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DISTRIBUTION, EXPLOITATION AND MARKETS FOR SUPPLEMENTS (*Codonopsis javanica* (Blume) Hook.F & Thoms) IN SON LA

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Abstract: *Codonopsis Javanica* (Blume) Hook.F & Thoms is a vine. *Codonopsis Javanica* (Blume) Hook.F & Thoms has medicinal value, high economic value and conservation significance. *Codonopsis Javanica* (Blume) Hook.F & Thoms is recorded in the Vietnam Red Book (2007) under the VU level (will be endangered), group 2 in the List of endangered and rare forest plants and animals in the Decree 06/2019 of the Government of Vietnam. This study was carried out within the framework of the Scientific Research and Technological Development Project at the Ministerial level, the Ministry of Education and Training, code B2019 – TTB – 03 in Son La area. The study was conducted in 5 districts of Son La province: Song Ma district, Sop Cop district, Thuan Chau district, Moc Chau district and Van Ho district. Carry out 25 investigation routes. Make 20 standard plots to assess the distribution status. Survey and interview 150 households at 5 points to assess the status of exploitation and product consumption market in Son La. Research results have clarified the characteristics of natural forests where species are distributed in terms of forest nests, mother trees, regenerated trees, demand for use, market for consumption, and methods of collection by local people. *Codonopsis Javanica* (Blume) Hook.F & Thoms root is a product very familiar to the local community in Son La from generations to now. In the community of people living near the forest (mainly the Thai community, the H'Mong people) have passed on the experience of species identification, how to exploit, use, and begin to pay attention to planting in the garden. households and commercialization of products. These are important bases for breeding and afforestation to develop this species locally.

Keywords: Codonopsis Javanica (Blume) Hook.F & Thoms, exploitation, consumption market, distribution, indigenous knowledge, Son La province.

1. Introduction

Codonopsis Javanica is harvested in the winter, and the telltale sign is yellowing and deciduous leaves. Or can be harvested at the beginning of spring next year when the leaves have not yet sprouted. In the process of harvesting iso ginseng, it is necessary to dig the roots more than 0.7 meters deep and not scratch the roots. After harvesting, the roots are brought back to clean the dust, then incubated overnight or can be used to evaporate the ginseng. When the ginseng is soft, it can be thinned from 1 to 2 cups and then soaked in ginger juice to reduce the solderability or copy it before use. Dang ginseng is preserved by covering it tightly to avoid moisture, need ventilation, dry, avoid moldy cases because the medicine is sweet herbal and susceptible to termites.
(source: vinmec.com)
Fig 1 – Codonopsis

(source: Wikipedia.org)

2. Previous studies

We analyze in below table:
Table 1 – Summary of related studies

Authors	Year	Content, results
Vo Van Chi and Tran Hop	2002	*Codonopsis Javanica* has the names Sam leo, Ginseng, Chicken thighs, Man Ray Cay (Tay), Cang Ho (H'Mong) are widely distributed in Lai Chau and Lao Cai provinces, Ha Giang, Son La, Yen Bai, Tuyen Quang, Cao Bang, Lang Son to Kon Tum, Lam Dong, Quang Nam provinces
Liulin et al	2012	Four new oleanane type triterpenoid saponins (**1**–**4**) and a known saponin (**5**) were isolated from the root bark of *Aralia taibaiensis* Z.Z. Wang et H.C. Zheng. The structures of the four new compounds were elucidated as 3-*O*-{*β*-D-glucopyranosyl-(1 → 2)-[*β*-D-glucopyranosyl-(1 → 3)]-*β*-D-glucurono-pyranosyl}-olean-11,13(18)-diene-28-oic acid 28-*O*-*β*-D-

		glucopyranosyl ester (**1**), 3-*O*-{*β*-D-gluco-pyranosyl-(1 → 3)-[*α*-L-arabinofuranosyl-(1 → 4)]-*β*-D-glucuronopyranosyl}-olean-11,13(18)-diene-28-oic acid 28-*O*-*β*-D-glucopyranosyl ester (**2**), 3-*O*-{*β*-D-glucopyranosyl-(1 → 2)-[*α*-L-arabinofuranosyl-(1 → 4)]-*β*-D-glucuronopyranosyl}-oleanolic acid 28-*O*-*β*-D-glucopyranosyl ester (**3**) and 3-*O*-{*β*-D-glucopyranosyl-(1 → 2)-[*β*-D-glucopyranosyl-(1 → 3)]-*β*-D-glucuronopyranosyl}-oleanolic acid 28-*O*-*β*-D-glucopyranosyl ester (**4**), on the basis of extensive spectral analysis and chemical evidence. Compounds **1**–**5** exhibited moderate effects on antioxidant and antiglycation activities, which correlated with treatment of diabetes mellitus.
Cheok et al	2014	Saponin is complicated compound made up of sugar link to a triterpenoid, or steroidal alkaloid widely distributed in plant kingdoms.
Nguyen Thi Thuy et al	2020	aims to evaluate the antioxidant ability and α-glucosidase inhibitory activities of Codonopsisjavanica

