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THE INFLUENCE OF URBANIZATION ON TRADITIONAL FOOD PLANT KNOWLEDGE AND TRADITIONAL CUISINE OF GAYO-LUT COMMUNITY

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ABSTRACT

Traditional knowledge explains the sustainable use and management of natural resources that are critical for the long-term of ecosystems and food security one of the challenges in maintaining traditional knowledge is urbanization. This study aims to identify the diversity of food plants used by the Gayo Lut community and describe the effect of urbanization on changes in traditional knowledge. Data collection methods include freelisting and field observation. This research involved 3 groups of 16 elders, 16 non-urban, and 16 Urban. The respondents were asked to freelist by mentioning 25 of Gayo Lut traditional common food plants and interviews related to food terminology, including the food plants used. Data were analyzed with Salience Index using Anthropac, and Jaccard index to see the similarity knowledge. This study found a total 188 of food plants and 224 dishes. The effect of urbanization on food plants knowledge is significantly seen for urban community. In contrast to cuisines knowledge, urban people tend to have more knowledge, and modified recipes as a form of adaptation but still maintained distinctive flavors. This study also reveals that there is a close relationship between traditional cuisine and food plants, which can be an alternative for food plant conservation.

Key words: *food plant, Gayo Lut, salience index, traditional cuisine, traditional knowledge*

INTRODUCTION

The wealth of natural resources can be utilized to support food security through the production of food, increase income access, and safe-sanitary food preparation (Richardson 2010). In many cases, plants are one of the most essential sources of humanity's ancient dietary needs (Kunwar dan Bussmann 2008; Shaheen et al. 2012) and have become rooted in the culture of the community. This is known as a traditional food plant (Maundu 1997). The utilization of traditional food plants is reflected in the community's traditional knowledge of how they were used, protect, and preserved for a long time as a cultural custom in traditional dishes (Pretty 2009; Mekonen 2017; Pandey 2017).

Some of the great challenges to sustaining the sustainability of food plants are urbanization and modern lifestyle. Other studies (Sayok and Teucher 2018; Seto and Reba 2018) have found that the process of becoming more urban has a negative impact on natural resource knowledge and that urbanization is related to the loss of the ability to recognize and understand the plants. Through this urban distribution, people will be much less directly connected to food plants and undoubtedly significantly impact the availability of culturally preferred foods in new locations. For this reason, it is crucial to preserve traditional knowledge, since it would become extinct if there is no longer relationship between the community and the environment. This could lead to traditional knowledge loss related with biodiversity loss (Arjona-Garcia et al. 2021)

A strategy that can be used to enhance biodiversity and sustain ecosystem service is the combination of traditional knowledge and culture (Kimmerer and Lake 2001), which can be seen in their traditional cuisines. A preceding study (Sukenti et al. 2016; Purba et al. 2018; Grubor et al. 2022) has shown that traditional cuisine has become one of the tools to preserve and conserve biodiversity and promotes the culture through gastro tourism (Derek 2021).

One of the ethnic groups that still holds culture and customs that have a habit of urbanization is Gayo Lut community, located in Central Aceh Regency, Indonesia. The number of Gayo Lut people who urbanized to Jabodetabek (Jakarta-Bogor- Depok-Tangerang-Bekasi) continues to rise every year (Interviewed with Gayo Ecolinguist, Yusradi Esman Al-Gayoni). Studies related to Gayo Lut food plant are still lacking and recorded in 2020 by (Hidayati et al. 2021; Sunkar et al. 2021) found as many as 334 potential food plant species in Gayo highland, However, the Gayo language's existence in urbanized culture is in threat since, while the language is spoken by all generations, only a few child-bearing generations are passing it down to their children in categories (Sunkar et al. 2021).

Unfortunately, more traditional knowledge is passed down in oral form through stories, experiences, and language than stored documentation (Sen 2005). This may indicate knowledge loss if people start not knowing their food plants because of the difficulty in adapting to food plants in new places. Therefore, recording the Gayo Lut community's knowledge of traditional cuisine and key food plant species is crucial. This research aims to discover the variety of food plants utilized in the traditional Gayo Lut Cuisine and observe

how urbanization has impacted the traditional knowledge of the Gayo Lut Community.

RESEARCH METHOD

This study was conducted in Mude Nosar Village, Central Aceh Regency, Indonesia (4°35'42.06"N, 96°57'3.99"E) from November-December 2020, and in Musara Gayo Jabodetabek Community from March-April 2021 (Figure 1). This study is limited to the people who live in Mude Nosar Village are residents have not migrated outside Aceh, and the Musara Gayo Jabodetabek Community are Gayo community that migrated to the Jakarta-Bogor-Depok-Tanggerang-Bekasi (Jabodetabek) area. Musara Gayo is a Gayo community organization formed to gather Gayo people overseas, one of them is Jabodetabek (musaragayo.com).

Geographically, Mude Nosar Village is directly adjacent to the Lut Tawar Lake tourist area and is located at the foot of Mount Bur Kelieten. Lake Lut Tawar is a lake but looks like an ocean, with one of the endemic biotas, namely *depik* (*Rasbora Tawarensis*). Furthermore, Mount Bur Kelieten has an altitude of 2930 masl, with biodiversity in it. This includes various types of food plants that are used by the community such as coffee, bananas, and Dutch eggplant. The people of Mude Nosar village also have an agroforestry plantation area along the climbing route of Mount Bur Kelietan, besides that the community also has rice fields around their homes which are used to process onions and rice as a source of meeting daily needs and main economic income.

The discovery of Gayo early human fossils that are more than 7400 years old at the Loyang Mendale site (Setiawan 2011), makes Mude Nosar Village the starting point for the spread of the Gayo Tribe (Ibrahim 1980 in Sukiman 2020) with the main subtribe being is Gayo Lut. The Gayo Lut community is one of the tribes that still adheres to its culture and on the other hand, has the belief that to improve the quality of education and life it can be done by urbanization to cities. The Gayo Lut community then gathered to become a Gayo community outside their original area known as "*Musara Gayo*". Based on the results of an interview with Yusradi (Gayo ethnolinguistic researcher), the JABODETABEK area (Jakarta-Bogor-Depok-Tangerang-Bekasi), is the largest Musara Gayo community that increases every year. Furthermore, Musara Gayo Jabodetabek became the second study area in this research.

