningrum, 2018). Their ancestors passed down the tradition of eating fresh vegetables since time immemorial. From generation to generation, the life of this classical community has a close interaction with resources and the environment, inheriting the traditional lifestyle that their ancestors lived. This conventional lifestyle then forms traditional wisdom.

Traditional wisdom is identified with human habits, nature, and the relationship between all inhabitants of the ecological community (Jaiswal, 2019; Makondo and Thomas, 2018). Consumption of plant species as lalapan is also identified with those three things. The indigenous villages know lalapan in the form of fresh vegetables eaten raw or cooked first to complement rice, side dishes, and sambal in their daily eating habits. Sambal is a sauce made from a mixture of chilies, tomatoes, galangal, garlic, shallots, sugar, salt, and shrimp paste. An example of a dish of lalapan with sambal is presented in Fig. 3.

Apart from being eaten raw with sambal, indigenous people in East Priangan are also accustomed to eating fresh vegetables as pecel (Hendariningrum, 2018). Pecel (Fig. 4a) is fresh vegetables (lalapan) that are boiled first, then mixed with peanut sauce that has been seasoned with spices like galangal. Sometimes, the term 'pecel' is replaced with 'karedok' (Fig. 4b), when the cooked lalapan are mixed in chopped raw lalapan. An example of a dish of lalapan as pecel is presented in Fig. 4. The concept of indigenous vegetables is also applied in several countries with dishes that are made to be appetizing, which differ in preparation techniques such as frying, making soup, or boiling for a long time (Łuczaj et al., 2013).

Consumption of raw vegetables is synonymous with salads. Consuming salads shows a close relationship with the concept of diet, so it is very promising to increase the consumption of salad as part of the diet (Pieroni et al., 2015). Lalapan benefits health and skin because it contains nutrients, including β-carotene (Amrinanto et al., 2019a). Even Martins et al. (2011) explained that edible vegetables are nutritionally balanced.

Table 1
List of Potentially *lalapan* vegetables in Kampung Adat Priangan Timur.

