The Substitution of *Materia Medica* in Tibetan Medicine: An Inquiry into Traditional Tibetan Treatises*

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Abstract: The substitution of *materia medica* in Tibetan medicine was an important issue in the past, and still is today. This article will offer a brief survey of references found in Tibetan written sources, and discuss the only three Tibetan treatises that deal exclusively with the subject. It will explore the underlying modes of substitution, and provide insights into the criteria that are used to determine suitable substitutes. Ultimately it will be demonstrated that one can distinguish seven criteria—namely the taste, healing potential, type, substance, name, shape, and smell—that are used to determine an appropriate substitute for rare or expensive *materia medica* in the Tibetan medical tradition.

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1. Introduction

During an interview with Dr. Sonam Wangdu Changbhar from the Tibetan Herbal Clinic, Calcutta, in 1998, he was asked about the costs of Tibetan drugs. In his answer he touched on an issue that is highly relevant for Tibetan doctors all over the globe:

Another important aspect is the high cost of the ingredients of Tibetan medicine and the difficulty in procuring them, like musk, gall stone of elephants, bear’s bile, etc. A few things are available in India and neighbouring countries, but they are very expensive. Saffron, nowadays, costs Rs. 50,000 per kilogram (approx. US$ 1250 per kg). Medicinal plants which grow beyond 15,000 feet above sea level are very rare. They require special attention because the flowering time of these herbs is sometimes only a day or a week. Hence, the doctor has to arrive during the right season, at the right place and right time to get a particular herb. Metals, minerals, precious and semi-precious substances, like gold, silver, diamond, sapphire, turquoise, pearl, coral, etc., are also used in some Tibetan precious pills.  

Here the most important reasons for substitution in Tibetan medicine are already mentioned. Some substances are rare and expensive, and some are difficult to obtain. One might also add that sometimes the best type or quality is not available, some ingredients are used too frequently in Tibetan medicine, and sometimes materia medica can be too difficult to identify, even by Tibetan doctors themselves. These reasons for substitution in the creation of Tibetan medicines are just as applicable to the past as they are the present.

Despite the fact that this is a highly relevant and critical issue, modern scholarly works fully addressing the subject of substitution are virtually non-existent. The only exception is an important article written by Katharina Sabernig in 2011. After giving an introductory note on Tibetan pharmacology and briefly examining the difficulty in finding precise identifications of Tibetan substances in terms of Western biological equivalents, she analyses the frequency of four ingredients used in Tibetan formulas—namely musk (latsi, gla rtsi), bezor, gallstone or bile of an

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2 The first term in the parentheses is phonetic transcription and the second is its transliteration. The transcription developed by The Tibetan and Himalayan Library (THL) is used in this article in order to make Tibetan terms also phonetically accessible for non-Tibetologists. On the THL
elephant (giwam, gi wam), bear’s bile (domtri, dom mkhris), and rhino’s horn (seru, bse ru)—based on three modern sources. She also discusses in some detail the substitution of frequently used materia medica. Besides the ingredients already mentioned, she also analyses saffron (gurgum, gur gum) and bitumen (drakzhün, brag zhun). Her findings are supplemented by field data from the hospital of Kumbum monastery in Amdo (Qinghai). Her important contribution basically confirms the common reasons for substitution in Tibetan medicine as expressed by Dr. Sonam Wangdu Changbhar in the passage cited above. She only occasionally, however, refers to two traditional Tibetan sources with regard to substitution—namely the The Four Tantras (Rgyud bzhi) and the Lump of Crystal: A Rosary of Crystal (Shel gong Shel phreng). The former is a fundamental medical treatise authored by Yutok Yönten Gönpo (G.yu thog Yon tan mgon po, fl. 12th cen.), and the latter a treatise on materia medica written by Deumar Tendzin Püntsok (De’u dmar Bstan ‘dzin phun tshogs, b. 1672). In her opinion they represent the most important sources on this subject, though she does not give any explicit reasons for this. However, one may also entertain a different view. Both texts do indeed provide some information about substitution, but they cannot be regarded as essential for this issue. In fact, there are other medical sources that treat the subject of substitution more explicitly, and it is these that form the subject of this paper. It should be stressed that this paper is a survey of textual sources on substitution, and does not include data obtained from fieldwork. Moreover, it will not deal with the theoretical concepts of Tibetan pharmacology, such as the six kinds of taste and so on, but introduces textual sources on substitution, provides an overview on the substances concerned, and discusses modes of substitution and its criteria. Some concluding remarks will be given at the end.

2. Textual Sources on Substitution

One can safely assume that substitution was critically important for the Tibetan medical tradition in the historical past, but there are only a few extant writings that exclusively treat the subject, which are known as


‘substitution manuals’ (tshab yig). One can find some advice on substitution in medical sources, but it is rarely presented in a systematic way, and it is always presented as supplementary information only. In early Tibetan sources, such as the King of the Moon (Zla ba’i rgyal po) and the Yellow Covered Book of Biji (Bi ji po ti kha ser), I have been able to find only one example of materia medica substitution. In the King of the Moon it is stated that both mother of pearl (nyachi, nya phyis) and a blue pearl (mutik ngo, mu tig sngo) can be used as a substitute for the fresh brain of a boy. Furthermore, methods for substitution are not explicitly mentioned in The Four Tantras, the fundamental medical treatise written by Yutok Yönten Gönpo. He lists specific materia medica and their healing potentials in the twentieth chapter of the second part of this treatise, where he gives some examples of two or three materia medica that can cure the same disease(s). Undoubtedly Yönten Gönpo knew that different materia medica can potentially heal the same illness, but he does not discuss the concept of substitution as such.

Another medical work, the Royal Treasury (Rgyal po’i dkor mdzod), dates from about the same period as the Four Tantras. It mainly represents instructions by Drakpa Gyeltsen (Grags pa rgyal mtshan, 1147-1216) that were probably compiled by his nephew, Sakya Pandita Kunga Gyeltsen (Saska Paṇḍita Kun dga’ rgyal mtshan, 1182-1251), both famous religious dignitaries of the Sakya school. The Royal Treasury describes treatments for various ailments and diseases, especially injuries of the head, and recommends the use of alternative substances three times, usually in terms of whatever suitable materia medica is available. For a certain treatment, for example, a doctor is instructed to prescribe either sugar (kara, ka ra), the ‘three sweet substances’ (ngarsum, mngar gsun), or whatever else is

5 Usually the term tsap (tshab) or tsapma (tshab ma) is used to signify a substitute or a substitution. Often such terms are not necessary, however, and it is simply stated that one should use X if Y is not available or difficult to obtain.

6 There are diverse opinions on what the scientific classification of nyachi might be. Sources variously identify nyachi as mother of pearl, the shell of an abalone or ormer (Haliotis diversicolor Reeve), the pearl of the cockscamb pearl mussel (Cristaria plicata [Leach]), the nacre or pearls of various pearl oysters (Pteria martensii [Dunker], Pteria margaritifera L.) and of freshwater mussels (Hyriopsis cumingii [Lea], Anodonta woodiana [Lea], Margaritifera dahurica [Middendorff]). For identifications and references, see nyachi in the Appendix.

7 Similar to nyachi, opinions about the scientific identification of mutik vary widely. Two authors just provide the basic meaning that it is a pearl, while others state that it is the pearl of a specific pearl oyster or freshwater mussel. For identifications and references, see mutik in the Appendix.

8 bus pa’i klad pa ma sungs pa / tshab ma nya phyis mu tig sngo, Zla ba’i rgyal po 279/13.

9 Grwa thang rgyud bzhi.
available. For curing an illness of the throat, a drug containing gentian (pangyen, spang rgyan) is recommended. The physician is advised to use either the white or the blue pangyen, depending on which one is available. In another instance, the physician is recommended to prescribe the bile of a black-haired bull as the first choice, but the bile of any bull would also be fine if it cannot be obtained. Moreover, Drakpa Gyeltsen states that both ligadur (li ga dur) and lagang (gla sgang) have the same healing potential, and therefore one can use either of them to treat ‘lung diseases.’ These examples from the Royal Treasury are early instances of textual evidence that the availability and substitution of materia medica was also on the minds of Tibetan doctors in the period when essential treatises such as The Four Tantras were being composed. However, one of the surprising

10 The three sweet substances are honey, sugar, and molasses.

11 The plant pangyen is traditionally classified according to the color of its flowers. The following types can be found: white pangyen (spang rgyan dkar po), small white pangyen (spang rgyan dkar po chung ba), pale yellow pangyen (spang rgyan me tog ser skya), dark blue pangyen (spang rgyan sngo nag), multi-coloured pangyen (spang rgyan khra bo), bluish-green pangyen (spang rgyan sngon po) and dark pangyen (spang rgyan nag po). Most publications follow this Tibetan classification and suggest different identifications accordingly. This same scheme is used as it is clearer and more accessible than just listing each author under the heading of pangyen. It is noteworthy that all authors fully agree that in each case it is a Gentiana species. For identifications and references, see pangyen in the Appendix.

12 The identifications mainly focus on the genera Bergenia, Geranium, and Rhodiola. Some authors also name species of the genera Rheum, Cyperus, and Erodium. This wide range is due to the fact that in Tibetan tradition there are two types of ligadur (alias gadur): a superior type (ga dar mchog) and an inferior type (ga dar dnam po). A few authors clearly acknowledge this in their identifications, but most do not. For identifications and references, see ligadur in the Appendix.

13 The identifications for lagang vary widely. Plants of the Polygonum, Cyperus, and Geranium genera are favored. For identifications and references, see lagang in the Appendix.

14 Rgyal po’i dkor mdzod 40/2, 82/2, 128/7, 3/20. In this regard it is important to note that to equate biomedical diseases with those of Tibetan medical tradition would be an oversimplification. For instance, if a certain plant is said to cure ‘liver diseases’ according to Tibetan medical tradition, this does not necessarily mean that such a plant would treat hepatitis or other biomedical diseases of the liver. In other words, a diagnosis made by a Tibetan doctor is not necessarily identical with a diagnosis made by a Western doctor, and, for instance, a patient with a ‘liver disease’ according to Tibetan medical diagnostic techniques might be diagnosed with a completely different disease according to biomedical diagnostics. With the exception of Kletter and Kriechbaum (2001), this important problem is not adequately addressed in most research into the intersections of Tibetan and biomedical traditions. In the present article, ‘single quotation marks’ are used to signify the interpretive limitations of literal translation.
findings of this survey is the fact that references to such practices are so rare in the written sources.\textsuperscript{15}

Examples of instructions for the substitution of \textit{materia medica} are also quite rare in the collected anthologies of treatises written by medical practitioners living in the thirteenth century. Tsangtö Darma Gönpo (Gtsang stod Dar ma mgon po, fl. 13th cent.), for example, composed an anthology of medical instructions for his sons and his pupils. Darma Gönpo was an important doctor of the Cherjé medical school (\textit{cher rje lugs}), who was familiar with \textit{The Four Tantras}, but was mainly trained in his family tradition, which was based on the \textit{As\text{"a}ngahādyaśamhitā}.\textsuperscript{16} It appears that there is not a single example of instructions regarding the substitution of \textit{materia medica} that can be found in his writings.