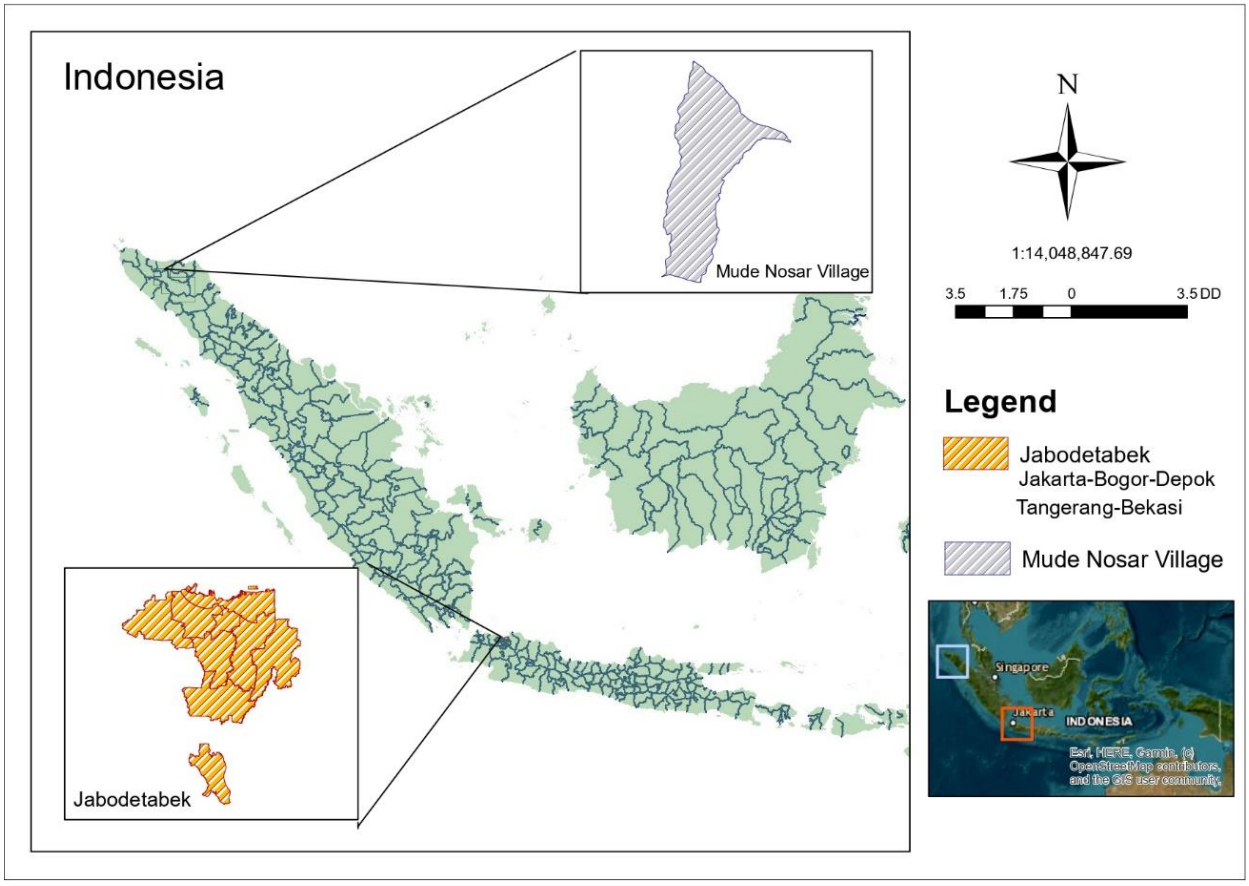

Figure 1. Research area map

Table 1 The number of respondents

No	Respondents	Sampling Method	Criteria	Number of Respondents
1	Elders (Control Data)	Cencus	Elders (≥60 years old)	16
2	Non-Urban (Eksperiment data 1)	Availability Sampling	• Lives in Mude Nosar Village • Gayo Lut tribes • <60 years old	16
3	Urban (Eksperiment Data 2)	Purposive Sampling	• Urban Community • Gayo Lut tribes • <60 years old	16

The number of respondents of elders are 16 respondents (8 female; 8 male), determined by looking at the condition and willingness of key informants. The 16 key informants were chosen not only based on age, but the ability of respondents, in this case there were only 8 male key informants, because the males are much older and have shown a reduction in responses so that it becomes one of the limitations in the interview process with elders. To balance the proportions, 8 female respondents were taken.

Data collection is carried out in 3 phases of free listing and semi-structured interviews. Free listing is used to document the number of food plants used and Gayo Lut traditional Cuisines known by the communities, with total 48 key informant of Elders, Non-urban and Urban community. This is relevant to previous research (D'Ambrosio and Puri 2016; Hidayati et al. 2017; Sunkar et al. 2021).

The first phase as the basis data involved purposive sampling where 16 elders aged 60 years old and above (50% males and 50% females) were chosen based on their reputation as traditional knowledge keepers. Elders are valued because they uphold historical traditions, customs, and kinship structures that are essential to the group's survival in a harsh environment (Linden 1991). The elders were asked to freelist 25 types of common food plants for Gayo Lut People.

The second phase involved availability sampling, where 16 respondents (50% males, 50% females) aged below 60 years old, were asked to make 25 freelists of Food plant used and Gayo Lut traditional cuisines. The third phase involved the urban community , run by online interview using WhatsApp and Zoom meetings due to the pandemic Covid-19. The urban community asked to freelist 25 types of common food plants for Gayo Lut People and then continue to freelist 25 of Gayo Lut traditional cuisines. Items with the greatest salience are those that informants list most commonly and that informants tend to recall more immediately than other items (Borgatti 1992) and from the list, every 25 foodplants and dishes were selected based on their salience using ANTHROPAC.

Semi-structured interviews with the same respondents are conducted to gather personal information (Name, age, sex, occupation, birthplace), information of food plants (type, part of used, utilization, cultivation), and information on cuisine ingredients (Ingredients, how to get ingredients, cooking process, serving process, use of dishes).

The freelisting of food plants used and traditional cuisines were calculated using the salience index function in the ANTHROPAC software and analyzed descriptively. This analysis can show the food plants and traditional cuisine that is most widely mentioned by both communities (Borgatti 2012; Levine et al. 2015) with the following formula:

$$S_j = ((\sum_{i-1}^{F_j} (L_i - R_{ij} + 1)/L_1)/N$$

Where S_j is Saliency Index j, J is Item to j, L_i is the Number of informants I, R_{ij} is the ranking given by the i-the respondent for the j item, and N is the number of informants.

Furthermore, to analyze the similarities between the various traditional knowledge of food plants among the communities we used the Jaccard similarity index (González-Tejero et al. 2008) calculated using the following formula:

$$Index\ of\ Jaccard = \frac{C}{A + B - C}\ x\ 100$$

Where A is the number of species of sample A, B is the number of species of sample B, and C is the number of species common to A and B. In this study, comparisons will be made between every 2 groups, between Elders and Non-urban groups, Elders and Urban groups, and Non-urban and Urban groups.

RESULT AND DISCUSSION

1. Gayo Lut Food Plant Diversity

In three communities studied, recorded 188 species of food plants that are used by the community. The results are then sorted based on the frequency of mention of the species from the three key groups which can be seen in table 2.

Based on the usage of food plants, it is categorized as spices, vegetables, fruits, beverages, snacks, medicines, and staple food (sequentially) (Figure 2). The community obtains fruits directly from plants around the house and plantation areas. The most fruit consumption was seen in *Gelime* (*P. guajava*) (16 mentions) and

Pokat (*P. americana*) (14 mentions), and traded when entering the harvest season, the top food plant used as a vegetable is *Jepang* (S. *edulis*) (12 mentions). This has been known and used by the Gayo Lut People since the Japanese colonial period (Sukiman 2020), and a multi-functional crop that can be grown in a variety of climates (Bal Krishna et al. 2020). In addition, *Jepang* also served a variety of dishes in wedding ceremonies and annual ceremonies for 7 days of birth, *Turun mani*.

Table 2 Gayo Lut Traditional Food Plant.