Number	Family/ Species	Local Name	Parts used	Usability	Application	Habitus	Wild / Cultivated Status	Habitat Type	UV	RFC
	Acanthaceae									
1.	*Staurogyne elongata* Kuntze	Reundeu	FOL	hypertension medication	ED	HR	WL	MT; GD; FR; YRD; FR	1	0.33
	Alismataceae									
2.	*Limnocharis flava* L.	Genjer	FOL; CAU	cholesterol medication	B; ED	HR	WL	PL; FR	0.5	0.71
	Amaranthaceae									
3.	*Amaranthus hybridus* L.	Bayem	FOL; CAU		B; S	HR	CV	GD; YRD; FR		0.27
	Anacardiaceae									
4.	*Anacradium occidentale* L.	Jambu mede	FOL	Stomachache Medicine; Medicine for vaginal discharge; Shrinking women's intimacy	ED	TR	CV	GD; YRD; FR	1.5	0.33
5.	*Mangifera indica* L.	Mangga	FOL		ED	TR	CV	YRD; SRD; GD		0.02
6.	*Bouea macrophylla* Griff.	Gandaria	FOL		ED	TR	CV	FR; GD; FR		0.02
7.	*Mangifera kemanga*	Kemang	FOL		ED	TR	CV	FR		0.02
8.	*Spondias dulcis* Parkinson	Kadongdong	FOL		B	TR	CV	YRD		0.13
	Apiaceae									
9.	*Centella asiatica* (L.) Urban	Antanan gondrong/ Kurawet galeung	FOL; CAU; RAD	For herbs; Blood booster medication; Ulcer medicine; wound medicine; Reduces cholesterol; Rheumatism medicine	ED	HR	WL	FR; MT; GD	0.5	0.49
10.	*Monochoria vaginalis* (Burm. f.) C. Presl ex Kunth	Antanan alit/ antanan beurit	FOL; CAU; RAD	treat jaundice; liver with edema; urinary tract infections; coughing; shortness of breath; mouth sores, sore throat; and ear infections	ED	HR	WL	FR; MT; GD	0.5	0.49
11.	*Daucus carota* L.	Wortel	RAD	eye medicine	ED; B	HR	CV	FR; GD	0.5	0.07
12.	*Eryngium foetidum* L.	Walang geni/ Walang sangit	FOL	To lower cholesterol; Lowering high blood pressure	ED; B; S	HR	WL	YRD; FR; GD	2	0.07
13.	*Oenanthe javanica* DC.	Tespong	FOL		ED	HR	WL	PK, FR		0.12
	Arecaceae									
14.	*Cocos nucifera* L.	Umbut Kalapa	CAU		B	TR	CV	FR		0.02
	Araliaceae									
15.	*Hydrocotyle sibthorpioides* Lamb.	Antanan alit	FOL	Blood booster	ED	HR	WL	FR	1	0.03
16.	*Polyscias fruticosa* (L.) Harms	Kadongdong cina/ Imba	FOL	For body aches; Increase appetite	ED; B	PR	CV	GD; SRD; YRD	0.6	0.11
17.	*Polyscias scutellaria* (Burm.f)	Mamangkokan	FOL		B; S	PR	CV	YRD; SRD; GD		0.05
	Asteraceae									
18.	*Conyza sumatrensis*	Jalantir	FOL	Wound medicine	ED	PR	WL	FR; GD	1	0.13
19.	*Emilia sonchifolia* DC.	Jonge	FOL		ED	HR	WL	GD; FR		0.33
20.	*Lactuca sativa* L.	Saladah bokor	FOL		ED	HR	CV	YRD; GD; FR		0,11
21.	*Cosmos coudatus* Kunth.	Randa midang	FOL	Drugs for vaginal discharge	ED; B	PR	CV	YRD; SRD; GD	1	0.07
22.	*Gynura divaricata* L.	Seupan lentah	FOL		ED	HR	WL	FR		0.03
23.	*Bidens pilosa* L.	Ketul	FOL	Health potion	ED; B	HR	WL	GD; MT		0.02
24.	*Spilanthes paniculata* Wall. ex DC.	Jotang	FOL	To warm the throat	ED	HR	WL	YRD; GD; MT; FR; SRD	1	0.17
25.	*Crassocephalum crepidioides* (Benth.) S. Moore	Sintrong/Bagelis	FOL	Cholesterol drugs	ED	HR	WL	GD; YRD	1	0.21
26.	*Pluchea indica* (L.)	Baluntas	FOL	Drugs for vaginal discharge	ED; B	PR	WL	GD; YRD	0.5	0.06
	Brassicaceae									
27.	*Brassica juncea* L.	Sawi	FOL		B	HR	CV	FR; GD		0.07

(*continued*)

Table 1 (*Continued*)