By the fifteenth century this situation begins to change. The Ten Million Instructions: Relics (\textit{Man ngag bye ba ring bsrél}), for example, is a collection of numerous short treatises mainly authored by Nyamnyi Dorjé (Mnyam nyid rdo rje, 1439-1475), the celebrated founder of the Zur medical school. Compared with the other texts just mentioned, the Ten Million Instructions is a treasure trove of information about the substitution of \textit{materia medica}. In total, he provides instructions for the substitution of two ingredients made from minerals, nine from animals, and twelve from herbal ingredients. Some of these instructions are well known in the Tibetan medical tradition—such as the advice to replace the urine of a fully ordained monk, if not available, with the urine of a seven-year-old boy.\textsuperscript{17} Others represent very specialized knowledge—such as the replacement of a ‘stone’ called the ‘\textit{khurkar} of Loro’ (\textit{lo ro'i khur dkar}) with a ‘stone’ named the ‘\textit{karkhung} of Loro region’ (\textit{lo ro'i yul gyi dkar khung}), also known as the ‘bird stone \textit{khurkar}’ (\textit{bya rdo khu dkar}).\textsuperscript{18} It is possible that the latter substitution was only of relevance to doctors practicing in southern Tibet. This replacement is listed in a brief work dealing with producing the so-called ‘jewel crystal’

\textsuperscript{15}To be sure, oral traditions play an important part in the transmission of Tibetan medical knowledge. It could be that the instructions for substitution were handed down orally, but this still needs to be proven. Moreover, contrary to popular beliefs about Tibetan medicine, there is no strict divide between textual and oral traditions. Reading Tibetan medical texts, one finds an abundance of teachings and instructions that were once orally transmitted, but later recorded in writing. This process of transmission is true for virtually all medical subjects. Therefore it is puzzling to encounter the extreme rarity of substitution in written sources. Also, the three treatises on substitution studied in this article rarely refer to oral knowledge or personal experience. If there was a strong oral tradition for substitution instructions, the authors of these works would probably have made use of it more frequently.

\textsuperscript{16}Gtsang stod zin thig dang yang thig.

\textsuperscript{17}Bye ba ring bsrél 617/21.

\textsuperscript{18}Bye ba ring bsrél 354/8. Loro is a region in Tibet.
(rinchen shel, rin chen shel), where such substitutions are common in regard to ‘precious and semi-precious stones’ for the obvious reason that they were too expensive or rare. Other doctors shared in such knowledge of substitutions, as one can see in the writings of Tendzin Püntsok, who incorporated Nyamnyi Dorjé’s work.\textsuperscript{19} The production of substitutes does not only concern ‘precious stones,’ but various types of ‘salt’ as well. For instance a common type of produced ‘salt’ is ‘horn salt’ (ratsa, rwa tshwa), produced from different types of livestock horn. A brief but important treatise by Nyamnyi Dorjé on this subject became a major source for future generations of doctors. It deals with substituting or producing certain types of ‘salt.’\textsuperscript{20} His work entitled Manufacturing Salt: A Mirror of Ambrosia (Tshwa bzo ldud rtsi’i me long) explains the process of making seven types of ‘salt.’ Among them is the above-mentioned ‘horn salt,’ cinnabaris (dachu, da chu),\textsuperscript{21} as well as rock salt (kharutsa, kha ru tshwa), which will be briefly discussed below. In a work entitled Responses to Various Queries on Manu-4 Potion, An Excellent Teaching of Zurkharwa: The Roar of a Lion (Zur mkhar ba’i khyadchos ma ru bzhi thang gi dris lan seng ge’i nga ro),\textsuperscript{22} Nyamnyi Dorjé makes a statement that is frequently quoted by subsequent Tibetan authors writing on substitution. He emphasizes that if one does not have all

\textsuperscript{19} Rig pa bzo gnas las tshogs.
\textsuperscript{20} Tshwa bzo me long.
\textsuperscript{21} Sometimes the name dachu is used as a synonym for mercury (ngulchu, dngul chu), cinnabar (tsel, mtshal), and cinnabar (chokla, cog la, also choklama, cog la ma). Sometimes it is regarded as a certain type of tsel. However, in a number of Tibetan treatises, such as A Lump of Crystal: A Rosary of Crystal, the author clearly distinguishes between each of these substances and deals with each separately. Tendzin Püntsok discusses the substance dachu under the category of ‘mineral medicine’ (domen, rdo sman) that can be melted. It represents a manufactured substance. It is said that its designation is a Chinese name. One can assume that it came traditionally from China. Dachu is described as being shaped like chokla, but its white color is brighter than the latter. Furthermore, Tendzin Püntsok states that choklama is the cinnabar (tsel) of India and China. This naturally occurring cinnabar looks like small needles put in rows, and is of maroon color. Regarding tsel, he writes that the different types of cinnabar (tsel) are distinguished by their place or region of origin, namely cinnabar of pebbles (shaktsel, shag mtshal), Mongolian cinnabar (soktsel, sog mtshal), ‘the great cinnabar’ (tselpoche, mtshal po che), cinnabar of arable land (zhingtsel, zhang mtshal), cinnabar of Kham (khamtsel, khams mtshal), and so on. In general, dachu comes from India, Russia, Central Asia, the Tibetan provinces of Tsang, Ü, and Kham. It has a maroon color, and the shape and shine of the ‘silver stone’ (nguldo, dngul rdo). In modern literature on Tibetan materia medica, the substance dachu is rarely listed. It is identified as a mercuric sulfide. The substances chokla and tsel are regularly discussed. There is clear consent among authors that chokla is cinnabar, and the same can be said about tsel. For references, see dachu, chokla and tsel in the Appendix.
\textsuperscript{22} Bye ba ring bsrel 364/19-368/24.
ingredients, such as an inula plant (*manu, ma nu*), and is going to use a substitute instead, the substitute should possess the same or a similar taste and healing potency as the originally prescribed ingredient. One would be utterly mistaken to use something different. Nyamnyi Dorjé highlights these aspects of taste and potency, and most doctors would certainly agree in theory, but it seems that in practice other criteria were relevant too, as it will be outlined below. Regardless, it is evident that Nyamnyi Dorjé had something to say on the details of *materia medica* substitution, and it is only regrettable that he did not write more on this subject.

In order to broaden the textual base for this survey, we now turn to an example from the rich commentarial literature on the *Four Tantras*. The *Blue Beryl* (*Baidurya sngon po*), a voluminous and highly influential commentary on the the *Four Tantras* written by Sangyé Gyamtso (Sangs rgyas rgya mtsbo, 1653-1705), provides a limited amount of information on substitution. Substitution is mentioned twenty-seven times in the *Blue Beryl*—namely for twelve types of plants, four types of minerals, and eleven types of animal substances. As one might expect, these instructions for substitution can mostly be found in descriptions of rare medicines and those that were difficult to obtain. The *Blue Beryl* includes a substitution for the urine of a hare (ribongi chu, ri bong gi chu), for example, that was considered helpful by later Tibetan authors, such as Karma Ngedön Tendzin Trinlé Rapgyê, also known as Karma Ratna (Karma nges don bstan ‘dzin ‘phrin las rab rgyas, Karma ratna, b. 1770). The occurrence of the exceedingly popular bear’s bile and the scarce ‘claws of the water monster’ among the list of substitutions is hardly surprising, as well as the flesh and bile of the peafowl (*mapja, rma bya*), a bird indigenous to regions adjacent to Tibet. The substitution of ‘red bodhicitta’ (jangsem marpo, *manu* is identified as *Inula racemosa* Hook.f. or *Inula helenium* L. Some authors give both identifications. One author adds that it could also be a species of the *Iris* and the *Aristolochia* genera. For botanical identifications and references, see appendix under *manu*.

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23 The plant *manu* is identified as *Inula racemosa* Hook.f. or *Inula helenium* L. Some authors give both identifications. One author adds that it could also be a species of the *Iris* and the *Aristolochia* genera. For botanical identifications and references, see appendix under *manu*.

24 Bye ba ring bsrel 367/18.

25 *Baidurya sngon po* 260/3, 264/14, 274/13, 279/9, 298/14, 305/10, 315/7, 325/6, 335/14, 335/21, 438/19, 666/10, 919/9, 930/12, 1092/12, 1093/5, 1095/9, 1096/15, 1097/9, 1097/14, 1101/6, 1105/2, 1105/3, 1237/18, 1246/15, 1247/3, 1248/22, 1274/20, 1292/8, 1334/2, 1336/11.

26 *Baidurya sngon po* 930/12, Pham bde'i sgo ‘byed lde mig 326/2. On the hare (ribong), see below.

27 The peacock is usually identified as the green peafowl, *Pavo muticus* Linnaeus, sometimes as its subspecies *Pavo muticus imperator* Delacour. One author only writes that it is the Indian or blue peafowl, *Pavo cristatus* Linnaeus. For the identifications and their references, see *mapja* in the Appendix.

28 *Baidurya sngon po* 1092/12, 1093/5, 1095/9, 1096/15, 1097/9, 1097/14, 1101/6, 1105/2, 1247/3.
byang sms dmar po) and ‘white bodhicitta’ (jangsem karpo, byang sms dkar po)—that is, menstrual blood and semen—is also a common topic when substitution is discussed in the Tibetan medical tradition. Such topics are also addressed in the treatises on substitution that shall be analyzed below. In sum, Sangyé Gyamtso provides several important instructions that were followed by doctors of later generations, but he does not give a systematic review of substituted materia medica in Tibetan medicine. Given the importance of materia medica substitution, as well as Sangyé Gyamtso’s aspiration to unite diverging commentarial traditions and establish orthodox interpretations of the Four Tantras, his attention to substitution is surprising by its scarcity. His lack of attention to substitution is even more astonishing if one consults another work by the same author that is known in brief as Supplement to the Tantra of Instructions (Man ngag lhan thabs), the third part of the above-mentioned Four Tantras. It lists various treatments and drugs for the diseases known in Tibetan medicine. Here indeed it would have been a good opportunity to explore this issue in more detail, but even though numerous materia medica are listed, it seems that there is not a single case where substitutions are mentioned.

Following this brief and admittedly limited survey, let us consider a clinically orientated treatise composed in the nineteenth century, A Jewel Mine of Instructions (Man ngag rin chen ‘byung gnas), written by Jampel Chökyi Tendzin Trinlé (‘Jam dpal chos kyi bstan ‘dzin ‘phrin las, 1789-1838), a high religious dignitary and author of a famous geographical work. In his extensive work, he provides information about twenty-six substitutions, some of them mentioned twice. He mentions substitutes for nineteen plants, three minerals, and four animals. Notably Jampel Chökyi Tendzin Trinlé does not include instructions for ingredients that commonly require substitution, such as musk or bear’s bile, and instead focuses on common, and not exceedingly rare substances. For instance, he prescribes the use of an inula plant (manu, ma nu) if sulfur (muzi, mu zi) is not available, which are instructions not found in later treatises on substitution. He also advocates the use of a plant of the Lagotis or the Picrorhiza genus (honglen,