No	Botanical Name	Local Name	NOM* (Elder)	NOM* (Non-Urban)	NOM* (Urban)	Category of use
1	*Citrus sp.*	*Asam Jantar*	5	7	3	Spices
2	*Arenga pinnata* (Wumb) Merr.	*Anau*	0	2	1	Beverage
3	*Malus domestica*	*Apel*	0	0	2	Fruit
4	*Tamarindus indica* L.	*Asam Jewe*	2	1	0	Spices
5	*Citrus sp.*	*Asam Kelele*	2	0	0	Spices
6	*Citrus x aurantifolia* (Critsm.)	*Asam Kuyun*	5	6	6	Spices
7	*Citrus limon* L.	*Asam Lemon*	8	0	1	Spices
8	*Averrhoa bilimbi* L.	*Asam Sunti*	5	0	0	Fruit
9	*Citrus sp.*	*Asam ganesah*	0	1	0	Fruit
10	*Citrus sp.*	*Asam Gelime*	0	0	1	Fruit
11	*Citrus sp.*	*Asam Gelime manis*	0	2	1	Fruit
12	*Citrus sp.*	*Asam Gerahgiri*	0	1	2	Fruit
13	*Citrus sp.*	*Asam Jering*	0	0	1	Fruit
14	*Citrus sp.*	*Asam Kelele*	0	3	2	Fruit
15	*Citrus sp.*	*Asam Kenyeren*	0	0	1	Fruit
16	*Citrus reticulata* L.	*Asam Keprok*	0	1	3	Spices
17	*Citrus sp.*	*Asam Mungkur*	0	0	3	Spices
18	*Citrus sp.*	*Asam Munti*	0	0	1	Spices
19	*Citrus sp.*	*Asam Pepok*	0	1	0	Spices
20	*Citrus sp.*	*Asam Taik Kurik*	0	1	1	Fruit
21	*Musa sp.*	*Awal*	0	1	0	Fruit
22	*Musa sp.*	*Awal (Pisang) Beret*	8	2	5	Fruit
23	*Musa acuminata x balbisiana*	*Awal Abu*	2	4	2	Fruit
24	*Musa sp.*	*Awal Nur*	0	5	3	Fruit
25	*Musa sp.*	*Awal Bok*	0	2	0	Fruit
26	*Musa sp.*	*Awal Coeng*	0	0	2	Fruit
27	*Musa sp.*	*Awal Keken*	0	0	1	Fruit
28	*Musa acuminata*	*Awal Mas*	0	0	1	Fruit
29	*Musa paradisiaca*	*Awal Nangka*	0	0	1	Fruit
30	*Musa sp.*	*Awal Suasah*	0	0	1	Fruit
31	*Musa acuminata x Musa balbisiana*	*Awal Wak*	0	2	0	Fruit
32	*Nicotiana tabacum*	*Bajik*	0	1	0	Spices
33	Unidentified	*Bako*	2	0	0	Medicine
34	Unidentified	*Batang Teguh*	0	0	1	Medicine
35	*Amaranthus* sp.	*Bayem*	2	5	2	Vegetables

No	Botanical Name	Local Name	NOM* (Elder)	NOM* (Non-Urban)	NOM* (Urban)	Category of use
36	*Melastoma candidum L.*	*Beke*	1	1	2	Fruit
37	*Piper betle*	*Belo*	5	0	2	Snack
38	*Pachyrhizus erosus*	*Bengkuang*	0	0	1	Vegetables
39	*Mangifera foetida*	*Berhul*	0	1	0`	Fruit
40	*Zingiber* sp.	*Bing*	2	4	5	Spices
41	*Zingiber zerumbet*	*Bing Ilang*	1	3	2	Spices
42	*Zingiber officinale*	*Bing Putih*	7	3	1	Spices
43	*Unidentified*	*Biwa*	1	2	0	Spices
44	*Illicium verum*	*Bunge Lawang*	1	2	1	Spices
45	Unidentified	*Celala*	0	0	1	Spices
46	*Syzygium armaticum*	*Cengkeh*	1	0	0	Spices
47	*Schizophyllum commune*	*Cibit*	2	0	0	Vegetables
48	*Pleurotus ostreatus*	*Dahniken*	3	0	0	Vegetables
49	Syzygium polyanthum	*Daun Salam*	1	1	2	Spices
50	*Physalis angulata* L.	*Dedepok*	0	2	0	Vegetables
51	*Auricularia auricula-judae*	*Dememir*	4	0	2	Spices
52	*Durio zitbethinus Murr.*	*Durin*	1	5	4	Spices
53	*Annona muricata*	*Durin Belene*	0	0	1	Spices
54	*Zanthoxylum acanthopodium*	*Empan*	6	5	7	Spices
55	*Manihot esculenta*	*Gadong*	10	5	11	Spices
56	*Manihot sp.*	*Gadong Item*	1	1	2	Spices
57	*Solanum tuberosum*	*Gantang*	5	6	5	Spices
58	*Passiflora foetida*	*Gegamut*	0	0	1	Spices
59	*Mentha cordifolia*	*Gegarang*	7	7	5	Spices
60	*Phyllanthus acidus* L. Skeels	*Gele*	1	0	0	Fruit
61	*Psidium guajava*	*Gelime*	3	5	8	Fruit
62	*Psidium guajava*	*Gelime Ilang*	4	1	0	Fruit
63	*Punica granatum* Linn.	*Gelime Mekah*	1	1	1	Spices
64	*Psidium* sp.	*Gelime Kapas*	0	1	0	Fruit
65	*Psidium* sp.	*Gelime Putih*	0	1	0	Fruit
66	Unidentified	*Gelune*	1	0	0	Spices
67	Unidentified	*Genjer*	0	0	1	Spices
68	Unidentified	*Gume*	2	0	0	Medicine
69	*Benincasa hispida* Cogn	*Gunur*	0	0	2	Vegetables
70	*Zea mays*	*Jagong*	3	1	1	Vegetables
71	*Nasturtium microphyllum*	*Jambek*	1	0	0	Vegetables
72	*Syzygium aqueum* (Burm.f.) Alston	*Jamu*	0	2	3	Fruit
73	*Syzygium* sp.	*Jamu Putih*	1	1	0	Fruit
74	*Eugenia cumini* Merr.	*Jemblang*	1	0	1	Vegetables
75	*Archidendron pauciflorum*	*Jengkol*	0	0	1	Vegetables
76	*Sechium edule*	*Jepang*	12	14	14	Vegetables