		extract to elucidate its mechanism in the treatment of diabetes type 2. The roots of Codonopsisjavanica were extracted with ethanol solvents and fractionated with n-hexane, ethyl acetate and butanol solvents. The total extract and the fractions were evaluated for free radical scavenging by 2.2-diphenyl-1-picrylhydrazyl method and α-glucosidase inhibitory activity in vitro. The study results show that ethyl acetate fraction from Codonopsisjavanica roots had the strongest antioxidant activity with a value of IC50 of 80.6 ± 2.8 µg/mL and a strong α-glucosidase enzyme inhibitory activity with a value of IC50 of 80.4 ± 5 µg/mL. These data suggest that ethyl acetate fraction from Codonopsisjavanica roots may have potential for the prevention and treatment of diabetes type 2
Cang Huynh Mai	2020	The root of a ginseng-like plant named Codonopsis javanica is a valuable ingredient in folk medicine with diverse biological properties and has been used in treatments for

		various diseases, including leukemia, inflammation, and hepatitis. This study aimed to optimize various parameters related to the extraction process of C. javanica root (CJR) with respect to total phenolic content (TPC), total flavonoid content, and antioxidant activities of the obtained CJR extract.

(source: author synthesis)

3. Methodology

A wide range of data was used to make analyses and propose solutions. Experiences in Vietnam planting were also mentioned. Besides, the Authors mainly use quantitative and qualitative methods, including synthesis, inductive and explanatory methods.

4. Main findings

4.1 Background

Describe:

Plants: Herbaceous, perennial, creeping by coiled stems. The roots are long, with a diameter of 1.5-2cm, branched, the root tip is enlarged with many keloid scars of the old stem, usually only a cylindrical root without branch roots, smaller towards the tail, When fresh, it is white, after it dries, the roots are yellow and wrinkled. Stems grow in clusters in spring, crawling on the ground or climbing into other trees, dark purple body, sparsely hairy, hairless at the top. Leaves ovate or ovate round, caudal pointed, near-stem heart-shaped, margin whole, greenish-yellow, upper surface villi, lower surface grayish-white smooth or sparsely hairy, 3-long. 8cm, 2-4cm wide. Light green flowers, growing individually in the axils of leaves, with 2-6cm long stalks, bell-shaped calyces, consisting of 5 narrow blades, 5 petals with purple veins in the throat, becoming pale yellow when about to fall, divided into 5 lobes, pistil 5, pistil slightly flattened, anther attached to base. The fruit is halved, club-shaped, with three centers of skin, a slightly flat head, with a short calyx, when ripe, it cracks. There are many smooth brown seeds.
(source: thuocdongduoc.vn)

Codonopsis Javanica or Ginseng is a precious medicinal plant in Vietnam. From 1978-1990, Party ginseng was used in the North mainly by natural exploitation (10-30 tons/year). And since then, the reserves of ginseng have been decreasing day by day. However, in the years 1991-1993, trees growing naturally in Lao Cai, Lai Chau and Ha Giang were still searched and exploited for cross-border sales. The Ginseng Party has been included in the "Vietnam Red Book" since 1996 for protection notice.
Codonopsis Javanica is a herbaceous plant with a long life span. Depending on the geographical location as well as the natural conditions in the surrounding environment of the ginseng, the stem can grow underground or climb up an object or another tree.

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4.2 Planting

We look at below table:

Table 2 – Survey route on the distribution of *Codonopsis Javanica* species in Son La

No.	Dist.	Location	North latitude		East longitude		Line length (km)	Number of dust *Codonopsis Javanica*
			Begin point	End point	Begin point	End point		
1	Mộc Châu 1	Đông Sang	20º50’40”	20º47’21”	104º39’8”	104º39’46”	7,22	3
2	Mộc Châu 2	Chiềng Sơn	20°47'29”	20°45'11”	104°35'5”	104°36'59”	6,83	1
3	Mộc Châu 3	Chiềng Sơn	20°43'57”	20°44'26”	104°36'53”	104°35'11”	4,16	1
4	Mộc Châu 4	Mường Sang	20°49'6”	20°48'48”	104°35'33”	104°35'12”	4,82	0
5	Mộc Châu 5	Mường Sang	20°49'55”	20°50'8”	104°34'46”	104°34'1”	4,1	1
6	Thuận Châu 1	Pha Đin Top	21º34’1”	21º36’18”	103º31’47”	103º32’27”	6,11	42
7	Thuận Châu 2	Copia	21º18’54”	21º20’8”	103º35’15”	103º33’41”	6,53	18
8	Thuận Châu 3	Copia	21°21'3”	21°21'14”	103°35'44”	103°34'55”	5,48	34
9	Thuận Châu 4	Copia	21°19'26”	21°20'29”	103°35'29”	103°36'19”	5,5	29
10	Thuận Châu 5	Pha Đin	21°34'3”	21°33'36”	103°32'17”	103°33'54”	4,18	46
11	Vân Hồ 1	Lóng Luông	20º45’5”	20º45’45”	104º52’22”	104º49’37”	6,68	53
12	Vân Hồ 2	Vân Hồ	20º47’28”	20º47’40”	104º45’29”	104º43’40”	5,34	21
13	Vân Hồ 3	Chiềng Xuân	20°42'47”	20°43'19”	104°45'15”	104°40'47”	8,33	30