29 Baidurya sngon po 919/9, 1292/8.
30 See Ø rgyan Bstan ’dzin Tshab yig 146/2, Padma bstan ’dzin Tshab yig 253/5. Cf. also Blo bzang ngyi ma (2006), p. 249.
31 Man ngag rin chen ‘byung gnas 12/8, 19/18, 34/4, 34/12, 136/8, 156/8, 172/9, 261/11, 284/11, 334/12, 399/18, 414/3, 566/3, 692/13, 569/9, 613/8, 638/5, 692/13, 695/13, 785/12, 805/15, 807/1, 825/3, 829/6, 835/18, 842/12, 873/6.
32 Man ngag rin chen ‘byung gnas 785/12. Most authors agree that the Tibetan muzi usually refers to sulfur. There is only one publication offering further identifications. For identifications and references, see muzi in the Appendix.
hong len\(^3\) if costus (\textit{ruta}, \textit{ru ruta})\(^4\) cannot be obtained.\(^5\) Jampel Chökyi Tendzin Trinlé does include instructions for the substitution of rare substances, however, such as the brain of a hare (\textit{ribonggl lepa}, \textit{ri bong gi klad pa}), which can be replaced with white sesame (\textit{tilkar}, \textit{til \d{a}kar}).\(^6\) These instructions were probably included because it is stated in the \textit{Four Tantras} that there are three remedies that are solely efficacious for 'retaining the sap of the hollow viscera.'\(^7\) Some editions of the \textit{Four Tantras} also specify that these three remedies are hare’s brain, bear’s bile, and black sesame (\textit{tilnak}, \textit{til nag}).\(^8\) These three ingredients are also each called the ‘white single remedy,’ the ‘golden single remedy,’ and the ‘black single remedy,’ respectively.\(^9\) It also seems that there was a tradition in the commentarial literature on the \textit{Four Tantras}, such as the \textit{Blue Beryl}, that Yutok Yönten Gönpo expressed the opinion that white sesame can be used as a substitute if a hare’s brain is not at the doctor’s disposal.\(^{10}\) The treatise by Pema Tendzin repeats this view, but his other authors give no such statement.\(^{11}\) Another example of a substance that is difficult to obtain and

\(^3\) There is a clear divide in the identification of \textit{honglen}. Some regard it as a plant belonging to the genus \textit{Lagotis} (A), some to the genus \textit{Picrorhiza} (B). Some give species from both genera (C). The latter suggestion is often based on the Tibetan distinction between a superior type (\textit{hong len mchog}) and inferior type (\textit{hong len dman pa}), or between \textit{honglen} and brownish \textit{honglen} (\textit{hong len smug po}). It is remarkable how widely the identifications vary. Only a few authors agree with each other. For identifications and references, see \textit{honglen} in the Appendix.

\(^4\) The identification of \textit{ruta} as costus is by and large agreed, with a few exceptions. When the chosen binomial names differ they generally represent synonyms. Two authors distinguish between a white and black \textit{ruta}, and the former is said to be \textit{Vladimiria souliei} (Franch.) Ling, which is a synonym for \textit{Dolomiaeae souliei} (Franch.) C.Shih. The black \textit{ruta} is \textit{Aucklandia lappa} Decne., also known as \textit{Saussurea lappa} (Decne.) Sch.Bip. One publication erroneously states that \textit{ruta} is \textit{Inula racemosa} Hook. f. For identifications and references, see \textit{ruta} in the Appendix.

\(^5\) \textit{Man ngag rin chen ’byung gnas} 156/8.

\(^6\) \textit{Man ngag rin chen ’byung gnas} 825/3.

\(^7\) dang po snod kyi \textit{rtsi srung chig thub} (commentarial note: \textit{ri bong klad pa} dom \textit{mkhris til nag}) \textit{gsum}, Grwa thang \textit{rgyu}d \textit{bzh}i 275/2.

\(^8\) White and black \textit{til} are not usually differentiated in Tibetan literature on \textit{materia medica}. In fact, black \textit{til} is rarely singled out, and white \textit{til} is not discussed at all. All authors agree that \textit{til} refers to \textit{Sesamum indicum} L. Two give the synonym \textit{Sesamum orientale} L. For identifications and references, see \textit{tilnak} in the Appendix.

\(^9\) \textit{rtsi srung chig thub} \textit{gsum ni} / \textit{dkar po chig thub/} (commentarial note: \textit{ri bong klad pa} / \textit{ser po chig thub} (dom \textit{mkhris}) / \textit{nag po chig thub} (\textit{til nag}) \textit{gsun} \textit{shangs nas nub mo gtang} / \textit{dkar po chig thub} \textit{na rnyed na} \textit{ti} \textit{dkar gyis chog pa gong sman nas bzshed}, \textit{Rgyud bzhi dka’} \textit{grel} 369/11.

\(^10\) \textit{Baidurya sngon} po 666/10.

\(^11\) \textit{Padma bstan ’dzin Tshab yig} 248/13.
about which much has been written is the strong heart of an adult killed in battle, the so-called ‘knife heart’ (drin\-ying, gri\-snying).\(^{42}\) Two treatises on substitution (see below) as well as one modern author all prescribe substitutions for the ‘knife heart.’\(^{43}\) Jampel Chökyi Tendzin Trinlé recommends the heart of a wild yak, a hare, or whatever is fitting as a substitute. Indeed, these medicinal substances were considered to have the same healing potential, as one can see in the *Lump of Crystal: A Rosary of Crystal* by Tendzin Püntsok. These alternative kinds of heart, together with the heart of a parakeet (netso, ne\-tsho),\(^{44}\) are said to cure ‘diseases caused by gyel-demons,’ ‘insanity,’ and ‘acute heartache.’\(^{45}\) At the close of this brief overview, one might add that substitution did not just concern the ingredients of drugs, but also the so-called ‘medicine horse’ (menta, sman\-rta), which refers to the vehicle that delivers the drug to the location of the disease. For example, in his supplement to the third and fourth parts of the *Four Tantras*, Karma Ngelek Tendzin Trinlé Rapgyé (Karma nges legs bstan ’dzin phrin las rab rgyas, b. 18th cent.) states that the best ‘medicine horse’ is liquor combined with sugar, the medium choice is warm milk with sugar, and an inferior option is the use of good beer.\(^{46}\)

3. Tibetan Treatises on Substitution

As evinced by the above brief survey of early influential works in the Tibetan medical tradition, the issue of *materia medica* substitution did not receive the attention it deserved, despite its importance for physicians. This silence must have been one of the reasons that some doctors felt the need to compose treatises exclusively devoted to *materia medica* substitution. There are three pre-modern texts that document this interest, and each will be analyzed in turn in order to illustrate the different modes and criteria for substitution. The three treatises are:

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\(^{42}\) *Man ngag rin chen ’byung gnas* 19/18. The initial term ‘knife’ is commonly used in tantric and medical writings to denote the flesh or blood of a person who has met a sudden and violent end.


\(^{44}\) Four similar identifications are offered for *netso* in the literature. *Netso* can refer to the red-breasted parakeet (*Psittacula alexandri*), or its subspecies *Psittacula alexandri fasciata* Müller. Other options include the Lord Derby’s parakeet (*Psittacula derbiana* Fraser), or possibly the grey-headed parakeet (*Psittacula finschii* Hume). For identifications and references, see *netso* in the Appendix.

\(^{45}\) *rgyal gdon smyo ‘bog snying gzer ’joms par byed, Shel gong shel phreng* 23/11, 385/3.

\(^{46}\) *Phan bde nor bu’i bang mdzod* 724/9.
(1) A Collation of All Treatises on Substitution: Jewels Eliminating the Poverty of Doctors (Tshab yig yongs kyi bcud bsdu sman dbul sel ba’i nor bu) attributed to Tendzin Püntsok (Bstan ’dzin phun tshogs, b. 1672)

(2) A Treatise on the Substitution of the ‘Essence Medicine’: A Rosary of White Sandalwood (Rtsi sman rnuams kyi tshab yig dpal gyi dam bu’i ‘phreng ba) by Orgyen Tendzin Gyamtso (O rgyan Bstan ’dzin rgya mtsho, b. 19th cent.)

(3) A Treatise of Childish Joy on the Door for Fools to Enter the Art of Healing: The Use of Medicinal Herbs as Substitutes for Difficult to Obtain Materia medica. Together with Minor Remarks on Categories and Identifications (Blun po go srig la ’jug pa’i sgo byis pa dga’ ba’i bstan bcos bzang sman rnyed par dka’ ba’i tshab tu sngo sman glong rigs dang ngos ’dzin phran bu bcas) by Pema Tendzin (Padma bstan ’dzin, b. 1869)

Tendzin Püntsok was an important doctor, scholar, and author. He wrote many treatises on a variety of medical subjects. Today he is known as the author of A Lump of Crystal: A Rosary of Crystal (Shel gong shel phreng), a fundamental work on materia medica written in 1727. It consists of two parts: the first, entitled A Lump of Crystal (Shelgong, Shel gong) is a concise list of materia medica and their healing potentials. The second consists of an auto-commentary, entitled A Rosary of Crystal (Sheltreng, Shel phreng), meticulously describing each medicine mentioned in the first part. The above-mentioned work on substitution is attributed to him, and is included in a modern edition of his collected works.47

At the beginning of A Collation of All Treatises on Substitution, Tendzin Püntsok writes that in general some materia medica do not exist in Tibet and can only be found in India, as well as the fact that some are difficult to obtain for other reasons.48 According to him, some doctors have the mistaken notion that materia medica belonging to the categories of ‘essence medicine’ (tsimen, rtsi sman) and ‘medicine of the plains’ (tangmen, thang sman) possess better healing potency than all others, and that these two categories of materia medica are superior to those of the ‘herbaceous medicine’ (ngomen, sngo sman), which is said to have much weaker healing potency.49 Perhaps, because they are rare in his home region of Kham in

47 Bstan ’dzin phun tshogs Tshab yig II. See also Yon tan rgya mtscho (2008), pp. xvii ff. For a brief biographical account on Tendzin Püntsok, see Byams pa phrin las (2000 [1990]), 381ff.

48 Bstan ’dzin phun tshogs Tshab yig I 862/9.

49 Bstan ’dzin phun tshogs Tshab yig I 862/3. As explained by Boesi (2006), 68ff., the category of ‘essence medicine’ brings together heterogeneous materia medica on the basis of their healing potency and their smell and odor. On the categories of
eastern Tibet, here Tendzin Püntsok criticizes those that overprescribe ‘essence medicine’ and excessively use musk, bear’s bile, bitumen, and so forth in the creation of medicines. He expresses his discontent with the fact that there are varied opinions among doctors regarding which substitute should be used, each making up his own solution.\(^\text{50}\) This might also be due to the fact that the substitution of \textit{materia medica} from the ‘essence medicine’ and ‘medicine of the plains’ categories was commonly performed based on experience and daily practice only, but not on study.\(^\text{51}\) He stresses the fact that the instructions of skilled doctors and the practical treatises of scholarly physicians are the foundations of a valid tradition of practice.\(^\text{52}\) Emphasizing the importance of the correct understanding of taste, healing potency, and post-digestive taste as the foundations of all medical expertise, he explicitly refers to the statement made by Nyamnyi Dorjé about the significance of taste in substitution, and strongly criticizes doctors who emphasize similarity in shape.\(^\text{53}\) He refers to two treatises on equivalent \textit{materia medica} (’dra yig, ’dra tshab gi yi ge), one that is attributed to Drangti Penden Tsojé (Brang ti Dpal ldan ’tsho byed, b. 14th cent.) and the other by one Zurkharwa (Zur mkhar ba) (perhaps Nyamnyi Dorjé).\(^\text{54}\) He states that both works are not without their flaws, evinced by the fact that they disagree on certain points, but on the fundamental issues they do agree. According to them, a substitute should be chosen based on taste, healing potency, and post-digestive taste in general, and based on the healing potency derived from ‘nature’ (\textit{ngowo}, \textit{ngo bo}) of each individual drug in particular (that is, the warming, cooling, and neutral properties), and never because of its appearance or shape.