No	Botanical Name	Local Name	NOM* (Elder)	NOM* (Non-Urban)	NOM* (Urban)	Category of use
77	Unidentified	*Jireu*	0	1	0	Spices
78	*Psophocarpus tetragonolobus*	*Kacang Glise*	1	1	0	Vegetables
79	*Phaseolus vulgaris*	*Kacang Ilang*	7	5	3	Vegetables
80	*Canavali ensiformis*	*Kacang Koro*	3	6	2	Vegetables
81	Unidentified	*Kacang Memin*	1	0	0	Vegetables
82	*Momordica charantia*	*Kacang Prie*	1	3	0	Vegetables
83	*Vignaungui culata* ssp.	*Kacang Ranting*	9	10	7	Vegetables
84	*Phaceolus vulgaris*	*Kacang Sontok*	3	4		Vegetables
85	*Aracis hypogaea*	*Kacang Tanoh*	4	3	1	Vegetables
86	*Psophocarpus* sp.	*Kacang Telak*	1	0	0	Vegetables
87	*Glycine max*	*Kacang Uni*	1	1		Vegetables
88	*Phaseolus vulgaris*	*Kacang Buncis*	0	2	1	Vegetables
89	*Pisum sativum*	*Kacang Kapri*	0	0	1	Vegetables
90	*Phaseolus vulgaris*	*Kacang Kunul*	0	3	4	Vegetables
91	*Uncaria gambir*	*Kacu*	2	0	1	Vegetables
92	*Garcinia atroviridis*	*Kanis*	1	0	0	Vegetables
93	*Diospyros kaki*	*Kasemah*	1	5	1	Fruit
94	*Scurrula sp.*	*Kayu Nalu*	1	0	0	Vegetables
95	*Cycas cirninalis*	*Keloang*	6	4	6	Vegetables
96	*Cycas* sp.	*Keloang Jewe*	1	0	0	Vegetables
97	*Aleurites moluccanus*	*Kemili*	1	8	3	Spices
98	*Ipomoea batatas*	*Kepile*	2	6	8	Snack
99	*Ipomoea batatas*	*Kepile Ilang*	2	0	0	Snack
100	*Ipomoea batatas*	*Kepile Kuning*	4	0	0	Snack
101	*Cocos nucifera*	*Keramil*	6	1	2	Spices
102	*Morus alba*	*Kertu*	1	0	0	Snack
103	*Coriandrum sativum*	*Ketumer*	2	4	7	Snack
104	Brassica oleracea	*Kol*	2	6	5	Spices
105	Unidentified	*Konyel*	1	0	0	Vegetables
106	*Cinnamomum burmanii*	*Kulit Manis*	1	0	2	Spices
107	*Curcuma longa*	*Kuning*	13	6	7	Spices
108	*Curcuma zanthorrhiza*	*Kuning Gajah*	2	0	0	Spices
109	*Coffea arabica*	*Kupi*	10	9	4	Spices
110	*Coffea arabica*	*Kupi Arabika*	0	1	0	Beverage
111	*Coffea* sp.	*Kupi Kucak*	0	1	0	Beverage
112	*Coffea* sp.	*Kupi Robusta*	0	1	0	Beverage
113	*Cucurbita moschata*	*Labu Manis*	0	4	4	Vegetables
114	*Alllium sp.*	*Lasun Bok*	2	0	0	Spices
115	*Allium cepa* L.	*Lasun Ilang*	14	11	9	Spices
116	*Allium Sativum*	*Lasun Putih*	6	8	5	Spices

No	Botanical Name	Local Name	NOM* (Elder)	NOM* (Non-Urban)	NOM* (Urban)	Category of use
117	*Alpinia galaga*	*Lengkues*	8	8	7	Spices
118	*Capsicum sp.*	*Leude Ilang*	0	1	6	Spices
119	*Capsinum frustescens* Linn.	*Leude Kucak*	5	0	0	Spices
120	*Piper nigrum*	*Leude Pedih*	1	3	7	Spices
121	*Capsicum annuum*	*Leude Pentek*	14	5	1	Spices
122	*Capsicum sp.*	*Leude Caplak*	0	3	2	Spices
123	*Capsicum sp.*	*Leude Ijo*	0	2	6	Spices
124	*Capsicum sp.*	*Leude Kul*	0	4	0	Spices
125	*Eugenia cumini* Merr.	*Lukup*	0	0	1	Spices
126	*Arum esculentum*	*Lumu Gayo*	8	1	4	Vegetables
127	*Mangifera* sp.	*Mancang*	0	0	3	Fruit
128	*Mangifera* sp.	*Mangga*	0	2	0	Fruit
129	*Citrus hystrix*	*Mungkur*	2	0	0	Spices
130	*Artocarpus heterophyllus*	*Nangka*	3	4	8	Spices
131	*Ananas comosus*	*Nas*	3	6	3	Fruit
132	*Passiflora quadrangularis Linn.*	*Nenggeri*	0	5	2	Fruit
133	*Pogostemon cablin*	*Nilem*	2	0	0	Fruit
134	Unidentified	*Noni*	0	0	1	Fruit
135	*Myristica fragrans*	*Pala*	1	0	0	Spices
136	*Arenga pinnata*	*Pango*	1	0	0	Beverage
137	*Carica papaya*	*Pertik*	5	0	8	Spices
138	*Parkia speciosa*	*Pete*	0	3	4	Vegetables
139	*Luffa acutangtula* Roxb.	*Peterle*	0	0	2	Vegetables
140	*Cucurbita moschata* Duch.	*Petukel*	8	9	11	Snack
141	Unidentified	*Petule*	0	0	1	Spices
142	*Areca catchu*	*Pinang*	1	1	0	Spices
143	*Persea americana*	*Pokat*	5	6	3	Fruit
144	*Etlingera sp.*	*Pokol*	0	1	1	Fruit
145	*Nephelium lappaceum*	*Rambutan*	0	0	2	Fruit
146	Unidentified	*Rembele*	1	1	1	Fruit
147	*Mangifera laurina* Blume	*Rempelam*	2	2	3	Fruit
148	*Ipomoya aquatica*	*Rempon*	5	3	5	Vegetables
149	Unidentified	*Rengkenil*	1	0	0	Vegetables
150	*Oriza* sp.	*Rom*	0	1	1	Staple Food
151	*Oriza* sp.	*Rom Rendah*	4	1	0	Staple Food
152	*Oriza* sp.	*Rom Unggul*	2	2	0	Staple Food
153	*Oriza* sp..	*Rom Konon*	0	0	1	Staple Food
154	*Solanum nigrum* Linn.	*Rukut*	6	7	6	Snack
155	*Berasica juncea* L.	*Sawi*	3	6	3	Vegetables
156	*Brassica pekinensia* L.	*Sawi Putih*	3	1	0	Vegetables
157	*Pandanus amaryllifolius*	*Seki Pulut*	3	7	4	Spices

No	Botanical Name	Local Name	NOM* (Elder)	NOM* (Non-Urban)	NOM* (Urban)	Category of use
158	*Lactuca sativa* L.	*Selada*	0	1	3	Vegetables
159	*Averrhoa* sp.	*Seliming*	0	4	1	Spices
160	*Citrullus lanatus*	*Semangka*	0	2	0	Fruit
161	*Cymbopogon nardus* L.	*Serre*	8	5	9	Spices
162	*Etlingera sp.*	*Serulle*	0	2	3	Fruit
163	*Apium graveolens*	*Sop*	2	3	3	Spices
164	*Fragaria x ananassa*	*Stroberi*	0	1	0	Fruit
165	*Amaranthus* sp.	*Tamok*	1	4	3	Vegetables
166	*Saccharum* sp.	*Tau*	1	0	4	Beverage
167	*Saccharum* sp.	*Tau Pedeh*	1	0	0	Beverage
168	*Saccharum* sp.	*Tau Tawar*	2	0	0	Beverage
169	*Kaempveria galanga* L.	*Tekur*	1	0	1	Spices
170	*Murraya koenigii*	*Temuru*	1	1	1	Spices
171	*Protium javanicum*	*Tenggolon*	1	3	1	Spices
172	Unidentified	*Tengkereng*	1	0	0	Spices
173	Unidentified	*Tepung Belilit*	1	0	0	Medicine
174	*Solanun melongena*	*Terong*	5	2	3	Vegetables
175	*Solannum betaceum* Cav.	*Terong Agur*	6	6	10	Vegetables
176	*Solanum lycopersicum*	*Terong Padul*	8	3	4	Vegetables
177	*Solanum* sp.	*Terong Panjang*	3	0	0	Vegetables
178	*Nicolaia speciosa* Horan	*Terpuk*	2	2	8	Vegetables
179	*Cucumis sativus*	*Timun*	1	2	2	Beverage
180	*Citrullus lanatus*	*Timundiki*	1	0	0	Fruit
181	*Solanum lycopersicum*	*Tomat*	6	8	1	Vegetables
182	*Dendrocalamus asper*	*Tuis*	2	6	5	Vegetables
183	*Sechium edule*	*Tutit*	2	0	1	Vegetables
184	*Allium fistulosum L.*	*Ulung Lasun*	2	0	3	Spices
185	*Sauropus androgynus*	*Ulung Katuk*	0	0	1	Spices
186	*Solanum torvum*	*Ungke*	1	4	5	Spices
187	*Myristica fragrans*	*Uwah Pala*	0	1	0	Beverage
188	*Daucus carota*	*Wortel*	1	8	3	Vegetables