Number	Family / Species	Local Name	Parts used	Usability	Application	Habitus	Wild / Cultivated Status	Habitat Type	UV	RFC
28.	*Brassica juncea var rugosa* L.	Jabung	FOL		ED; B	HR	CV	GD		0.03
29.	*Brassica oleracea* L.	Kol	FOL		ED; B	HR	CV	FR; GD		0.19
30.	*Brassica pekinensia* L.	Pecai	FOL		B	HR	CV	FR; GD		0.15
31.	*Brassica rapa* L.	Sausin	FOL		ED; B	HR	CV	FR		0.29
32.	*Raphanus sativus* L.	Lobak	RAD		ED; B	HR	CV	FR		0.02
	Caricaceae									
33.	*Carica papaya* L.	Gedang	FOL; FR; FLO	Lowering high blood pressure; Increase appetite; Blood booster; Dengue medicine; Pain medicine for the body; Smooth digestion	B	PR	CV	GD; YRD; FR	0.75	0.83
	Convolvulaceae						CV			
34.	*Ipomoea batatas* (L.) Lam	Boled/Huwi	FOL	Raise platelets; Cholesterol drugs; Heat medicine; Hot / burn wound medicine	B; S	HR	CV	YRD; GD; FR	4	0.12
35.	*Ipomoea aquatic* Forsk.	Kangkung	FOL; CAU	Improves digestion; Sleep; Blood supplement	ED; B	HR	CV	PL; GD; FR	1.5	0.45
	Commelinaceae									
36.	*Commelina benghalensis* L.	Gewor	FOL; CAU; RAD		B	HR	WL	GD; RF; SRD		0.02
	Cucurbitaceae									
37.	*Cucumis sativus* L.	Bonteng	FRU	hypertension medication	ED	LN	CV	GD; FR; SRD; YRD	0.25	0.90
38.	*Cucurbita moschata* Duchesne	Waluh gede	FRU; FOL	hypertension medication	ED; B; S	LN	CV	FR; GD; YRD	0.5	0.45
39.	*Lagenaria siceraria* (Molina) Standl.	Leor	FRU	Fever medicine	B	LN	CV	GD; YRD	1	0.02
40.	*Luffa acutangula* (L.) Roxb	Emes (oyong)	FRU		B	LN	CV	GD; FR		0.02
41.	*Momordica charantica* Linn.	Paria/Pare	FRU; FOL	Medicine for headache	B	LN	CV	FR; MT; GD	1	0.43
	Euphorbiaceae									
42.	*Cnidoscolus aconitifolius* (Mill.) I.M. Johnst	Chaya-chaya	FOL		B; S	PR	CV	GD; YRD; SRD		0.06
43.	*Euphorbia hirta* L.	Nanangkaan	FOL	Drugs for vaginal discharge	ED	HR	WL	GD	1	0.02
44.	*Glochidion arborescens* Blume.	Mareme	FOL		ED	TR	CV	YRD; FR; GD		0.03
45.	*Manihot esculenta* Crantz	Sampeu	FOL	Blood booste; Ulcer medicine; Medicine for paralyzed pain; Wound medicine	B	PR	CV	GD; YRD; FR	0.2	0.86
46.	*Sauropus androgynus* (L.) Merr	Katuk	FOL	Eye medicine; Heat medicine; Streamlining breast milk	ED; B; S	PR	CV	YRD; GD; FR	0.3	0.29
	Fabaceae									
47.	*Sesbania grandiflora* (L.) Pers.	Kembang Turi	FLO		B; S	PR	WL	GD; SRD		0.03
48.	*Cajanus cajan* (L.) Huth	Hiris	FRU		ED	PR	CV	GD		0.03
49.	*Canavalia ensiformis* (L.) DC.	Koas	FRU		ED	HR	CV	GD		0.02
50.	*Leucaena leucocephala* (Lam.) de Wit	Peuteuy selong	FRU, FOL		ED	TR	CV	GD; YRD; SRD		0.24
51.	*Parkia javanica*	Peuteuy	FRU	Lowers cholesterol; Lowering high blood pressure	ED	TR	CV	GD; YRD	0.6	0.47
52.	*Pithecellobium lobatum Benth.*	Jengkol	FRU	Dry sugar medicine; Lowers cholesterol	ED; B	TR	CV	GD; YRD	0.6	0.62
53.	*Phaseolus lunatus* L.	Roay/Kratok	FRU		ED; B	LN	CV	GD; YRD		0.17

(*continued*)

Table 1 (*Continued*)