It is evident that Tendzin Püntsok was deeply dissatisfied with the practice of substituting that was common in his time, which seems to have been the main impetus for his writing of the treatise on substitution. In order to avoid presenting just another personal opinion and to establish a valid tradition of practice, he rests his work on authoritative sources, giving full quotations in every instance. The texts that he used correspond

\(^{50}\) Bstan ’dzin phun tshogs Tshab yig I 863/5.
\(^{51}\) Bstan ’dzin phun tshogs Tshab yig I 862/1.
\(^{52}\) Bstan ’dzin phun tshogs Tshab yig I 861/16.
\(^{53}\) Bstan ’dzin phun tshogs Tshab yig I 862/24.
\(^{54}\) Bstan ’dzin phun tshogs Tshab yig I 863/9.
to those found in *A Lump of Crystal: A Rosary of Crystal*, an indication that this treatise on substitution may indeed have been written by Tendzin Püntsok. Interestingly, Tendzin Püntsok claims to be part of the Biji tradition, which was important for the formative phase of Tibetan medicine in the eighth and ninth centuries, but appears to have discontinued by about the thirteenth century. The works associated with this tradition did not circulate widely in Tibet, and they are rarely cited in medical writings. Regardless, a reference to a work of the Biji tradition, *The Treatise of Equivalents: The Eyes of a Conch-shell* (*Pha stong bcu phyi*), can be found in *A Lump of Crystal: A Rosary of Crystal*, and in the treatise on substitution discussed here.\(^{55}\) The reference concerning a work called *About Tastes: A Rosary of Iron* (*Ro skor bcu phyi phreng ba*), which is purported to be part of the Biji tradition, may also refer to another treatise by the same title that was written by Nyamnyi Dorjé.\(^{56}\) As both works are not extant, this matter cannot be resolved.

Yet another work that deserves attention is a treatise entitled *The Wish-fulfilling Tree* (*Zhab dkar bzhin bstan bshing*), a medical manuscript that again is frequently cited in both works attributed to Tendzin Püntsok.\(^{57}\) It is part of a compilation of medical treatises called the *Authoritative Treatises: An Ocean of Jewels* (*Ges grags 'gyur brgya mtsho*), or the *Miscellaneous Writings of Dakpo* (*Bya' byung bcu'i las 'bum*), that was authored by the famous doctor and religious dignitary, Gampopa Sönam Rinchen (Sgam po pa Bsod nams rin chen, 1079-1153), who was also known as the Doctor of Dakpo (*Bya' byung bcu'i las rje*).\(^{58}\) It has always been very rare in Tibet, and is still unpublished today.\(^{59}\) Therefore, one cannot say much about its contents beside the fact that is a treatise on medicinal plants (*khrungs dpe*). Again quotations of this manuscript can frequently be found in both works attributed to Tendzin Püntsok, the treatise on substitution and the treatise on *materia medica*. The latest source mentioned in the work on substitution is the *Blue Beryl* (*Brid dugs sngon po*), finished by Sangyé Gyamtso in 1688.\(^{60}\) Moreover, one encounters statements made by a person referred to by the title *situ* (*si tu*) only. This appellation certainly refers to Situ Chökyi Jungné (Si tu Chos kyi 'byung gnas, 1699/1700-1774), an important and influential

\(^{55}\) Bstan 'dzin phun tshogs Tshab yig I 882/24, Shel gong shel phreng 362/6, Gso rig chos 'byung 1061/12, 1071/4.

\(^{56}\) Bstan 'dzin phun tshogs Tshab yig I 865/10, 865/18, 868/23, 869/8, 870/13; Shel gong shel phreng 136/8 etc., Gso rig chos 'byung 1061/13, 1177/14.

\(^{57}\) Bstan 'dzin phun tshogs Tshab yig I 866/5, 867/7, 867/20, 868/24, 869/24 etc., Shel gong shel phreng 112/22.

\(^{58}\) Gso rig chos 'byung 1135/24.

\(^{59}\) It seems that the Tibetan Buddhist Resource Center (TBRC) found a copy of it, but it has not been scanned yet, #W3CN2576.

\(^{60}\) Bstan 'dzin phun tshogs Tshab yig I 876/18.
Kagyü dignitary, well-versed in medicine as well, and said to be one of the teachers of Tendzin Puntsok.61

The second author listed above, Orgyen Tendzin, also known as Orgyen Tendzin Gyamtso, was the personal physician of the Thirteenth Dalai Lama. His most important works include treatises on refining mercury and on drugs.62 He wrote this treatise on substitution because he wanted to show which medicinal herbs growing in Tibet could be used instead of the ‘essence medicine’ coming from India and Nepal. The main sources for his work were one or more unnamed treatises on materia medica (khrungs dpe), the Four Tantras, especially its second part, and The Ocean of the Names of Drugs (Sman ming rgya mtsko) by the Third Karmapa Rangjung Dorjé (Rang byung rdo rje, 1284-1339).63 There also are references to the Blue Beryl and A Lump of Crystal: A Rosary of Crystal.

Nothing is known about Pema Tendzin, the third author listed above, except the small amount of information given by him in the colophon of his treatise.64 Based on the references and quotations he gives, one can assume that he lived in the nineteenth century or the beginning of the twentieth century. It is stated in the colophon that he composed his work in 1903 when he was thirty-four years old. In his lengthy introduction, Pema Tendzin points out that the substitution of materia medica was part of medicine right at the beginning of it history, because herbs that only grew in India and so forth had to be substituted with herbs that grew in Tibet. He highlights that this practice continued throughout Tibet’s medical history, and that it was common to replace substances that were difficult to obtain with common substances of similar healing potential. He also notes that substitution was of special significance for replacing ‘essence medicines,’ such as bear’s bile and musk, with ‘herbaceous medicines.’ Compared with both above-mentioned treatises, Pema Tendzin exhibits a transition in the use of textual sources. By the nineteenth and twentieth centuries, both the Blue Beryl and A Lump of Crystal: A Rosary of Crystal had gained the status of undisputed authorities on medical matters. Both works are by far the most cited sources, even exceeding the Four Tantras. A close third are the works of Tashibum (Bkra shis ’bum, b. 18th cent.), a close

61 Bstan ’dzin phun tshogs Tshab yig I 873/1, 873/12, 882/22, 889/20.
62 O rgyan Bstan ’dzin Tshab yig. See also Yon tan rgya mtsko (2008), pp. xx ff. For a brief biographical account on Orgyen Tendzin Gyamtso, see Byams pa phrin las (2000 [1990]), 410ff.
63 For the The Ocean of the Names of Drugs, see Sman ming rgya mtsko in the Collected Works of Rangjung Dorjé, or modern editions on Tibetan materia medica.
64 Padma bstan ’dzin Tshab yig 166/1. See also Yon tan rgya mtsko (2008), pp. xxiii ff.
disciple of Situ Chökyi Jungné.\footnote{Padma bstan 'dzin Tshab yig 190/10, 192/5, 193/5, 194/7, 194/11, 195/1, 196/2, 196/10, 199/9, 200/4, 209/1, 212/5, 214/1, 220/4, 225/8, 226/1, 227/14, 235/6, 236/4, 242/7, 244/1, 244/4, 251/6, 252/3, 256/6.} Other students of the latter, namely Tsewang Künkhyap (Tshe dbang kun khyab, b. 18th cent.) and Emchi Gyurmé (Im chi ’Gyur med, b. 18th cent.), are also briefly cited.\footnote{Padma bstan 'dzin Tshab yig 205/3, 210/15, 227/3, 230/3.} He was also acquainted with both the Northern and the Southern medical traditions (byang lugs, zur lugs). Moreover, he consulted, for example, the writings of Tsewang Tenpa (Tshe dbang brtan pa, b. 1631), a disciple of Chökyi Drakpa (Chos kyi grags pa, 1595-1659), the twenty-third throne holder of the Drigung Kagyü school, and a trained and practicing scholarly physician.\footnote{Padma bstan 'dzin Tshab yig 179/10, 219/13, 224/2, 228/1, 245/3.} It is evident that Pema Tendzin had received a thorough medical training. Moreover one can assume that he also practiced as a doctor. On three occasions he writes that a specific substitution represents his personal experience.\footnote{Padma bstan 'dzin Tshab yig 222/5, 222/11, 241/3.} Moreover, he frequently notes that certain information is based on the specific style of practice (phyag rgyun) of some doctors.\footnote{Padma bstan 'dzin Tshab yig 195/2, 195/5, 196/2, 199/11, 203/9, 205/5, 206/8, 208/11, 209/2, 210/11, 210/14, 211/2, 213/11, 216/1, 217/6, 218/18, 219/10, 223/4, 228/11, 251/11, 253/2, 254/14, 255/2, 255/9, 256/1.} He even goes as far as distinguishing between the practical handling of doctors from nomadic areas and that of doctors from the valleys.\footnote{Padma bstan 'dzin Tshab yig 244/8.} It is obvious that he was deeply familiar with the medical practice of his time. It also seems that he was from eastern Tibet, which is evinced by his references to the opinions of three scholarly physicians from eastern Tibet who shaped the medical views of the nineteenth century, namely Kongtrül Yönten Gyamtso (Kong sprul Yon tan rgya mtsho, 1813-1899/1900), Jamyang Khyentsé Wangpo (Jam dbyangs Mkhyen brtse’i dbang po, 1820-1892), and Mipam Namgyel Gyamtsö (Mi pham Rnam rgyal rgya mtsho, 1846-1912).\footnote{Padma bstan 'dzin Tshab yig 212/8, 215/8, 237/3, 252/7.} It is probable that he knew them personally.

Up to now these three treatises are the only works of the past that are known to have exclusively explained substitution in the Tibetan medical tradition. Perhaps further treatises will come to light in the future. It is difficult to estimate the circulation or influence of these works for several reasons. Firstly, one can observe that they do not quote or refer to each other. This might be an indication that the each work was unknown to the author of the others. Two were probably written in eastern Tibet, whereas one could have been composed in central Tibet. The treatise attributed to Tendzin Püntsok is not listed among his works in recent publications on
Tibetan doctors, but, as mentioned above, it was included in a 2007 edition of his medical works. Moreover, it was also included in an edition of various ancient Tibetan treatises on materia medica published in the same year. Finally, it was also part of an excellent edition on Tibetan treatises on substitution made by Yönten Gyamtsö (Yon tan rgya mtsho, b. 20th cent.), published a year later in Dharamsala. These new editions are important, as they will help to circulate these works, and make them more accessible to modern practitioners of Tibetan medicine. The treatises of Orgyen Tendzin and Pema Tendzin were not published until the edition by Yönten Gyamtsö, for which he used manuscripts that were microfilmed by the Nepal German Manuscript Preservation Project (NGMPP). The treatise of Orgyen Tendzin is owned by Tulku Tshewang of the Nampa Kundten Monastery in Jumla, a western district of Nepal. It is unclear how it came into his possession. The treatise of Pema Tendzin is part of the collection of medical manuscripts in possession of Doctor Tashi Chozang in Lomöntang (Glo smon thang), the capital of Mustang in Nepal. It is unknown whether these texts were ever used by local doctors, or whether they were simply preserved in isolation. Additionally, it should be noted that two modern Tibetan authors, Jikmé Püntsok Jungné (’Jigs med phun tshogs ’byung gnas, 1933-2004) and Lozang Nyima (Blo bzang nyi ma, b. 20th cent.), also wrote on this subject, mainly drawing their information from these three treatises.