Description: *NOM: *Number of Mention*

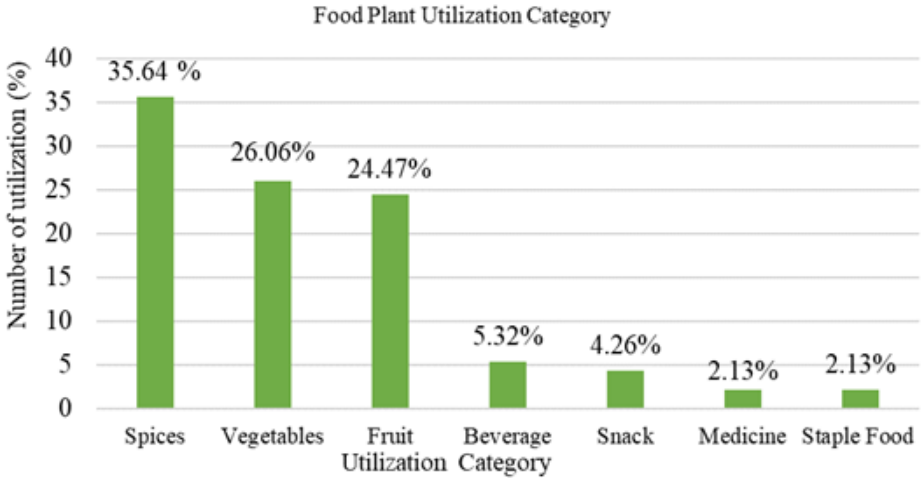

Figure 2. Food Plant Utilization Category

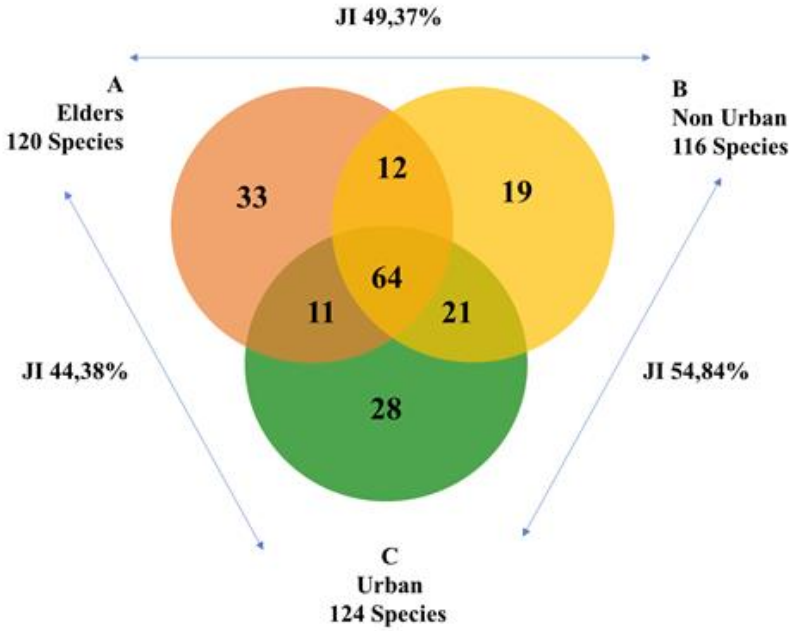

Figure 3 Venn diagram showing the overlapping of the food plants among the three communities studied as well as their Jaccard indexes

The most widely used category by the non-urban community is spices (35.64%), such *Lasun Ilang* (*A. cepa*) that also became food plant with the highest salience value (Table 2). This food plant also become the most used food plant in Gayo Lut traditional cuisine. The role of spices in dishes is also inextricably linked and used to flavor, color, and preserve food in addition to improving savory (Srinivasan 2005). The sour and spicy flavor is a trademark of Gayo cuisine in general, so the food's ingredients become essential. In contrast to non-urban groups, urban communities have fruit as a category for the use of food plants that can be influenced by the presence of urban communities which undoubtedly has a significant impact on the availability of culturally preferred foods in new locations.

2. The effects of urbanization on the Gayo Lut Traditional Knowledge

a. Traditional knowledge of Food plants

Analysis with the Jaccard index is carried out to see the percentage of similarities among the communities. This data is interpreted in the Venn diagram in Figure 3. The highest similarity is shown between the non-urban community and the Urban community (54,48%). Meanwhile, the percentage of the two groups towards elders showed a similarity of less than 50%. Although the similarity between elders and non-urban groups is still higher (49,37%) than the urban group (44,38%). This trend is similar to previous research in Europe, which shows that there are differences between urban

and non-urban groups because the transmission of food plant knowledge tends to be more influenced by media and rich social exchange (Fontefrancesco and Pieroni 2020).

As well this study, it can be seen that there is a transmission of traditional food plant knowledge from the Elders group who are more than 59 years old with two other groups less than 60 years old who have experienced modernization and urbanization, as according to Mcinerney (2002), knowledge is founded in or comes from life forms, and so it is constantly evolving with human experience.

For both communities, elders and non-urban, *Lasun ilang* (*A. cepa*) has become the main commodity after rice and has been designated as horticultural crop varieties (Decree of the Minister of Agriculture, Indonesia O34/ KPTS.SR.120 /d.2.7/3/2019). Both communities, elders and non-urban plant by applying crop rotation between shallots and rice. This is done to increase the community's livestock and according to Nunis and Harlock (2005), this method can affect soil fertility. Meanwhile, Japan and *Kupi* also support the cultural and food needs of the Gayo community. The tradition of drinking *Kupi* (*Coffea* sp.) has the slogan "*Gere ara Kupi, Gere ara Cerite*" (no coffee, no story).

In contrast to it, the urban community came up with different important food plants. This difference occurred because the habits and environmental conditions of residence between non-urban and urban communities are also much different. The characteristics of non-urban groups tend to offer large areas of agriculture and forest so that people can take advantage of nature directly. While the Urban group has an urban living area that has minimal open space. Then it becomes difficult for urban communities to carry out food plant cultivation activities

This is in line with the way the community obtains these food plants (Figure 4). For the non-urban, only 20% of the species were purchased, while for the urban, the species obtained by purchase reached 79.81%. This is inversely proportional to the way to get plants through plant cultivation. For the non-urban, the number reached 68.33% of the species, while for the urban only 9.62% of the species were cultivated. Limited area become the main reason for urban communities to cultivate plants, on the other hand buying is considered more efficient in time, where urban groups also do not work as farmers.

However, the interesting point is that there is 1.92% (*gegarang* and *empan*) of food plants are obtained by the urban community by being sent directly from Gayo Lut. The results of the interview show that some food plants cannot be found in Jabodetabek, and if they are substituted with other types of food plants, it will give a different taste to the traditional Gayo Lut cuisine which is still enjoyed by urban communities in Jabodetabek.

