The Himalayan hallucinogenic honey and its future prospects and proposed uses

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Abstract

In the valleys of Annapurna Himalayan mountain range of central Nepal, houses the country's one of the most treasured medicinal (or probably toxic) wealth, The Himalayan honey. It is also known in various names by various parts of the world namely, Himalayan honey; mountain honey; etc. is found. It is harvested by the localities Gurung people in the remote villages of Talo Chipla. The bees producing this honey are not normal bees, they are the largest bees in the world, namely; *Apis dorsata laboriosa*, the mysterious Himalayan honeybees of the Nepal. Due to high altitude, normal bees are not able to reach heights to feed on the nectar of the Rhododendron (*Rhododendron ferrugineum*) flower. It is Nepal's national flower, and the pollen picked up by these enormous bees, contains the chemical Grayanotoxin, which infuses their honey with its drug-like qualities. It is almost impossible control the amount of rhododendron pollen used up by the bees, so the potency of the high-inducing, hallucinogenic-psychedelic honey varies from season to season. Yet, during spring and fall as evident from various studies, it has been seen that the amount of psychedelic activity of the honey is more. The Kulung people of eastern Nepal have used the honey for long periods of times as a cough syrup and an antiseptic and further medicine whereas the beeswax has been used up as adhesive with other chemicals and skin care medicine. The use of this honey by various people has been documented over various cases in various patients.

There has been reports of disease and even causalities by consuming this honey that has been reported by consumption of the hallucinogenic, psychedelic honey. In recent years, however the controlled use of the purified physio-chemical of the hallucinogenic honey upon further purification and in properly administered dosages can be used as a new novel drug to treat several neuroleptic disorders. Integrated exploration in this honey and also in the bees may lead to discovery of new noble compound that may lead to humanity to a new stepping stone of drugs of tomorrow.

Introduction

Due to high altitude, normal bees are not able to reach heights to feed on the nectar of the Rhododendron (*Rhododendron ferrugineum*) flower. It is Nepal's national flower, and the pollen picked up by these enormous bees, contains the chemical Grayanotoxin, a group of closely related neurotoxins named after Leucothoe grayana. Grayanotoxin I is also known as landromedotoxin, acetylandromedol, rhodotoxin and asebotoxin, which infuses their honey with its drug-like qualities. The people of eastern Nepal have used honey as cough syrup, antiseptic and Beeswax as skin care medicine. By controlled use of purified psysio-chemical, and after further purification process it can be used as new novel drug specially for treatment of Neuroleptic disorders and may open a new path for . So, Here we are going to look into several nobel Bio-components which can open a new pathway of drug discovery for tomorrow & future generation.

Geographical Location

All the Nepalese honey are produced by *Apis dorsata laboriosa*, found mostly in Shahbgunj, Dhakeri, Narayanpur and Perari Forests, Nepal. All these areas belong to Banke district of Terai, mid-eastern region Nepal. Narayanpur and Perari forests are located near Nepal-India boarder. The altitude approximately is 200m. Similarly Shahabgunj and Dhakeri areas are located near east-west highway of Nepal. Subtropical climate prevails in this area. Ten to twenty colonies of *A. dorsata laboriosa* may be found on the same tree, which is usually named as bee tree or generally found more in a hanging mountain cliff. Since up-to 50 colonies of giant honey bees (*A. dorsata* and *A. laboriosa*) may aggregate on the same nesting site and each colony can give 10 to 30 kg of honey in a single harvest, honey hunting is an important apicultural practice in Nepal.

Place & Bio-component

Nepalese honey samples stored for 8 months showed pH in the range of 3.9-4.6, free acidity 48.5-53meq/kg, lactone 15.5-17.1meq/kg, total acidity 61-70meq/kg, electrical conductivity 0.24-0.64mS/cm, Proline content 148-241mg/kg, HMF content 53.4-122mg/kg, Diastase Number 1.02-13.25DN and Invertase Number 0.58-10.5IN. After 16 months of storage the various parameters recorded were: pH 3.7-5.08, free acidity 46.1-57.07meq/kg, lactone 17-19meq/kg, total acidity 64-74meq/kg, electrical conductivity 0.29-0.71mS/cm, Proline content 66.43-120mg/kg. HMF content was 30-56mg/kg. Similarly diastase Number (0.22-0.86DDN) and Invertase Number (00-0.71IN) were much below than the minimum standard, fructose 36.93-44.61%, glucose 19.61-27.51% and sucrose 12.07-20.38%. Although honey produced by *A. dorsata* from Nepalese forest showed various quality parameters close to International Honey Quality Standards, yet its shelf life was shorter due to high moisture content.

Table I.- Physicochemical analysis of *A. dorsata* honey from four forests, Nepal.