4. Substances and Modes of Substitution

Let us begin this survey of treatises on substitution with a taxonomy of the materia medica included in the works. The following overview provides the numbers of plants, animals, and minerals that can be replaced with other substances according to the above-mentioned three Tibetan treatises:

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73 Bstan ’dzin phun tshogs Tshab yig II.
74 Bstan ’dzin phun tshogs Tshab yig I.
75 Orgyan Bstan ’dzin Tshab yig, Padma bstan ’dzin Tshab yig.
76 Today it is called the Nepalese-German Manuscript Cataloguing Project (NGMCP). See their website and online database.
77 NGMCP: 46284, Microfilm: L 114/10-115/1.
78 NGMCP: 46389, Microfilm: L 139/12.
Table 1. A Taxonomy of Replaceable Materia Medica

<table>
<thead>
<tr>
<th></th>
<th>Plants</th>
<th>Animals</th>
<th>Minerals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tendzin Püntsok</td>
<td>99</td>
<td>10</td>
<td>13</td>
<td>122</td>
</tr>
<tr>
<td>Orgyen Tendzin Gyamtso</td>
<td>94</td>
<td>21</td>
<td>18</td>
<td>133</td>
</tr>
<tr>
<td>Pema Tendzin</td>
<td>110</td>
<td>81</td>
<td>40</td>
<td>231</td>
</tr>
</tbody>
</table>

It is evident that plants occupy the first rank among replaceable materia medica, probably because they represent the most common class of substances used in Tibetan medicine. In the treatise attributed to Tendzin Püntsok, plants constitute approximately 81 percent of all replaceable materia medica, followed by eleven percent for minerals, and eight percent for animals. The percentage distribution changes in both later sources. Orgyen Tendzin Gyamtso has approximately 70 percent plants comprising his list of replaceable materia medica, along with 16 percent animals and 14 percent minerals, while the list prepared by Pema Tendzin comprises about 48 percent plants, 35 percent animals, and 17 percent minerals. One may speculate that there was a higher demand for animal and mineral materials, or that it was more difficult to obtain them in the second half of the nineteenth century and first half of the twentieth century. However, perhaps because the authors wanted to make their lists as long and comprehensive as possible, they included substances that were, strictly speaking, not real substitutions.\(^{79}\) Moreover, one has to stress that a full evaluation can only be given if percentage data of materia medica used in Tibetan medicine is provided according to different periods and regions, and based on the various written sources that are available. Lacking such a survey, however, one can only state that Tibetan treatises of the past had much to say, not only about substitutions for animal and mineral products, a major issue today, but also for plants. The share of plants decreased in our latest treatises, however, while the proportion of animals and minerals increased. Comparing the total number of replaceable substances included in each treatise, the total number of substances increases by 88 percent from that of Tendzin Püntsok (122) to that of Pema Tendzin (231). Analyzing the class of substance used to replace each class of replaceable materia medica produces the following tables:

\(^{79}\) See below for the interchangeable nature of substitution.
Table 2. The Number of Replacements According to Materia Medica Class in the Treatise of Tendzin Püntsok

<table>
<thead>
<tr>
<th>Tendzin Püntsok</th>
<th>By Plant</th>
<th>By Animal</th>
<th>By Mineral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>91</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Animal</td>
<td>22</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Mineral</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 3. The Number of Replacements According to Materia Medica Class in the Treatise of Orgyen Tendzin

<table>
<thead>
<tr>
<th>Orgyen Tendzin</th>
<th>By Plant</th>
<th>By Animal</th>
<th>By Mineral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>138</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Animal</td>
<td>6</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Mineral</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 4. The Number of Replacements According to Materia Medica Class in the Treatise of Pema Tendzin

<table>
<thead>
<tr>
<th>Pema Tendzin</th>
<th>By Plant</th>
<th>By Animal</th>
<th>By Mineral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>113</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Animal</td>
<td>10</td>
<td>83</td>
<td>2</td>
</tr>
<tr>
<td>Mineral</td>
<td>3</td>
<td>1</td>
<td>37</td>
</tr>
</tbody>
</table>

Again one should be very cautious in formulating standard rules for substitution based on these tables, primarily because these three textual sources provide only limited insights into a practice that lasted for many centuries and was regionally diverse. However, it seems reasonable to say that there was a strong tendency to replace substances with those of the same class of materia medica. When these treatises were written, it appears that there was not the same need to substitute animal and mineral substances as there is today. Regarding the discrepancies between the three authors, it seems that Tendzin Püntsok preferred plants as a substitute, while Orgyen Tendzin Gyamtso used plants as only one option and not necessarily the first, while Pema Tendzin would predominantly replace substances with those of the same category. Again, these trends clearly contrast with the substitution practices observed in the twenty-first century. Today substitution in Tibetan medicine primarily focuses on the replacement of animal and mineral ingredients in Tibetan drugs and, to a lesser degree, the replacement of endangered plant species with other plants.80

80 See, for instance, Blaikie (2015), pp. 8ff. See also Blaikie (2009).
Analyzing the treatises under discussion, one can generally distinguish between the substitution of a single substance and that of combined substances. The term ‘combined substances’ refers to medicinal butter, beer, and so on, for which substitution is relatively rare. Moreover, one has to differentiate replacements with another raw substance or another produced substance. The latter can be done if one wants to produce substances such as asafoetida (shinggün, shing kun),\textsuperscript{81} or various types of salts and ashes. For example, Tibetan doctors had the opportunity to produce their own rock salt (kharutsa, kla ru tshwa)\textsuperscript{82} when they did not have access to naturally occurring rock salt. According to one version, the physician would mix three sang of Northern salt (jangtsa, byang tshwa) and four sang of unstained Northern trona (jangpül, byang bul).\textsuperscript{83} Then one would add six sang of Himalayan blue sheep’s horn (ridag naru, ri dwaqs gna’ ru)\textsuperscript{84} that was burned until it turned yellow. One needs to crush it finely and knead it with water, to which a full zho of borax water (tsala, tsha la)\textsuperscript{85} would then be added. When finished, one would form pills the size of sheep droppings and let them dry. Then one would dissolve them in a small bowl on a coal fire, and pour the solution into another vessel.\textsuperscript{86}

5. Criteria for Substitution

Reviewing the methods for materia medica substitution in the Tibetan sources, one can deduce seven criteria derived from the different

\textsuperscript{81} The identifications for the plant provide some Ferula species. For identifications and references, see shinggün in the Appendix.

\textsuperscript{82} In modern literature, kharutsa is identified with halite. The exact denomination varies. One author only gives a type of rock salt commonly known as black salt. For identifications and references, see kharutsa in the Appendix.

\textsuperscript{83} Most modern authors agree that bul tog is the evaporite mineral trona. Others identify it with natron, an alkali salt, or sodium carbonate. For identifications and references, see jangpül in the Appendix. A sang (srang) is a traditional Tibetan measurement of weight, especially for gold and silver. It was also used as a currency unit. One sang is equal to ten zho (zho).

\textsuperscript{84} The majority of authors agree that ridag naru refers to the horn of the Himalayan blue sheep (Pseudo nayaur Hodgson). One author gives three identifications which are somehow confused. For identifications and references, see ridag naru in the Appendix.

\textsuperscript{85} There is a general consensus in the modern literature that tsha la refers to borax—only one publication suggests that it refers to Tinca iconit (in English, but then gives the Chinese term for borax, pengsha 硼砂, as an equivalent). For identifications and references, see tsala in the Appendix.

\textsuperscript{86} Bstan ’dzin phun tshogs Tshab yig I 891/2.
presentations. One should emphasize that these criteria are not systematically listed in each of the texts, but result from the compilation of criteria found across all available sources. Their particular order is roughly based on a presumed order of importance in accordance with the Tibetan medical tradition. These seven criteria are (1) taste, (2) healing potential, (3) type, (4) substance, (5) name, (6) shape, and (7) smell. A substitution is generally made based on at least one of these seven criteria. Each criterion will be illustrated below with an example from one of the three treatises on materia medica substitution.

5.1. Taste

A substance both very precious and widely used in Tibetan medicine is domtri (dom mkhris), the bile of a black bear (dom, dom). According to A Lump of Crystal: A Rosary of Crystal, it heals wounds, removes 'bile disorders,' and is beneficial for 'eye disorders.' It closes 'channels,' removes rotten tissue and generates new tissue. According to the substitution treatise attributed to Tendzin Püntsok, it can be replaced by any of four substances that have the same taste and similar healing potential. These four substances are (1) the bile of a brown bear (dremo, dred mo), (2) a concentrated decoction of various biles (trina tsoktsé, mkhris sna tshogs tshad), (3) a mineral known as 'stone bile' (domtri, rdo mkhris).

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87 The majority of scholars identify dom as the Asian black bear, Ursus thibetanus, also Selenarctos thibetanus. Two authors state that it could be the brown bear Ursus arctos L. For identifications and references, see dom in the Appendix.

88 rma gso mkhris sel mig gi nad la phan, Shel gong shel phreng 24/6, 387/15.

89 dom mkhris rtsa sdom rul gcod sha’u skyed, Shel gong shel phreng 9/1, 154/12.

90 Bstan ’dzin phun tshogs Tshab yig I 871/12.

91 Authors identify dremo as brown bear or its subspecies the Tibetan or Himalayan blue bear. In one publication two identifications are offered, but one has to see whether the binomial name Ursus lagomyarius is still applicable. For identifications and references, see dremo in the Appendix.

92 There is no established formula for this decoction. It is therefore not possible to say what the exact ingredients are, and each doctor probably had his own recipe. Orgyan Tendzin Gyahtso states that it is comprised of the bile of wild animals, farm animals, and animals that live in water, but not the bile of a hare (ribong). The bile of men and of bears (dom) are the main ingredients. Orgyan Bstan ’dzin Tshab yig 91/3.

93 The identification of domtri is still debated. Many authors do not offer any identification, not even mentioning it in their list of materia medica. The indentifications of those authors who do vary widely, probably because a systematic survey has never been made. The identification ranges from glauconite (an iron potassium phyllosilicate usually blue green, green and yellow green in color), limonite (an iron ore, brown and yellow in color), yellow ochre, ferruginous shale and siderite (a ferrous carbonate mineral). One identification (Argile
and (4) a flowering plant called ‘black plant bear’s bile’ (dumnak domtri, ldum nag dom mkhris). Each of these ingredients is of a bitter taste, and can potentially cure the same ailments as the bile of a black bear. The bile of the Tibetan brown bear has the very same healing potency as that of a black bear. The decoction of various kinds of bile is used in order to close ‘channels,’ remedy ‘bile disorders’ and generate new tissue. The mineral substance known as ‘stone bile’ can be beneficial to seal the open ‘channels’ of wounds.

The last substitute, ‘black plant bear’s bile,’ is employed as a remedy to heal wounds and close ‘channels.’ Orgyen Tendzin Gyamtso tends to agree with Tendzin Püntsok, but he does not mention ‘stone bile,’ listing the bile of a marmot (chiwa, ‘physi bu) instead. Pema Tendzin agrees with both animal substitutions suggested by Tendzin Püntsok, but ignores his mineral and plant substitutions. He seems to prefer the former kind of replacement, stating that one can also use the bile of a man, a marmot, or a wild boar (pakgö, phag rgod). He also mentions the opinion of the doctor Tashibum (Bkra shis ‘bum), who says that the bile of a black dog with a white chest is also suitable. The reason is probably that such dogs are often called ‘bear cubs’ (dombu, dom bu) or ‘dog bear cubs’ (khyidombu, khyi dom bu), and in Tashibum’s view this

glaucniconus) remains unclear. For identifications and references, see domtri in the Appendix.

The plant is probably called ‘black plant’ because it is said to grow between slates in areas of black soil where the sun does not reach. See Shel gong shel phreng 341/8. The dumnak domtri is usually identified with a species of the Veronica genus. Some authors give, in addition, species of the Stachys and Nepeta genera. For identifications and references, see dumnak domtri in the Appendix. Bstan ’dzin phun tshogs Tshab yig I 871/12.