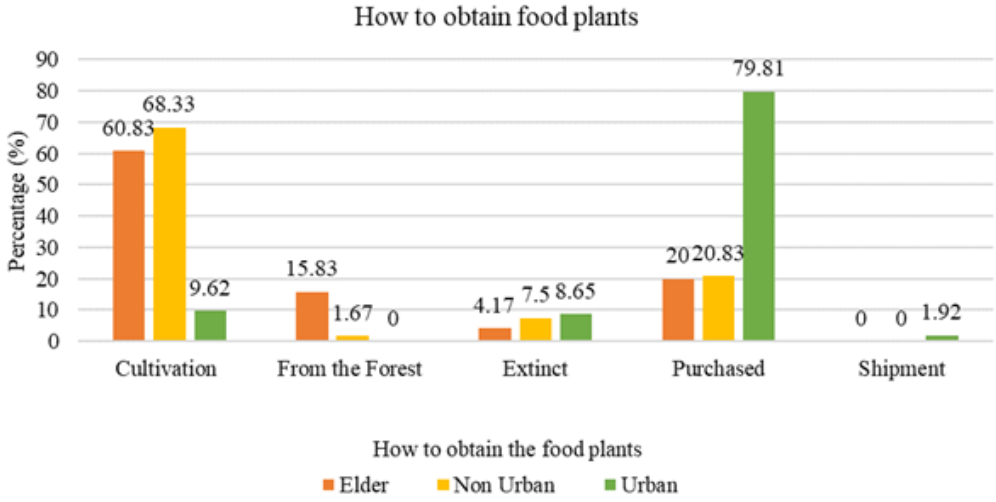

Figure 4. Diagram showing the comparison of how to obtain food plants between study groups

Table 3. A total of 25 Gayo Lut Food plants based on its salience.

No	Elders	Non-Urban	Urban
1	*Lasun Ilang* *(Allium cepa var. aggregatum.)*	*Jepang* *(Sicyos edulis Jacq.)*	*Gadong* *(Manihot esculenta* Crantz*)*
2	*Leude Pentek* *(Capsinum frustescens* Linn.*)*	*Lasun Ilang* *(Allium cepa* var. aggregatum.*)*	*Petukel* *(Cucurbita moschata Duch.)*
3	*Jepang (Sicyos edulis* Jacq.*)*	*Petukel (Cucurbita moschata* Duch.*)*	*Kuning (Curcuma longa)*
4	*Kuning* *(Curcuma longa* L.*)*	*Lasun Putih* *(Allium sativum* Linn.*)*	*Terong Agur* *(Solanum betaceum* Cav.*)*
5	*Kupi (Coffea arabica* Linn.*)*	*Kupi (Coffea* sp.*)*	*Pertik (Carica papaya* L.*)*

No	Elders	Non-Urban	Urban
6	*Asam Lemon (Citrus limon* L.Burm.f.*)*	*Kacang Ranting (Vignaungui culata* ssp.*)*	*Lasun Ilang (Allium cepa var. aggregatum.)*
7	*Petukel (Cucurbita moschata* Duch.*)*	*Asam Jantar (Citrus sp.)*	*Kepile (Manihot esculenta* Crantz.*)*
8	*Kacang Ranting (Vignaungui culata* ssp.*)*	*Rukut (Solanum nigrum* Linn.*)*	*Keloang (Cycas cirninalis* L.*)*
9	*Gadong (Manihot esculenta Crantz)*	*Gantang (Solanum tuberosum Linn.)*	*Ketumer (Coriandrum sativum* L.*)*
10	*Lasun Putih (Allium sativum* Linn.*)*	*Gegarang (Mentha cordifolia)*	*Gelime (Psidium guajava* Linn. *)*
11	*Bing Putih (Zingiber officinale* Roscoe*)*	*Sawi (Berasica juncea* L.*)*	*Serre (Cymbopogon cytratus* Stapf.*)*
12	*Kacang Ilang (Vigna unguiculata* (L.) Walp.)	*Gadong (Manihot esculenta* Crantz*)*	*Terpuk (Nicolaia speciosa* Horan*)*
13	*Terong Agur (Solanun betaceum* Linn.*)*	*Kuning (Curcuma longa* L.*)*	*Lengkues (Alpinia galanga* (L.*)* Willd.*)*
14	*Tomat (Solanum lycopersicum* Linn.*)*	*Lengkues (Alpinia galanga* (L.) Willd.*)*	*Gantang (Solanum tuberosum* Linn.*)*
15	*Serre (Cymbopogon cytratus* Stapf.*)*	*Wortel (Daucus carota* Linn.*)*	*Empan (Zanthoxylum acanthopodium* DC*)*
16	*Empan (Zanthoxylum acanthopodium* DC*)*	*Kemili (Aleurites moluccanus* (L.) Wild.*)*	*Lasun Putih (Allium Sativum)*
17	*Gantang (Solanum tuberosum* Linn.*)*	*Awal Nur (Musa* sp.*)*	*Bing (Zingiber officinale* Roscoe*)*
18	*Lengkues (Alpinia galanga* (L.) Willd.)	*Kol (Brassica oleracea* L.*)*	*Asam Kuyun (Citrus x aurantifolia* Swingle*)*
19	*Terong (Solanum melongena* L.*)*	*Bing (Zingiber officinale* Roscoe*)*	*Gegarang (Mentha cordifolia)*
20	*Gegarang (Mentha cordifolia)*	*Awal Abu (Musa sp.)*	*Kacang Ranting (Vignaungui culata* ssp.*)*
21	*Leude Kucak (Capsinum frustescens* Linn.*)*	*Asam Kuyun (Citrus x aurantifolia* Swingle.*)*	*Leude Ijo (Capsicum sp.)*
22	*Terong Padul (Solanum lycopersicum* var. cerasiforme*)*	*Empan (Zanthoxylum acanthopodium* DC*)*	*Kupi (Coffea arabica* Linn.*)*
23	*Awal Beret*	*Tomat (Solanum lycopersicum* L.*)*	*Tuis (Dendrocalamus asper* Schult.f.*)*
24	*Rom Rendah (Oryza sativa* Linn.*)*	*Tuis (Dendrocalamus asper* (Schult.f.)*)*	*Rempon (Ipomoya aquatica* Forssk.*)*
25	*Asam Jantar (Citrus sp.)*	*Kacang Koro (Canavali ensiformis* (L.) DC.*)*	*Jepang (Sicyos edulis* Jacq.*)*

b. Traditional Knowledge of Traditional cuisines

Traditional cuisines are valued because they showcase the community's tradition and provide numerous health benefits (Emmanuel et al. 2017). According to the findings of this study, a total of 224 traditional cuisines of Gayo Lut found and 90.1% of it, use food plants as food ingredients. The similarity among the communities were interpreted in the Venn diagram in **Figure 5**. The highest similarity was shown by the Elder and Non-urban groups (54,40%). Meanwhile, the percentage of the urban community towards elders showed the lowest similarity of 24,63%.

What is of concern is that the Urban community recorded up to 164 traditional cuisines, in contrast to the elderly (84 dishes) and non-urban (104 dishes) groups. Significant differences were also noted in the study of Arjona-García et al. (2021), where urban communities have greater knowledge of traditional medicine than non-urban groups. According to Vandebroek and Balick (2012), this can happen because urban communities still maintain their traditional knowledge due to demographics and history. In this case, the Urban Gayo Lut community joined in the Gayo Lut community in Jabodetabek and often held traditional events that served traditional Gayo Lut cuisine (interviewed with Gayo Ecolinguist, Ysradi Esman Al-Gayoni).