Number	Family/ Species	Local Name	Parts used	Usability	Application	Habitus	Wild / Cultivated Status	Habitat Type	UV	RFC
54.	*Phaseolus vulgaris* L.	Buncis	FRU		ED; B	LN	CV	GD; FR		0.09
55.	*Psophocarpus tetragonolobus* (L.) DC.	Jaat/Kecipir	FRU		ED; B	LN	CV	GD; FR; SRD		0.13
56.	*Vigna cylindrica* (L.) Skeels.	Kacang panjang/ Kacang turus	FRU; FOL		ED; B; S	LN	CV	SRD; FR; GD; YRD		0.58
	Gnetaceae						CV			
57.	*Gnetum genom* L.	Tangkil	FOL		B	TR	CV	GD		0.02
	Lamiaceae						CV			
58.	*Ocimum basilicum* L.	Surawung	FOL		ED	PR	CV	YRD; GD; FR		0.61
59.	*Plectranthus amboinicus* (Lour.) Spreng	Jinten	FOL		ED; B	HR	CV	GD; YRD		0.09
	Lecythidaceae									
60.	*Planchonia valida* Bl.	Putat/Jaha	FOL	Bloating medicine; Getting close to a woman's intimacy; Diarrhea medicine	ED	TR	WL	MT; GD; FR; YRD; FR	0.6	0.45
	Moraceae									
61.	*Artocarpus heterophyllus* Lam	Nangka (tongtolang)	FRU		B	TR	CV	GD		0.09
62.	*Ficus fistulosa* Reinw ex. Blume	Beunying	FOL		ED	TR	WL	GD; FR		0.02
63.	*Ficus sundaica* Blume.	Koang	FOL	Diarrhea medicine	B	TR	WL	FR; GD	1	0.03
	Moringaceae									
64.	*Moringa oleifera* L.	Kelor	FOL	Cure all diseases; Cholesterol drugs; Gout medicine; Rheumatism medicine	B; S	TR	CV	GD	2	0.03
	Musaceae									
65.	*Musa paradisiaca* L.	Ower /Jantung pisang	SPAT		ED; B	HR	CV	GD		0.02
	[59]eae									
66.	*Bambusa vulgaris* Schrad. ex J.C. Wendl	Iwung/Rebung	CAU		B	PR	WL	FR; GD		0.05
67.	*Zea mays* L.	Putri jagong	FRU		ED; B	HR	CV	FR; GD		0.03
	[56]ederiaceae									
68.	*Monochoria vaginalis* (Burm. f.) C. Presl ex Kunth	Eceng leutik/ Wewehan	FLO; CAU; FOL		B	HR	WL	RF; YRD; PL		0.02
	Portulacaceae									
69.	*Portulaca oleracea* L.	Krokot	FOL; CAU; RAD		B; S	HR	WL	GD; RF		0.02
	Primulaceae									
70.	*Ardisia elliptica* Thunb.	Ki lampeuni	FOL		ED	TR	WL	GD; FR		0.03
	Rubiaceae		[5]							
71.	*Paederia foetida* L.	Kahitutan	FOL	Bloating medication	ED; B	LN	[46]	SRD; GD; YRD	0.25	0.12
72.	*Morinda citrofolia* L.	Mengkudu	FOL	Pain medicine for the body	B	TR	CV	YRD; GD	1	0.03
	Solanaceae									
73.	*Solanum lycopersicum* L.	Kemir	FRU		ED	PR	CV	YRD; FR; GD		0.05
74.	*Solanum macrocarpon* L.	Terong buweuk	FRU		ED; B	PR	CV	GD; YRD		0.03
75.	*Solanum melongena* L.	Terong gelatik	FRU		ED; B	PR	CV	GD; YRD		0.53
76.	*Solanum nigrum* L.	Leunca	FRU; FOL		ED	PR	CV	YRD; GD; FR		0.49
77.	*Solanum torvum* Swartz	Takokak/magae	FRU	Diarrhea medicine; Itching medicine	ED; B	PR	WL	GD; SRD	1	0.17
	Talinaceae									
78.	*Talinum paniculatum* (Jacq.) Gaertn	Ginseng jawa	FOL; CAU	Pain medicine for the body	ED; B	HR	CV	GD; YRD	1	0.02
	Urticaceae									
79.	*Pilea trinervia* Wight.	Pohpohan	FOL		ED	HR	WL	MT; FR; GD; FR		0.25
80.	*Villebrunea rubescens* (Bl.) Bl.	Nangsi	FOL		ED	TR	WL	GD; FR		0.02
	Woodsiaceae									
81.	*Diplazium esculentum* (Retz.) Sw.	Pakis sayur	FOL		B; S	HR	WL	MT; FR; FR		0.03
	Xanthorrhoeaceae									
82.	*Aloe vera* Burm. f.	Lidah buaya	FOL		B	HR	CV	GD; YRD	2	0.02

(*continued*)

Table 1 (*Continued*)

Number	Family / Species	Local Name	Parts used	Usability	Application	Habitus	Wild / Cultivated Status	Habitat Type	UV	RFC
				treat heartburn; hair fertility						
	Zingiberaceae									
83.	*Alpinia galangan* L.	Laja	RHI	Pain medicine	ED	HR	CV	GD; YRD	1	0.02
84.	*Curcuma longa* L.	Koneng	RHI	Ulcer medication / lowering stomach acid	ED	HR	CV	YRD; GD	0.25	0.15
85.	*Etlingera elatior* (Jack)	Comrang/Rombeh	CAU		ED	HR	CV	GD		0.03
86.	*Kaempferia galanga* L.	Cikur	FOL	Swelling medicine	ED; B	HR	CV	YRD; GD	1	0.09

Description:
Parts used: CAU: caulis (stem); RHI: rhizoma (rhizome); RAD: radix (root); FOL: folium (leaves); FLO: flos (flower); FRU: fructus (fruit);. SPAT: spatha (sheath).
Application: ED: eaten directly; B: boiled; S: steamed.
Habitus: TR: tree; PR: perdu; LN: liana; HR: herbs.
Habitat Type: MT: mountain; FR; forest; RF: rice fields; YRD: yard; GD: garden; PL: Pool; SRD: side of the road.
Wild/Cultivate : CV: cultivation; WL: wild.