Most scholars state that chiwa refers to the Himalayan marmot, except one who also mentions the bobak marmot. For identifications and references, see chiwa in the Appendix.

The scholars who list pakgö all agree that it is the wild boar. For identification and references, see pakgö in the Appendix.

According to him, this is based on commentaries on the last part of the Four Tantras, but he does not give any titles.

khyi nag snying dkar, Padma bstan ’dzin Tshab yig 199/9.
renders its bile a viable substitute. The basic reason is surely that, besides its appearance, every bile is regarded as bitter, and, as stated by Orgyen Tendzin Gyamtso, bile is simply the best to treat ‘bile disorders.’

5.2. Healing Potential

A second important criterion for *materia medica* substitution is healing potential, which is also stressed by each of the authors mentioned above. The healing potentials of the replaceable substance and its substitution should be identical, or at least similar. For some suggested substitutions, the choice is generally obvious, for the replaceable substance and its substitution are traditionally treated in pairs in the description of potentials used to cure the same ailment. For example, the traditional healing potential of asparagus (*nyeshing, nje shing*) and Solomon’s seal (*ramnyé, ra mnye*) is described as “nyeshing and ramnyé prolong life and eliminate diseases of the yellowish fluid.” One substance with different types can also be grouped together with other substances that also have different types, because these all are traditionally seen as having the same healing potential. The same potential ability to cure a specific disease can also be

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105 The modern author ’Jigs med phun tshogs ’byung gnas agrees with this notion and lists this particular breed of dog. Additionally, he names the bile of a wild yak from the high altitude plateau of the Northern Plain and the ‘black plant bear’s bile’ as viable substitutes, ’Jigs med phun tshogs ’byung gnas (2003), p. 238. Blo bzang nyi ma just repeats O rgyan Bstan ’dzin, Blo bzang nyi ma (2006), p. 236.

106 O rgyan Bstan ’dzin Tshab yig 91/6.

107 Scholars are in agreement that *nyeshing* is a plant in the genus *Asparagus* but they disagree about which species. Some authors offer two or three identifications. The only exception is Parfionovitch et al. (1992) and Clark (1995). Parfionovitch et al. (1992) also adds *Notopterygium forbesii* H.Boissieu. Clark (1995) gives the additional identification of *Polygonatum falcatum* A.Gray. For identifications and references, see *nyeshing* in the Appendix.

108 The overwhelming majority of authors regard *ramnyé* as a species of the genus *Polygonatum*. Tenzin Dakpa (2007) alone sees it as a plant of the *Aconogonon* genus. For identifications and references, see *ramnyé* in the Appendix.

109 *nje shing ra mnyes tsho bsrung chu ser sel*, Rgyud bzhi 73/7, Padma bstan ’dzin Tshab yig 217/7, Shel gong shel phreng 250/6. The ‘yellowish fluid’ (*chuser, chu ser*) is a sticky fluid said to be located between flesh and skin and in the joints. It has a mixed reddish yellow color—the red color is because it is a waste product of blood, and the pale yellow color is because it is a refined product of ‘bile.’ If it increases or decreases it causes diseases—that is, the so-called diseases of the yellow fluid.

110 See, for instance, the group of *karpo belgyap* (*dkar po sbla rgyab*), *mukpo belgyap* (*smug po sbla rgyab*), *karpo dungtsé* (*dkar po mdung rtse*) and *mukpo dungtsé* (*smug po mdung rtse*), Rgyud bzhi 66/17, Padma bstan ’dzin Tshab yig 191/6, Shel gong shel phreng 111/3.
observed for the substitute of jangpa (byang pa), a kind of beetle belonging to the Mylabris genus. All three treatises suggest that it can be replaced by droppings of the khuktä bird (khug rta), a type of swallow or martin. In the treatise, A Lump of Crystal: A Rosary of Crystal, the view is expressed that the jangpa beetle purifies ‘channel diseases’, and the droppings of the khuktä bird can also help purify the ‘channels’ and stop ‘dysentery / bloody diarrhea.’ Nothing is said about the taste of these substances, however. Furthermore, there are several cases where medicinal substances are used interchangeably. Often these substances are not treated separately or brought together, because a certain one can be used as a substitute for the other. This is because they are already dealt with in Tibetan treatises on materia medica as a group, and are used for the very same medicinal purposes. This can be observed in a number of instances in the treatise written by Pema Tendzin. For example, he states that the neck or throat of a cinereous vulture (jagö, bya rgod), a bearded vulture (gowo, go bo), or that of a certain waterfowl (soja, so bya) each have the same healing potential. He quotes A Lump of Crystal: A Rosary of Crystal stating that the

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111 Modern authors disagree about to which species jangpa refers. Some are of the opinion that jangpa is Mylabris phalerata Pallas, but others identify it with Mylabris cichorii Fabricius. Two scholars give both species. Furthermore, the authors of two publications prefer not to specify it further. For identifications and references, see jangpa in the Appendix.

112 There are clearly two opinions regarding the identification of this bird. It is identified with Riparia riparia (Linnaeus) or a Hirundo species. In some publications, both identifications are offered. The notion that it is a type of cuckoo, Cuculus melanoleucus, is just given by one author. Presumably, it just derives from Tibetan-Sanskrit dictionaries, where khuktä (khug rta) is equated with cātaka. For identifications and references, see khuktä in the Appendix.


114 byang pas rtsa yi nad rnu ms shيون gbar byed, Shel gong shel phreng 75/20, 420/16; khug rta’i brun gis rtsa shيون dmor byal ‘joms, Shel gong shel phreng 32/15, 412/14.

115 Modern scholars agree that the jagö is the cinereous vulture. Two authors just state that the jagö is a (Himalayan) vulture. For identifications and references, see jagö in the Appendix.

116 All scholars are in agreement that the bird called gowo is the Gypaetus barbatus (hemachalanus) Hutton. For the identification and references, see gowo in the Appendix.

117 Some authors state that soja is the great cormorant or the subspecies sinensis. Others partly agree, but add another identification, namely an anser species, a gull species, or a heron. One author simply writes that it is a heron. For identifications and references, see soja in the Appendix.

118 Padma bstan ’dzin Tshab yig 245/5.
throats of these three birds help to digest undigested food, especially meat.  

This is described by Tendzin Püntsok in a collective way, and it is surprising that Pema Tendzin lists them in his treatise on substitution at all, because they are always described together.

Some substitutions are, however, not based on identical healing potentials. In such cases, substitutions are made on the basis of a specific indication only. A good example is the substitution for Kashmiri saffron crocus (khaché gurgum, kha che gur gum). The plant gurgum is said to heal all ‘liver diseases’ and close open ‘channels.’ If it is necessary to replace it, one has two options according to Pema Tendzin, one can use Nepalese saffron crocus (bel gurgum, bal gur gum) because it is a nearly identical plant but coming from a different region. Secondly, one can also take a dragonhead plant (triyangku, pri yang ku), which is also called the Tibetan saffron crocus (bō gurgum, bod gur gum) in Tibetan medicine. It is said to eliminate ‘heat / fever’ of the stomach and the liver. Consequently Pema Tendzin notes that triyangku is an appropriate substitution if the medical indication is ‘fever’ of liver, bile, and stomach, and diseases of the long intestine only, and stresses that it does not have the healing potential to close open ‘channels.’

5.3. Type

The issue of substitution based on identical or similar healing potentials is also related to substances that are the same, but of different types or qualities, and are virtually interchangeable. This can apply to cultivated or domesticated species and their wild counterparts, for example. For instance,
Orgyen Tendzin Gyamtso states that the wild and cultivated type of nettles, zagö (zva rgod) and zayung (zva g.yung), have the same healing potential.126 To give another example, the same author writes that the flesh, heart, bile, and blood of a wild yak (yakgö, g.yag rgod) can be replaced by the substances coming from a domestic uncastrated yak (khyuyak, khyu g.yag).127 A comparable kind of substitution can be also observed for materia medica that were seen as the same substance, but of different quality. For example, Pema Tendzin recommends the inferior quality of diamonds (dorjé palam, rdo rje pha lam) if the superior type is not available.130 It could be also illustrated by honglen (hong len), for which he distinguishes four types (rigs bzhi).132 The superior types, both ‘male’ and ‘female’ types, come from Western regions (Stod). If they cannot be obtained one should use the inferior types, which grow in Central Tibet. Similarly, he recommends the use of the superior type of gadur (ga dur) instead, if the latter cannot be acquired. The superior gadur comes from Western regions, while the inferior type grows in the south-east of Tibet and adjacent areas to its south (Lho mon Dwags Kong). What is surprising about such statements is that they were made at all. The superior and inferior types of a certain substance do not possess different healing potentials, and should naturally be employed for the same medicinal purpose. The only difference is how effective they might be, as they differ in quality. One should have assumed that it would be taken for granted that a doctor would take a lesser quality

125 Zapö is certainly a flowering plant of the genus Urtica, but there is disagreement about which species. In Tibetan works on materia medica, it is stated that there are two types, a so-called wild one and a cultivated one. The former grows in the mountains and the latter in valleys. This is reflected in two publications, which only distinguish between two types of zapö. For identifications and references, see zapö in the Appendix.

126 Orgyen Bstan ‘dzin Tshab yig 120/1. See also Blo bzang nyi ma (2006), p. 244.

127 There is some confusion in publications on Tibetan materia medica regarding the domestic and wild forms of the yak. Many authors identify the wild yak as Bos grummiens Linnaeus even though this represents the domestic yak. Only some give the correct Bos mutus Przewalski. Notably, some authors also suggest identifying the wild yak as the takin, Budorcas taxicolor Hodgson. For a thorough discussion of both forms of the yak, see Leslie and Schaller (2009). For identifications and references, see yakgö in the Appendix.

128 The domestic yak is rarely mentioned in publications on Tibetan materia medica. There are only two authors who list it. For the identification and references, see appendix under khyuyak.

129 Orgyen Bstan ‘dzin Tshab yig 116/4.

130 The authors who list dorjé palam agree that it is a diamond. For references, see dorjé palam in the Appendix.

131 Padma bstan ‘dzin Tshab yig 189/9.

132 Padma bstan ‘dzin Tshab yig 222/1.
if the best is unavailable. It is interesting to note that in the treatise attributed to Tendzin Püntsok this kind of substitution rarely occurs. The fact that it can be found in Orgyen Tendzin Gyamtso’s and Pema Tendzin’s works may add to the increase of the total number of substitutions in both sources compared to the former. Perhaps both wanted to address the issue that doctors should take what is at hand, rather than constantly using the best quality that had to be brought from regions far away, and was therefore expensive.