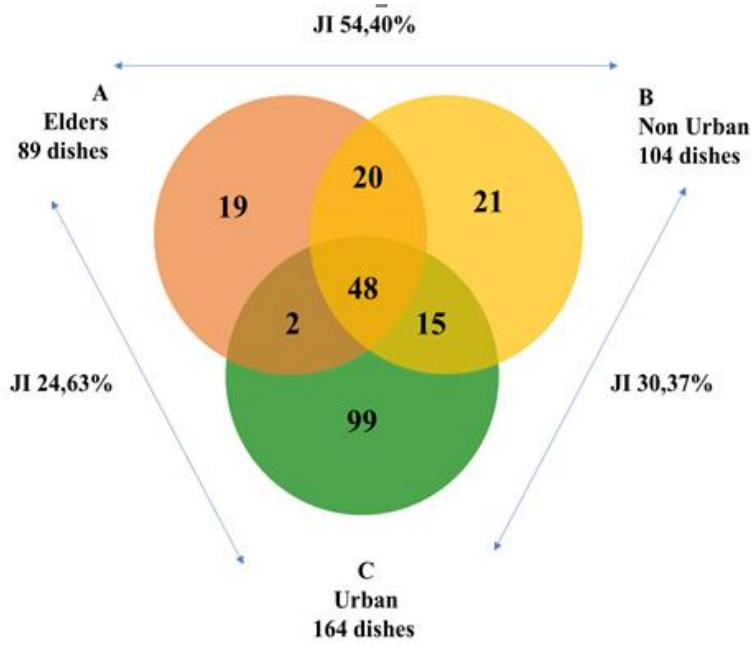

Figure 5. Venn diagram showing the overlapping of the traditional cuisine knowledge among the three communities studied as well as their Jaccard Indexes

One of the changes in the variety of traditional cuisine between the Non-urban and Urban groups can be seen in the variety of ingredients used, namely the *Macam Jing Jahir* menu. Urban people tend to add additional ingredients in the form of boiled quail eggs, so children want to enjoy this menu. This is included in the form of their adaptation so that they can preserve the menu of *Macam Jing Jahir* for the next generation even though they are far from Gayo land in Takengon, Central Aceh. The variety of food ingredients is also inseparable from the involvement of other ingredients that can maintain the authenticity of the taste of traditional Gayo Lut cuisine. *Lasun Ilang* (*A. cepa*) is the ingredient with the highest frequency of use (40% cuisines). This plant is also included in the important food crops for the Elderly and non-urban communities (Table 3).

Based on Hasibuan et al. (2020), *A. cepa* contains flavonoid compounds, saponins, tannins, alkaloids, and steroids and is a source of vitamins, antioxidants and other minerals that can be used for the prevention of various diseases (Dalhat et al. 2018). There are also food plants that are distinctive to Gayo Lut Traditional Cuisine but are difficult to find in other locations, such as *Empan* (*Z. acanthopodium* DC) and *Gegarang* (*M. cordifolia*). *Empan* (*Z. acanthopodium*) includes chemicals such as phenolics as antimicrobial, saponins as antioxidant, flavonoids as respiratory inhibitor, tannins as anti-diarrheal, triterpenoids as antibacterial, and alkaloids as insecticidal that can treat ailments such as diabetes, menstruation disorders, snake bites, skin disorders (Saragih and Arsita 2019), *Gegarang (M. cordifolia)* has rosmarinic acid compound as an antimicrobial against bacteria (Kapp 2015). This variety of phytochemical contents has shown that Gayo Lut Traditional Cuisine has supported community health with the important nutrients and phytochemicals contains in the food plants which processed into traditional cuisine.

Gayo Lut people's awareness of the need for food plants for dishes, which is the key to culture, makes this food plant important to ensure its existence. Gayo Lut traditional knowledge on how the community cultivates and utilizes the key species in traditional cuisines as the agrobiodiversity can be a form of conservation of the key food plants species of Gayo Lut.

3. Ecotourism potential of Gayo Lut

The result of the study showing that urban communities can mention a greater number of food plants indicates that urban people are still able to maintain a comprehensive amount of food plants knowledge. This in line with Sunkar et al. (2021), shows the Gayo diaspora community in Jabodetabek still maintain ethnobotanical knowledge by still using Gayo language in communicating at Jabodetabek community events. According to Sunkar et al. (2021) ,the existence of the Gayo community in Jabodetabek can also be regarded as a core zone in ensuring the sustainable use of the Gayo in the non-urban area (Gayo Highlands). Other potential contributions to preserve Gayo Lut Culture and food plant diversity can be seen in Gastrotourism. Traditional cuisine has been examined as an indigenous asset for community-based tourism, where it plays an important role in community development and biodiversity conservation (Putri et al. 2017). The tourism in Central Aceh is highly potential, considering that the

Gayo Lut are indicated to be the oldest tribe in Sumatra and offer views of Lake Lut Tawar, and Mount Bur Kelieten. In addition, Central Aceh has an airport that is connected to Kualanamu-International-Airport in Medan, as a city for Lake Toba which is currently a super priority destination by the Ministry of Tourism. Therefore, tourists can add Central Aceh on their list after visiting Lake Toba.

CONCLUSION

This study presented the findings of food plants associated with cuisines traditions to conserve biodiversity in Gayo Lut on documenting the rather extensive knowledge of food plants and their salience among a sample of the Gayo Lut People. This knowledge of traditional food plants is dynamic and can be determined by sociocultural process such as urbanization. A total of 188 food plant recorded, with the highest salience index become a key species in supporting the economic needs of the community and their traditional cuisines for the elders and non-urban, such as *lasun ilang* (*A. cepa*), *Kupi* (*Coffea* sp.), respectively, while for urban community is *Gadong* (*M. esculenta*) but not for supporting the economic needs, but traditional cuisines.

The existence of traditional cuisines is important for the Gayo community. This can maintain the relationship and dependence of the community on the surrounding forests and plantations, which is indirectly helps to maintain the conservation of food plants, and indirectly the preservation of traditional Gayo Lut cuisine will also be maintained. In this study it was also seen that urban people modified recipes as a form of adaptation but still maintained their distinctive flavors.

Since there is no written record of traditional knowledge and transmission is only through oral communication, collaboration with the urbanized Gayo Lut community is required to understand the knowledge change. Studies related to the potential for culinary tourism in the Gayo Lut community also need to be carried out to preserve culture and its biodiversity.

REFERENCE

Arjona-Garcia C, Blancas J, Beltran-Rodriguez L, Binnquist CL, Bahena HC, Moreno-calles AI, Sierra-Huelsz JA, Lopez-Medellin X. 2021. How does urbanization affect perceptions and traditional knowledge of medicinal plants. *Journal of ethnobiology and ethnomedicine*. 17:48.

Bal Krishna J, Shreesti S, Bibechana A, Mukunda B. 2020. TRADITIONAL PRACTICES AND GENETIC DIVERSITY ON CHAYOTE LANDRACES AND THEIR CONSERVATION. *Natural Resources and Sustainable Development*. 10(2):272–288.doi:10.31924/nrsd.v10i2.060.

Borgatti S P. 1992. ANTHROPAC 4.00 methods guide. Analytic Technologies, Columbia.

Borgatti SP. 2012. Stephen Peter Borgatti. *Ecol Modell*.(December):1–12.