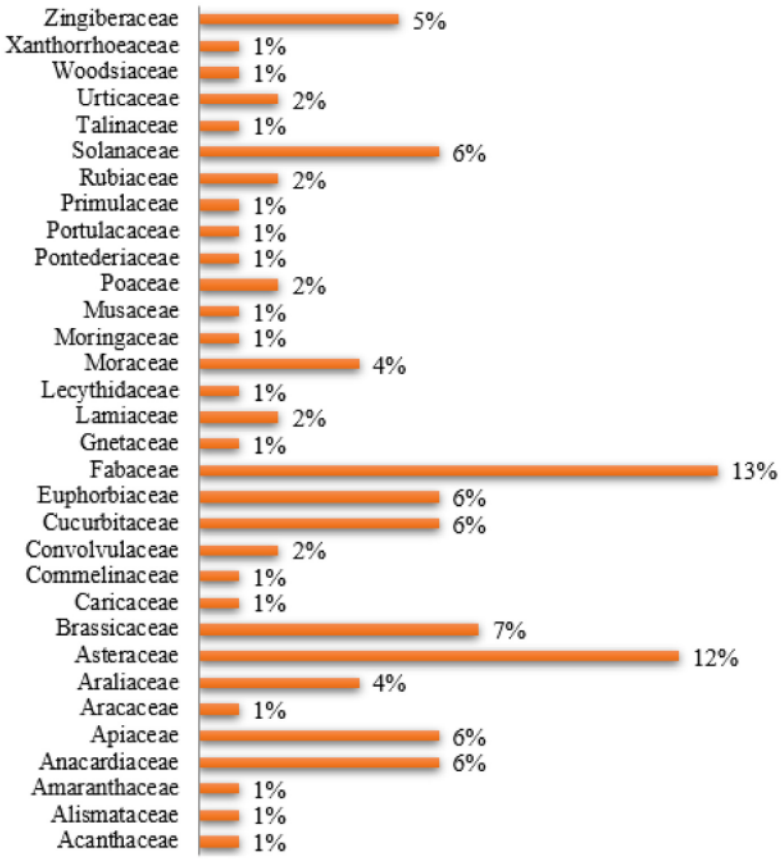

Fig. 2. Familia of edible indigenous vegetables that are consumed as *lalapan* in four traditional villages in East Priangan.

3.3. Local knowledge

The level of education of the local people at traditional villages in Priangan Timur was dominated by the elementary school level, so the people are considered to have a low level of education. However, the level of education of these indigenous people did not significantly influence the level of knowledge about edible and medicinal plants and their farming activities. The local genius of the indigenous people is obtained from their ancestors based on experiences. The tradition of eating indigenous vegetables has declined over the years.

Lalapan tended to be better known by women with an average age above 50 years. The well-known and perceived benefit stimulus

Fig. 3. *Lalapan* with *Sambal* as Sauce.

Fig. 4. *Lalapan* is served as *pecel* (A) and *karedok* (B).

is that some fresh vegetables have benefits as traditional medicines, which local people believe treat more than one disease. The correlation between the age of the informants in the traditional village and the level of knowledge about lalapan at four traditional villages in East Priangan has analyzed the value of α 0.05 (5%), as presented in Table 2.

Table 2 shows a significance value of 0.000, which was smaller than the value of α 0.05 and meant that there was a positive correlation between age and the people's level of knowledge about indigenous vegetables that were consumed as lalapan. The correlation coefficient (R) was 0.587, which was in the excellent category, and the coefficient of determination (R-squared) was 0.344 or equal to 34.4%. This coefficient meant that the age of the people contributed to the knowledge level variable by 34.4%. In comparison, the remaining 65.4% was the contribution of other variables that did not examine in this study. The contribution of these different variables was an error in this study. However, the results in Table 2 found that the coefficient of determination (R-Squared) was lower than the value of the contribution of other variables. Therefore, we can say that the contribution was low. The linear regression line is shown by a scatterplot (bivar) = X with Y in Fig. 5.