No.	Dist.	Location	North latitude		East longitude		Line length (km)	Number of dust *Codonopsis Javanica*
			Begin point	End point	Begin point	End point		
14	Vân Hồ 4	Chiềng Xuân	20°43'1”	20°43'18”	104°40'29”	104°38'47”	5,59	21
15	Vân Hồ 5	Vân Hồ	20°43'58”	20°44'25”	104°52'18”	104°50'20”	4,64	39
16	Sốp Cộp 1	Nậm Lạnh	20°51’40”	20°47’55”	103°30’46”	103°32’24”	7,64	1
17	Sốp Cộp 2	Nậm Lạnh	21°0'42”	20°59'28”	103°55'56”	103°54'32”	5,33	2
18	Sốp Cộp 3	Púng Bánh	21°0'43”	21° 2'53”	103°28'18”	103°27'26”	4,45	0
19	Sốp Cộp 4	Dồm Cang	20°59'2”	21° 0'19”	103°34'13”	103°33'41”	3,01	4
20	Sốp Cộp 5	Nậm Lạnh	20°54'54”	20°56'11”	103°34'20”	103°33'6”	4,71	0
21	Sông Mã 1	Chiềng Cang	21°0’42”	20°59’28”	103°55’56”	103°24’32”	5,94	21
22	Sông Mã 2	Huổi Một	21°0’2”	20°58’43”	103°38’48”	103°47’36”	5,78	11
23	Sông Mã 3	Huổi Một	21°1'59”	21° 2'36”	103°37'50”	103°35'42”	4,3	19
24	Sông Mã 4	Huổi Một	21°0'38”	21° 1'37”	103°37'53”	103°37'2”	2,51	15
25	Sông Mã 5	Huổi Một	21°0'10”	20°58'11”	103°38'49”	103°41'42”	6,83	29

(source: author synthesis)

Crop:

Codonopsis Javanica prefers a cool climate all year round, grown mainly in Son La, Lai Chau, Lao Cai, Ha Giang and some provinces in the Central Highlands.

Plants can be propagated by root tips, but in production mainly by seeding. Choose old seeds that are free from pests for seeding. Seeds are collected in December-February and sown immediately in February-March. If the cold persists, they can be sown in April. Seeds are kept every other year, the growth rate is poor. Seeds are sown straight, not through the nursery
(source: thuocdongduoc.vn)

4.3 Advantages
Medicinal herbs: Round cylindrical roots slightly bent, 10 - 35 cm long, 0.4 - 2 cm in diameter. Outwardly pale yellow to grayish-brown, the upper part of the root has a circular concave stem, the lower part has many horizontal veins. The whole root has many longitudinal wrinkles and scattered with giant skin. The roots are flexible, the cross section is less flat, the bark is pale yellow, the core is ivory white. Mild aroma, sweet taste.
What is the effect of *Codonopsis Javanica* or ginseng? In oriental medicine, ginseng has a sweet taste, so it can directly affect the waste and spleen, helping the gas, supplementing the middle, giving birth to the new and convenient spleen. *Codonopsis Javanica* can be used for patients with weak spleen and stomach, bad blood, fatigue, poor appetite, loose stools...
(sourcer: vinmec.com)
Fig 1 - a medicinal plant with a vines stalk

(source: vinmec.vn)

5. Discussion and conclusion

Codonopsis Javanica has the scientific name Codonopsis sp. However, Danshen medicinal herbs are known as precious medicinal herbs used a lot in the world and each country will have different names for Danshen, such as Dang Shen Giseng in China, such as Dang Shen Giseng in China. Norway calls Cordonkilikke, Sweden calls Fatigmans...

In Vietnam, *Codonopsis Javanica or* ginseng is also called by many different names such as: party ginseng, Ngoc Linh ginseng, red ginseng, forest ginseng...

Codonopsis Javanica is used as a tonic to treat diseases related to raw, loose or broken stools, indigestion, pale face, low voice, weak limbs, shortness of breath, fatigue, and waste. In addition, iso ginseng is also used instead of ginseng in remedies that can treat diseases such as weak digestion, poor digestion, along with other medicines such as Bach Truc, Bach Linh, Hoai Son, Lien humiliation.... Remedies using isogonum ginseng in combination with ginseng, Bach Truc, and Huong Sa corps helps to supplement the central benefit of gas to

cure diseases related to malnutrition in young children or children with diarrhea, digestive disorders, malabsorption disorders.

Fig 2 - Codonopsis

(source: internet)

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