Physiochemical parameters	Shahabgunj Forest (n=40)	Dhakeri Forest (n=29)	Narayanpur Forest (n=21)	Perari Forest (n=9)	Codex draft 1999	EU draft 1999	Directive 2001/EC **
pH	4.68±0.027	4.58±0.03	4.39±0.04	3.8±0.06			
Free acidity (meq/kg)	41.65±1.22	43. 16±0.67	43. 14±2.34	48.88±2.40	≤50	≤40	≤50
Lactone (meq/kg)	14.25±0.48	13.76±0.32	15.14±0.40	16.33±0.48			
Total acidity (meq/kg)	55.5±1.51	56.92±0.85	60.02±1.55	65.22±2.56			
Moisture content (%)	22.97±0.18	23.99±1.36	23.91±0.18	22.21±0.48	<21	<21	<21
Diastase activity (DN)	27.69±1.11	29.35±1.36	25.48±0.86	5.53±1.81	<8		<8
Proline content (mg/kg)	76.71±5.57	100.08±13.39	119.98±11.31	160.64±14.67	180*		
HMF content (mg/kg)	33.38±2.74	30.36±3.39	36.48±4.00	56.10±8.97	<60	<40	<60
Invertase Number (IN)	390.31±11.07	463.78±9.04	483.68±3.89	499.83±10.05	<10*		
Electrical conductivity (mS/cm)	0.60±0.00	0.61±0.01	0.48±0.74	0.22±0.03	0.80*		
Apparent reducing sugars (%)	74.99±0.64	77.76±0.48	76.02±0.74	73.76±0.90			
Fructose (%)	39.28±1.06	39.81± 1.85	44.61±1.72	36.93±1.77			
Glucose (%)	19.61±0.55	20.17±0.89	25.52±1.37	27.51±1.50			
Sucrose (%)	17.88±0.88	15.95±0.63	20.38±0.63	12.07±1.17	≤5	≤5	≤5
Unidentified sugars (number)	3.43±0.31	2.97±0.28	2.38±0.21	2.22±0.32			
Unidentified – sugars (%)	1.13±0.08	0.92±0.13	1.14±0.03	1.01±0.20			

ANOVA, pH, $P<9x10^{-4}$; Free acidity, $P<6.788x10^{-4}$; lactone, $P<6.079x10^{-4}$; Total acidity, $P<8.15x10^{-4}$; Moisture, $P<2.14x10^{-4}$; Diastsae activity, $P<0.020$; Proline content, $P<0.020$; HMF, $P<0.012$; Invertase number, $P<2.96x10^{-3}$; Conductivity, $P<0.013$; App. redu. sugars, $P<3.59x10^{-4}$; Fructose, $P<1.49x10^{-3}$; Glucose, $P<5.88x10^{-3}$; Sucrose, $P<4.98x10^{-3}$; Unidentified sugars no., $P<7.67x10^{-3}$; Unidentified sugars %, $P<2.71x10^{-3}$.

*The suggested values for invertase activity, Proline content and electrical conductivity for new honey standards (Bogdanov *et al.*, 1999)

**Council of the European Union. Council Directive 2001/ 110/EC of Dec 20, 2001, relating to honey. *Off. J. Eur. Commun.*, 2002, Jan 12, L10/47-L10/52.

Fig1: Apis Dorsata laboriosa

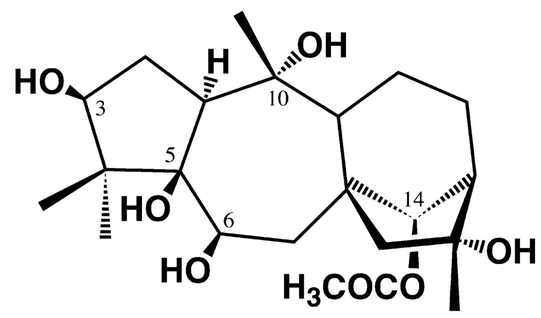

Fig2: Grayanotoxin 1; Found in Himalayan Honey.

Discussion

Since phenolic substances have been shown to be responsible for the honey antioxidant activity, total phenol content of the honey samples was investigated. The results of Physiochemical and total phenolic content (TP) of the samples determined by DPPH assay and Folin-Ciocalteu method are presented in Table 1 Similar phenolic contents of several honeys from various floral sources were reported in literature, among which the highest TP contenet was found in strawberry tree (*Fragaria ananassa*) honey and honeydew honey samples [Gheldof & Engeseth, 2002; Beretta *et al*., 2005; Bertoncelj *et al*., 2007]

Conclusions

Honey produced by *A. dorsata* collected from Nepalese forest shows various quality parameters close to the International Honey Quality Standards, yet it, showed shorter shelf life due to natural high moisture contents. Two quality parameters *i.e.* Invertase number and moisture content are quite distinctive and can be used as parameters to identified honey on the basis of bee species type. It appears that International Honey Standards are based on honey produced by *A. mellifera*. There is an urgent need that fresh standards be delimited keeping in view the honey composition of Asian species.

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