Based on the scatterplot presented in Fig. 5, a linearity line pattern can be seen between age and people's level of knowledge about indigenous vegetables consumed as lalapan. The dots on the plot indicate the amount of error from the correlation. The regression equation obtained from the analysis was $\acute{Y} = 9 + 0.1 * x$. The value of a was positive, meaning that if the age variable did not exist or were equal to zero, the level of knowledge would decrease. If the age were

Table 2
The results of the analysis of the correlation between age and the level of knowledge.

Model	R	R-Squared	Adjusted R-Squared	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.587[a]	.344	.330	1.182	.344	24.647	1	47	.000

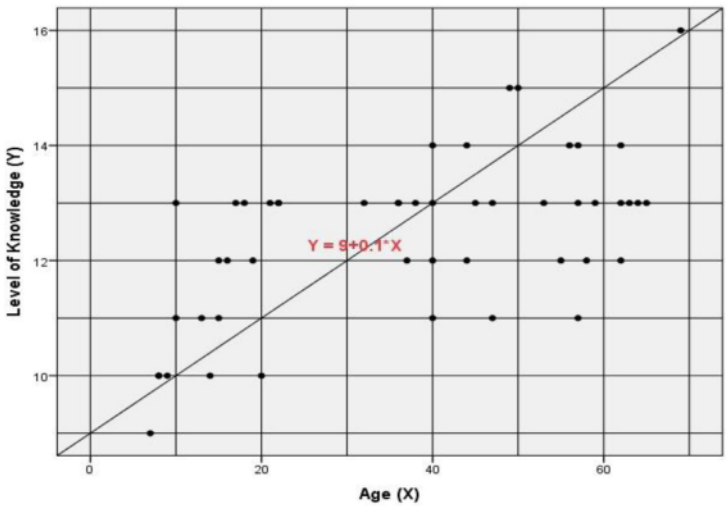

Fig. 5. Scatterplot with Regression Line.

increased by 1, the level of knowledge would increase by 0.1. This positive correlation could mean that if the age of the indigenous people of traditional villages we getting older, the level of knowledge would also increase. The results of the research conducted by Uchiyama et al. (2017) showed that the level of recognition of traditional vegetables correlated with the age of the respondents.

3.4. Future prospect

The use of plants in people's lives can be seen in tri-stimuli, namely, natural stimulus, beneficial stimulus, and religious stimulus (Zuhud et al., 2007). Natural stimulus in the form of people's innate knowledge about plants, valuable stimulus related to the benefits or interests of the people towards plants, and religious or spiritual stimulus is the willingness and morals of the people to take conservation actions.

The correlation between utilization and people related to the role of the stimulus leads to the interest in sustainable use. However, sometimes, igenous knowledge is undermined quickly. This loss of expertise negatively affects the lives and health of rural communities who live traditionally. For this reason, the preservation of igenous knowledge is essential. Dweba & Mearns (2011) argued that the transfer of indigenous knowledge about traditional vegetables would ensure the availability and utilization of this critical food source for resource-poor r communities. Chen & Qiu (2012) explained that the extraction of non-timber forest products is a way to create healthy socioeconomic relationships that depend on the surrounding biodiversity. The interaction of people with existing natural resources requires them to maintain indigenous knowledge to live in harmony with nature.

Indigenous vegetables are used as lalapan by the people in the four traditional villages and are not sold to people outside the traditional villages. They only plant on a small scale for personal consumption or share with neighbors in need. Most fresh vegetables and edible plant species with secondary functions as traditional medicines are grown and cultivated in gardens and yards.

Planting beneficial species in the yard is based on their function, for example, as a source of carbohydrates, protein, vitamins and minerals, medicinal plants, and others. This action is a form of conservation conducted by the local people that leads to natural stimuli, namely, the cultivation of edible plants consumed as lalapan. Local people only cultivate plants that are needed in their daily life. Meanwhile, the religious stimulus in terms of sustainable use of natural resources is a self-sacrificing attitude to realize conserving natural resources in the vicinity. A participatory approach by involving local communities in plant conservation activities is an excellent supporting factor (Ulian et al., 2017).

Scholars and stakeholders are increasingly attaching the importance to local wild foods to evaluate and assess local biocultural heritage (Pieroni et al., 2015). For prospects, it is crucial to make an effort to obtain the primary data that are needed for the preservation of potential plant use, both in terms of bioecology and cultivation techniques and exploration of beneficial active compounds. Another function related to the sustainability of indigenous vegetables is to protect flora (Uchiyama et al., 2017).