Dalhat MH, Adefolake FA, Musa M. 2018. Nutritional Composition and Phytochemical Analysis of Aqueous Extract of Allium cepa (Onion) and Allium sativum (Garlic). *Asian Food Science Journal*. 3(4):1–9.doi:10.9734/afsj/2018/43165.

D'Ambrosio U, Puri RK. 2016. Foodways in transition: Food plants, diet and local perceptions of change in a Costa Rican Ngäbe community. *J Ethnobiol Ethnomed*. 12(1).doi:10.1186/s13002-015-0071-x.

Derek M. 2021. Nature on a plate: Linking food and tourism within the ecosystem services framework. *Sustainability (Switzerland)*. 13(4):1–17.doi:10.3390/su13041687.

Fontefrancesco MF, Pieroni A. 2020. Renegotiating situativity : transformations of local herbal knowledge in a Western Alpine valley during the past 40 years. :1–20.

González-Tejero MR, Casares-Porcel M, Sánchez-Rojas CP, Ramiro-Gutiérrez JM, Molero-Mesa J, Pieroni A, Giusti ME, Censorii E, de Pasquale C, Della A, *et al.* 2008. Medicinal plants in the Mediterranean area: Synthesis of the results of the project Rubia. *J Ethnopharmacol*. 116(2):341–357.doi:10.1016/j.jep.2007.11.045.

Grubor B, Pivarski BK, Đerčan B, Tešanović D, Banjac M, Lukić T, Živković MB, Udovičić DI, Šmugović S, Ivanović V, *et al.* 2022. Traditional and Authentic Food of Ethnic Groups of Vojvodina (Northern Serbia)—Preservation and Potential for Tourism Development. *Sustainability (Switzerland)*. 14(3).doi:10.3390/su14031805.

Hasibuan AS, Edrianto V, Purba N. 2020. Skrining Fitokimia Ekstrak Etanol Umbi Bawang Merah (Allium cepa L.). *JURNAL FARMASIMED (JFM)*. 2(2):45–49.doi:10.35451/jfm.v2i2.357.

Hidayati S, Iman Suansa N, Merlin Franco F. 2017. Using Ethnotaxonomy to assess Traditional Knowledge and Language vitality: A case study with the Urang Kanekes (Baduy) of Banten, Indonesia. Volume ke-16.

Hidayati S, Sunkar A, Suansa NI, Fuadah AS, Hartoyo APP. 2021. Ethnotaxonomy of food plants in Gayo People: A case study in the Jabodetabek community. *IOP Conf Ser Earth Environ Sci*. 771(1).doi:10.1088/1755-1315/771/1/012039.

Kapp K. 2015. Polyphenolic and Essential Oil Composition of Mentha and Their Antimicrobial Effect DIVISION OF PHARMACEUTICAL BIOSCIENCES FACULTY OF PHARMACY DOCTORAL PROGRAMME IN DRUG RESEARCH UNIVERSITY OF HELSINKI.

Kimmerer RW, Lake FK. 2001. Kimmerer and Lake 2001. *J For*. 99(11):36–41.

Kunwar RM, Bussmann RW. 2008. Ethnobotany in the Nepal Himalaya. *J Ethnobiol Ethnomed*. 4(January).doi:10.1186/1746-4269-4-24.

Levine J, Muthukrishna M, Chan KMA, Satterfield T. 2015. Theories of the deep: Combining salience and network analyses to produce mental model visualizations of a coastal british columbia food web. *Ecology and Society*. 20(4).doi:10.5751/ES-08094-200442.

Linden E. 1991. Lost Tribes, Lost Knowledge. Time:46-54.

Maundu PM. 1997. The Status of Traditional Vegetable Utilization in Kenya. in: Guarino L. (ed.). Traditional African Vegetables: Promoting the Conservation and Use of Underutilized and 9 Neglected Crops. Proceedings of the IPGRI International Workshop on Genetic Resources of traditional vegetables in africa: conservation and use; 1995 aug 29-31; nairobi; kenya; rome: institute of plant genetic and crop plant research.

Mcinerney C. 2002. Knowledge management and the dynamic nature of knowledge. Volume ke-53.

Mekonen S. 2017. Roles of Traditional Ecological Knowledge for Biodiversity Conservation. *Journal of Natural Sciences Research*. 7(15):21-27–27.

Nunis T, Harlock S. 2005. Field Management and Rotations. In Organic Vegetale Production: A complete Guide. (ed.) Davies G, Lennartsson M, in association with the Henry Doubleday Research Association, UK pp.140-154.

Pandey A. 2017. Ethnobotany and Its Relevance in Contemporary Research.

Pretty JN. 2009. Conservation & Society. (December).

Purba EC, Silalahi M, Nisyawati. 2018. Gastronomic ethnobiology of "terites"—a traditional Batak Karo medicinal food: A ruminant's stomach content as a human food resource. *Journal of Ethnic Foods*. 5(2):114–120.doi:10.1016/j.jef.2018.06.002.

Putri WK, Hakim L, Indriyani S. 2017. Plants Diversity for Ethnic Food and the Potentiality of Ethno-culinary Tourism Development in Kemiren Village, Banyuwangi, Indonesia. *Journal of Indonesian Tourism and Development Studies*. 5(3):161–168.doi:10.21776/ub.jitode.2017.005.03.04.

Richardson RB. 2010. Ecosystem services and food security: Economic perspectives on environmental sustainability. *Sustainability*. 2(11):3520–3548.doi:10.3390/su2113520.

Saragih DE, Arsita EV. 2019. Kandungan fitokimia Zanthoxylum acanthopodium dan potensinya sebagai tanaman obat di wilayah Toba Samosir dan Tapanuli Utara, Sumatera Utara. *Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia*. 5(1):71–76.doi:10.13057/psnmbi/m050114.

Sayok AK, Teucher U. 2018. Loss of Food Plants Knowledge and Identity among Indigenous Peoples in Malaysia. *Journal of Advanced Research in Social and Behavioural Sciences Journal homepage*. 11(June):174–188.

Sen B. 2005. Indigenous knowledge for development: Bringing research and practice together. *The International Information & Library Review*. 37(4):375–382.doi:10.1016/j.iilr.2005.10.004.

Seto KC, Reba M. 2018. City Unseen: New Visions of an Urban Planet.

Shaheen H, Shinwari ZK, Qureshi RA, Ullah Z. 2012. Indigenous plant resources and their utilization practices in village populations of Kashmir Himalayas. *Pak J Bot*. 44(2):739–745.

Srinivasan K. 2005. Role of spices beyond food flavoring: Nutraceuticals with multiple health effects. Food reviews international . 21(2):167-188.Sukenti K, Hakim L, Indriyani S, Purwanto Y, Matthews PJ. 2016. Ethnobotanical study on local cuisine of the Sasak tribe in Lombok Island, Indonesia. *Journal of Ethnic Foods*. 3(3):189–200.doi:10.1016/j.jef.2016.08.002.

Sunkar A, Hidayati S, Hartoyo AP, Al-Gayoni YU. 2021. Ethnobotanical knowledge and vitality of Gayo ethnolinguistic in Jabodetabek, Indonesia. *IOP Conf Ser Earth Environ Sci*. 771(1).doi:10.1088/1755-1315/771/1/012007.

Vandebroek I, Balick MJ. 2012. Globalization and loss of plant knowledge: Challenging the paradigm. PLoS One. 7(5).doi:10.1371/journal.pone.0037643.

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