5.4. Substance

The substitution of *materia medica* based on the identity or similarity of the substance can be found in the case of the stones removed from the urinary bladder of a woman, briefly called ‘small stones of women’ (*mo rde’u*). These stones appear when women have a ‘stone disease’ (*deuné, rde’u nad*), but men can have it too. It is said that the stones from a woman can be used to cure a ‘stone disease’ of men and vice versa. The substitute is labeled as the ‘fine small stones of the Brahmaputra river’ (*tsangchap deuzhib, gtsang chab rde’u zhlib*). Tendzin Phüntsok explains in his *A Lump of Crystal: A Rosary of Crystal* that these stones are used when a patient has difficulties in urinating. One can find it in some big rivers and in lakes. The stones are white, soft, and shine like pearls. They manifest like sand, and are as small as a mustard seed. He adds the information that they are a suitable substitute for *mo rde’u*. This opinion to substitute the ‘small stones of women’ was already expressed in the *Blue Beryl* by Sangyé Gyamtso. Notably, the text on substitution attributed to Tendzin Phüntsok does not mention *mo rde’u* or *tsangchap deuzhib*. Orgyen Tendzin Gyamtso and Pema Tendzin, however, provide a prescription based on the

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133 Modern authors on *materia medica* in Tibetan medicine usually ignore this substance. It is only mentioned as female urinary stones by Parfionovitch in a discussion of Tibetan medical paintings, Parfionovitch et al. (1992), p. 217. A brief description is given by Pasang Yonten Arya. He writes: “Mo rde’u - Literally means female stone. It is a stone removed from the female body. The stone removed from the urinary bladder of a man is called pho rde’u. The female stone is used for men and the male stone (pho rde’iu) is used for women. Generally, it is almost impossible for women to get stone disease. It is more common in men. The name mo rde’u is used more often because it is the female stone which is more commonly used.” Pasang Yonten Arya (1998), p. 186.
134 ha shig rtsa sbyon mo rdo’i rde’i nad sel, Rgyad bzhi 67/12, Shel gong shel phreng 7/7, 127/4.
135 Again modern authors on *materia medica* do not list this substance.
136 Shel gong shel phreng 127/4.
137 Baidurya sngon po 260/3.
Shelgong Sheltreng. The modern author Lozang Nyima holds the same opinion, but Jikmé Püntsok Jungné disagrees, stating that the substitute for female urinary stones is saltpeter (zetsa, ze tsha). It is quite clear that the reason for choosing the so-called ‘fine small stones of the Brahmaputra river’ as a substitute was its similarity in terms of substance. They are not featured outside of this context in medicine, and their healing potentials are unknown.

5.5. Name

Occasionally, the criterion for substitution is a shared appellation between two different kinds of materia medica. The substance known as the ‘claws of the water monster’ (chusin dermo, chu srin sder mo) is an apt example. The ‘water monster’ (chusin, chu srin) is a mythical, hybrid creature that corresponds to the makara sea-creature of Indian tradition. Tibetan authors of both past and present have faced some difficulties regarding the identity of the animal that is actually to be used in Tibetan medical prescriptions. The contemporary scholar, Gawé Dorjé, points out that in his opinion there are at least two options: ‘water monster’ could refer to the back shell of an animal that lives in lakes in Tibet. He describes the shell, but does not give any information about the animal in question, and does not provide any identification. Alternatively, ‘water monster’ could also

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138 O rgyan Bstan ’dzin Tshab yig 110/2, Padma bstan ’dzin Tshab yig 193/5.
139 There is general consent among all authors that zetsa is nitre. There is only one author who also suggests mirabilite, a hydrous sodium sulfate mineral. For identifications and references, see zetsa in the Appendix.
141 It can also bear the name nagi (na gi). One author even distinguishes between chusin dermo and nagi, treating them as different materia medica. He states that chusin dermo is wolf’s-foot clubmoss (Lycopodium clavatum L.) and nagi is the Chinese pangolin. But he offers yet a third identification, now for the plant chusin dermo (sngo chu srin sder mo), namely Selaginella tamariscina (Beauv.) Spring. See Luo Dashang (1997), pp. 20ff., 322. The majority take chusin dermo alias nagi as a name for a creature, but Dga’ ba’i rdo rje (1995) discusses the idea that chusin dermo can be a shell of an unidentified lake creature or the Chinese pangolin. One Chinese source gives a spiral shell as an identification. Still another publication gives the gharial crocodile. For identifications and references, see chusin dermo in the Appendix.
142 Robert Beer explains “The makara is an ancient Indian symbol formed of a number of animals which together possess the nature of a crocodile. The makara has the lower jaw of a crocodile, the trunk of an elephant, the upper tusk and ears of a wild boar, the wide staring eyes of a monkey; the scales and flexible body of a fish, and the extended tail feathers of a peacock.” Beer (1999), p. 68.
CZAJA: THE SUBSTITUTION OF MATERIA MEDICA IN TIBETAN MEDICINE

refer to the Chinese pangolin (na gi).\textsuperscript{143} This latter identification was already stated by Sangyé Gyamtso in his work *The Blue Beryl*. On two occasions he writes that the real ‘claws of the water monster’ are those of the Chinese pangolin (na gi).\textsuperscript{144} If this is not to hand, one should use a plant named *ngo chusin dermo* (*sngo chu srin sder mo*),\textsuperscript{145} and the authors of all three treatises on substitution agree that the ‘claws of the water monster’ can be replaced with the plant *chusin dermo*.\textsuperscript{146} Two authors, Orgyen Tendzin Gyamtso and Pema Tendzin, use this name explicitly, whereas the third writes that it is named ‘plant frog’s hand’ (*ngo belpa lakpa, sngo sbal pa lag pa*), also known as ‘hollow claws of the water monster’ (*chusin derbup, chu sri n sder sbub*).\textsuperscript{147} The former name is known as a plant name, and the latter is unknown. According to *A Lump of Crystal: A Rosary of Crystal*, an alternative name for the plant ‘frog’s hand’ is ‘claws of the water monster.’\textsuperscript{148} Orgyen Tendzin Gyamtso also gives a brief description of where the plant *chusin dermo* usually grows, which is similar to a description for the plant *belpa lakpa*. Based on this, one might suggest that all three authors of the past possibly meant the same plant, namely *chusin dermo*.

Although the authors agree that the ‘claws of the water monster’ can be replaced with a plant of a similar title, not all authors agree about the details of this substitution. Orgyen Tendzin Gyamtso merely writes that the plant named *chusin dermo* is also called *bezha bpa* (*be zhabs pa*), and describes where it usually grows.\textsuperscript{149} The same can be said about the statements made

\textsuperscript{143} Dga’ ba’i rdo rje (1995), p. 374. One might add that Tendzin Püntsok lists *chusin dermo* under the category of *senmo* (*sen mo*) in his *A Lump of Crystal: A Rosary of Crystal*, Shel gong shel phreng 409/5. Usually *senmo* refers to the nails of the fingers and toes, but Tendzin Püntsok employs it here in a wider sense as the hooves of donkeys, claws of *khyung*-birds, the hooves of white horses, and the spurs of cocks.

When he briefly discusses *chusin dermo* he notes that it is explained that this substance comes from Takzig (Stag gzig), a legendary country to the west of Tibet. The designation Takzig might derive from Tajik, an ancient name for Persia. Regardless of its exact geographical location, it is obvious that Tendzin Püntsok does not know of *chusin dermo* in Tibetan lakes or coming from China.

\textsuperscript{144} Baidurya sugon po 1247/3, 1254/9.

\textsuperscript{145} All modern sources state that *ngo chusin dermo* is a certain species of spikemosses (*Selaginella*), but they disagree which species it is exactly. For identifications and references, see *ngo chusin dermo* in the Appendix.

\textsuperscript{146} Bstan ’dzin phun tshogs Tshab yig l 889/2, O rgyan Bstan ’dzin Tshab yig 85/2, Padma bstan ’dzin Tshab yig 251/15.

\textsuperscript{147} Bstan ’dzin phun tshogs Tshab yig l 889/2.

\textsuperscript{148} Shel gong shel phreng 299/23.

\textsuperscript{149} O rgyan Bstan ’dzin Tshab yig 85/2.
by both modern Tibetan authors.\textsuperscript{150} Interestingly, Pema Tendzin writes that if the claws (or scales) of the real ‘water monster’ are not available one should use an incense preparation called nagi (na gi).\textsuperscript{151} Obviously he had never heard of the term nagi as a synonym for this animal. Then, if this incense preparation is also unavailable, one might use the chusin dermo plant. In the treatise attributed to Tendzin Püntsok, three further substitutions are given, all of them plants, the names of which and Western identification are of no interest for this specific discussion. What is interesting, however, is the healing potential traditionally ascribed to them.

A healing potential for the medicinal substance chusin dermo cannot be found in the Four Tantras. In his A Lump of Crystal: A Rosary of Crystal, Tendzin Püntsok provides the information that it eliminates the ‘heat/fever’ of the bones.\textsuperscript{152} Quoting other sources, he adds that it can also annihilate ‘poison fever’ and connect severed ‘channels.’\textsuperscript{153} Notably, this description of healing potentials does not match with the description for the plant chusin dermo, which is also called belpa lakpa. The latter is described as removing any blockage of the urinary tract.\textsuperscript{154} In the substitution treatise, it is listed with the additional information that is can also remove ‘fever/heat’ in the lower part of the body.\textsuperscript{155} It is evident that there is a discrepancy here. The true chusin dermo is used for a different ailment than its substitute, and vice versa. It seems that the substitution of the chusin dermo plant for the ‘claws of the water monster’ is mainly based on the similarity of their names, and not on the similarity of their healing potential.

5.6. Shape

In addition to the name of a substance, its shape and appearance can also determine the conditions of its substitution. A good example for this approach is the proposed substitutes for the so-called ‘heart-shaped zhosha’ (nyingzhosha, snying zho shā),\textsuperscript{156} which is said to remove ‘heat/fever of the

\footnotesize{\textsuperscript{150} Jigs med phun tshogs ‘byung gnas (2003), p. 245, Blo bzang nyi ma (2006), p. 235.}

\footnotesize{\textsuperscript{151} Padma bstan ‘dzin Tshab yig 251/15.}

\footnotesize{\textsuperscript{152} chu sрин sder mos rus pa’i tshad pa sel, Shel gong shel phreng 31/12, 409/6.}

\footnotesize{\textsuperscript{153} chu sрин sder mo / (commentarial note: ‘di stag gzig nas gong bar bshad / na gi yin / sder mo dngos yin min dgag bzhag mang ba yod / lyon shing las / chu sрин sder mos dug tshad sel dang / rang byung pas / chu sрин sder mos rtsa chad / (thud ces gsunge) chu sрин (ming pam kri zer ba sngo yin klu sman dus ma gthogs / ’di dang mi mthun) sder mos rus pa’i tshad pa sel, Shel gong shel phreng 409/6.}

\footnotesize{\textsuperscript{154} shul pa lag pas dri chu ‘gag pa sel, Shel gong shel phreng 16/6, 299/21.}

\footnotesize{\textsuperscript{155} smad kyi tsha ba’ang sel ba, Bstan ‘dzin phun tshogs Tshab yig 1889/3.}

\footnotesize{\textsuperscript{156} Most authors give Choerospondias axillaris (Roxb.) B.L. Burtt & A.W. Hill, the Nepali hog plum, for the ‘heart-shaped zhosha.’ Some also give Spondias axillaris Roxb., but the latter plant is identified with the former and regarded as a synonym.}
Tendzin Püntsok names four substances that are appropriate substitutions for the 'heart-shaped zhosha', (a) the heart of a hare (ribong, ri bong), (b) berries of the herbaceous plant pangma ('phang ma'), (c) the cones of the black som-tree (somnak, som nag), and (d) the plant Lancea tibetica (payak tsawa, spa yag rtsa ba). Orgyen Tendzin Gyamtso suggests (a) the plant Lancea tibetica, (b) berries of the herbaceous plant pangma, (c) cones of the black som-tree, and (d) the heart of a hare. Surprisingly, Pema Tendzin is silent on this matter, and does not include the 'heart-shaped zhosha' in his work. However, both modern authors Jikmé Püntsok and O rgyen Tendzin 'dzin Tshab yig I 869/13.

One can also find the opinion that 'heart-shaped zhosha' refers to the yellow hog plum, Spondias lutea L., a synonym of Spondias mombin L., or the Indian hog plum, Spondias pinnata (Linn.f.) Kurz. For identifications and references, see snyingzhosha in the Appendix.