To discover the extent to which research on indigenous vegetables has been carried out to prospects around the world and to know research trends and research collaborations, We made a bibliometric map of science. Bibliometric indicators are knowledge t t can use to evaluate scientific research results. It is widely used to produce a mapping of fields of science and to track or trace the development of new knowledge in a particular area and is used as an indicator in the future in providing a more competitive advantage and in making strategic plans (Mallig, 2010; Leydesdorff and Rafols, 2012).

To obtain data on indigenous vegetables about prospects, We searched an international database, Scopus, for 2015–2020. The search results selected the collected journal articles to ensure that the articles matched the topics and keywords used. The search results obtained for articles that fit the topic were 398 articles. The data were obtained using the keywords of 'indigenous vegetable' and 'prospects'. The network visualization display is presented in Fig. 6.

Fig. 6 shows that reduced the resea trend on indigenous vegetables about prospects to 4 clusters. The vantage of VOSviewer over other analytical applications is that it uses a text-mining function to identify combinations of noun phrases relevant to mapping and an integrated clustering approach to examine data co-citation networks and co-occurrence. Interactive options and functions make this pr m accessible and easy to explore bibliometric data networks, such as the number of citations and co-occurrence relationships between key terms and concepts (Hofmann and Chisholm, 2016; Miner et al., 2012).

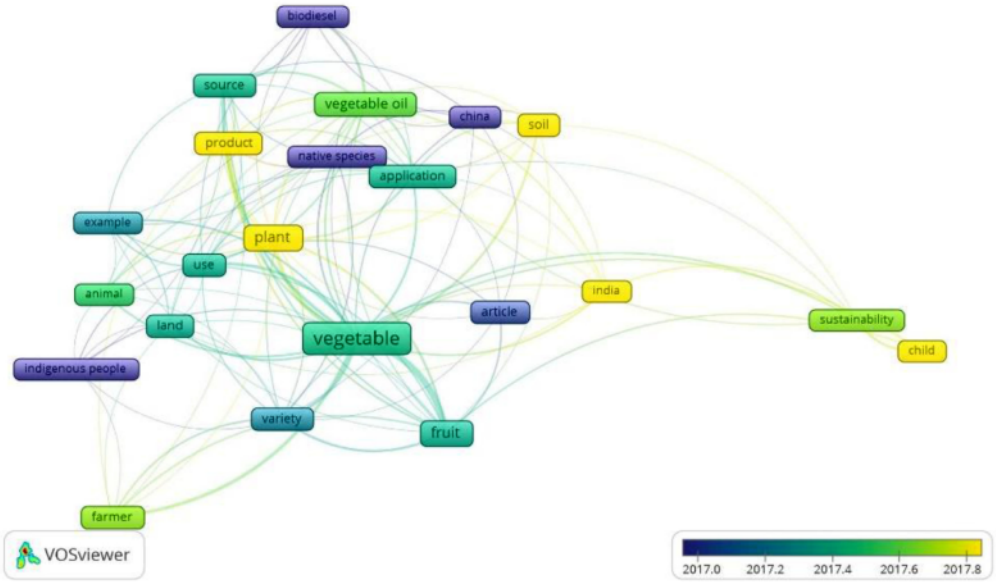

Fig. 6. Visualization of network trend of research publication based on co-words.

The results of the bibliometric knowledge map showed that the prospects of research on indigenous vegetables are still broad. Indigenous people are indifferent clusters in many countries, such as China and India. Indigenous people in Indonesia still have many opportunities to explore more profoundly, especially in terms of sustainability.

4. Conclusion

Lalapan is an essential part of a food source. The experience of indigenous people in the East Priangan region can explain that the details of plants that can eat as lalapan included young shoots and leaves, flowers and whorls, raw fruit, ripe fruit and its seeds, tuber, bark, and skin of tuber. A custom firmly held by the local Sundanese community is a tradition passed down from generation to generation. The results of the correlation analysis conducted on the age of the indigenous people in East Priangan and the level of traditional knowledge related to the use of lalapan in their daily lives showed a poor level of influence. This condition was caused by other major influencing factors that need further study in future research. The results of the bibliometric analysis showed that the prospect of indigenous vegetables is still broad for future research.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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