All publications provide the identification of the Tibetan woolly hare, Lepsus oiiostolus Hodgson. There is one author only who speaks of a hill pigeon. This is obviously a mistake. For identifications and references, see ribong in the Appendix.

Pangma may refer to plants belonging to the genus Lonicera or the genus Lycium. Only one author provides additional identifications, Clark (1995). In Tibetan medicine, different types of pangma are known, such as the black pangma ('phang ma nag po), white pangma ('phang ma dkar po), and the pale pangma ('phang skya). For identifications and references, see pangma in the Appendix.

The identity of the black som-tree is not entirely clear. The problem is that this term rarely appears in Tibetan works on materia medica. In Tibetan-English dictionaries, the term denotes a fir or a pine. The proper Tibetan names would be, however, drönshing (gyron shing) for pine and tangshing or somtangshing (thang shing, gsom thang shing) for fir. Boesi explains that tangshing refers to fir (Abies spp.) and spruce (Picea spp.) trees, but another term often used is sampa (som pa) or sompa (som pa), deriving from the Chinese word for pine tree (song). See Boesi (2005), p. 41. In the treatise A Lump of Crystal: A Rosary of Crystal, Shel gong shel phreng 218/22. The name somtangshing also occurs separately when Tendzin Püntsok discusses the resin of the tangshing (tang chu, thang chu) and blood-like sap of the tangshing (tangtrak, thang khrag), Shel gong shel phreng 232/12, 233/15. In the literature on Tibetan materia medica, drönshing is identified with trees of the Larix, Pinus, Picea and Abies genera. The tangshing is mostly regarded as a Pinus species, but it is also identified as a tree of the Abies or Picea genus. Finally, the som-tree has been identified as a Pinus sp., Abies sp., or Cedrus sp. The latter, however, is rarely discussed in the literature on materia medica. For identifications and references, see a drönshing, tangshing and somshing in the Appendix.

All scholars agree that payak tsawa refers to Lancea tibetica Hook.f. et Thoms. For references see payak tsawa in the Appendix.
Jungné and Lozang Nyima do discuss it. The former only gives berries of the herbaceous plant *pangma*, while the latter suggests (a) the plant *Lancea tibetica*, (b) cones of the black *som*-tree, and (c) the heart of a hare. It looks as if there was, by and large, an agreement among Tibetan scholar-doctors regarding appropriate substitutions for the ‘heart-shaped *zhosha,*’ but this is not the case in actual practice. Tendzin Püntsok lists (c) *somnak* and (d) *payak tsawa,* for example, in order to explicitly warn against their usage as substitutes. In the case of the black *som*-tree, he quotes the text *A Precious Lamp* (*Rin chen sgron me*), stating that its cones are of sour taste, that it dries wounds, and dispels ‘gynecological disorders’ and ‘disorders of phlegm and wind.’ Tendzin Püntsok stresses that black *som*-tree cones are not beneficial for ‘heart diseases,’ and therefore are not appropriate substitutes. It is clear that, according to Tendzin Püntsok, the ‘heart-shaped *zhosha,*’ and the black *som* tree have diverging healing potentials. This discrepancy in healing potentials is still the case even if one compares the ‘heart-shaped *zhosha,*’ with the healing potentials of *drönshing* and *sontangshing.* Perhaps because of this, Orgyen Tendzin Gyamtso cautiously writes that there is a tradition that prescribes the use of black *som*-tree cones because they resemble a heart. Importantly, he does not dismiss this notion as invalid. Overlooking these admonitions, Lozang Nyima simply writes that it is explained that one can also use black *som*-tree cones.


165 Note that all authors—except Jikmé Püntsok Jungné, who does not list *payak tsawa* at all—use the alternative name, ‘raven jewel’ (*jarok norbu, bya rog nor bu*), or ‘male raven jewel’ (*porok norbu, pho rog nor bu*) for *payak tsawa.* For the alternative names of *payak tsawa,* see Shel gong shel phreng 351/7. Moreover, these three authors give names for the black *som*-tree that differ slightly, but probably refer to the same plant: Tendzin Püntsok (*shiṅ som nag gi ’bras bu*), Orgyen Tendzin Gyamtso (*sbon nag gi ’bras bu*) and Lozang Nyima (*shiṅ spon nag gi ’bras bu*).

166 The Tibetan text reads: *rin chen sgron mer / som nag ’bras bu ro skyar zhiṅ / rma skam mo nad bud rlung ’joms / khaṅs zhiṅ nag po’i rigs yin no / zhes ’byung bas, Bstan ’dzin phun tshogs Tshan yig 1 869/18.* The text is probably a botanical treatise (*’khrungs dpe*), said to have been translated by Sāntigarbha in the eighth century, that consists of three chapters. See Gso rig chos ’byung 1072/6. Such botanical treatises are constantly quoted in *A Lump of Crystal: A Rosary of Crystal,* but without its title(s). The quotation cited above cannot be found in the Shelgong Sheltrenge, and the black *som*-tree is also not discussed in it. There are several editions of this botanical treatise linked to Sāntigarbha. The one consulted here does not contain this quotation, *Rin chen ’khrungs dpe.*

167 *sgron shing bad rlung chu ser grang ba sel, Shel gong shel phreng 11/22, 218/17, nags ma’i thang chus rna’g ’big s cu ser ’dzin, ibid. 12/22, 232/11, thang khrag sa dug ’khru nad sel bar byed, ibid. 13/2, 233/16.*
With regard to *payak tsawa*, Tendzin Püntsok writes that some doctors maintain that *payak tsawa*, also alternatively called ‘yak’s heart’ and ‘sheep’s heart,’ is a suitable substitute for the ‘heart-shaped zhosha’ because of its shape, but this is a mistaken notion. He does not include the healing potential traditionally attributed to *payak tsawa*, but one can assume that he was aware of it. According to the *Four Tantras* and *A Lump of Crystal: A Rosary of Crystal*, the plant *payak tsawa* helps to heal and draw out pus from the lungs.\(^{168}\) It is obvious that the healing potential of *nyingzhosha* and *payak tsawa* differ from this description entirely. Nevertheless Orgyen Tendzin Gyamtsos is of the opinion that one can use the fruits of *payak*, which resemble the heart of a sheep, because the *Four Tantras* states: ‘raven jewel’ (*jarok norbu, bya rog nor bu*) removes ‘heat / fever of the heart.’\(^ {169}\) Lozang Nyima just repeats the discussion first provided by Orgyen Tendzin Gyamtsos. Notably, this statement is not found in extant versions of the *Four Tantras*.

Regardless of these discrepancies, there also are substitutes for the ‘heart-shaped zhosha’ on which all authors agree, such as the heart of a hare or the berries of the herbaceous plant, *pangma*. Interestingly, the traditional healing potential of a hare’s heart has a notable difference to that of the ‘heart-shaped zhosha.’ The heart of a hare eliminates ‘gyel-demons,’ ‘insanity,’ and ‘sharp pain in the heart.’\(^ {170}\) Notably, Tendzin Püntsok does not comment on this issue, but simply lists the heart of a hare without any further explanation. Orgyen Tendzin Gyamtsos, whose presentation is again reiterated by Lozang Nyima, points out to the particular use of the hare’s heart for treating a ‘wind disorder located in the heart’ (*snying rlung*). He does not name any specific text, but states that the ingredient called the ‘heart endowed with stained concentration’ (*bsam gtan zag bcas ldan pa’i snying*) is used in this regard. This particular term is a secret name for a hare’s heart. Probably Orgyen Tendzin Gyamtsos has taken this usage from the *Millions of Instructions: Relics* by Nyamnyi Dorjé.\(^ {171}\) In this work a specific remedy is recommended for suppressing a ‘wind disorder located in the life-channel’ (*soklung, srog rlung*), but if this remedy is without effect, the ‘heart endowed with stained concentration’ should be mixed in.\(^ {172}\) One can also find entries in later clinical works on drugs, such as the *Rosary of...*
One can make an interesting observation in this case of substitution. Based on the traditionally applied healing potential, the ‘heart-shaped zhosha’ should not be replaced with a hare’s heart. Therefore this specific usage mentioned above is taken by some Tibetan doctors to justify the use of a hare’s heart as a substitute for the ‘heart-shaped zhosha,’ even though the ailment ‘heat/fever of the heart’ is not wholly congruent with a specific ‘wind disorder.’ A precise correspondence in terms of healing potential is, however, found for the last substitute, the berries of the plant *pungma*. *Pangma* berries are said to remove ‘heat/fever of the heart’ and ‘gynecological disorders.’ Therefore all three pre-modern authors, as well as Jikmé Püntsok Jungné, recommend it.

These recommended substitutions for the ‘heart-shaped zhosha’ illustrate the fact that appearance and shape of a medical substance could act as a criterion for the selection of substitutes. Occasionally, the traditional healing potential of the substitute was not, or at least not fully identical with the healing potency of the original substance. It seems that the aforementioned warning not to select a substitute based on shape, but on taste and healing potential, was indeed necessary.

5.7. Smell

In addition to taste, shape, and appearance, smell could also be used as a criterion in the prescription of *materia medica* substitution. A prominent example is musk (*latsi, gla rtsi*), which was probably expensive and difficult to obtain, even in the past. According to *A Lump of Crystal*, its primary healing potentials were the elimination of ‘poison,’ ‘diseases caused by small animals,’ ‘kidney diseases,’ and ‘nyen-heat / fever.’ As stated in the *Four Tantras*, musk removes ‘poison,’ ‘diseases caused by small animals,’ ‘kidney and liver diseases,’ and ‘nyen-diseases.’ However,

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173 ‘Chi med nor bu’i phreng ba 7/13-23. See also ‘Chi med nor bu’i phreng ba 85/15-17, ‘Chi med nor ‘phreng gi ma bu 153/16-154/5.

174 ‘phang ma’i ‘bras bus snying tshad mo nad sel, Rgyud bzhi 81/15, Shel gong shel phreng 10/16, 197/10.

175 The musk deer is generally identified with the dwarf musk deer (that is, the Chinese forest musk deer), the Alpine musk deer, or the Siberian musk deer. Some authors give more than one identification. For identifications and references, see *latsi* in the Appendix.


177 gla rtsis dug srin mkhal mchin gnyan nad sel, Rgyud bzhi 68/9, gla rtsis dug srin mkhal nad gnyan tshad sel, Shel gong shel phreng 153/7. There is a difference between the statements found in the *Four Tantras* and *A Lump of Crystal: A Rosary of Crystal*. The *Four Tantras* gives “(disorders of the) kidneys (and) liver” (*mkhal mchin*) and *A Lump of Crystal: A Rosary of Crystal* just gives “kidney disorders” (*mkhal nad*).
the actual use of musk was much more diverse and numerous than these descriptions indicate. For example, musk appears 291 times in the Ten Millions of Instructions: Relics (Man ngag bye ba ring bsrél), and one might imagine that substitutes for musk were a much sought-after commodity, if only because they would need to be used so frequently. According to the treatise attributed to Tendzin Püntsok, the black purmong (purmong nakpo, phur mong nag po) plant was used as a substitute for the elimination of ‘small animals,’ the treatment of ‘ulcerous sores of the nyen-type,’ and the eradication of ‘demons inflicting diseases.’ Occasionally one might also take the plant jagöpö (bya rgod spos). Tendzin Püntsok does not explicitly state the healing potentials of jagöpö, but one can assume that they are similar to those described above, namely the eradication of ‘demons inflicting diseases,’ the elimination of ‘poison,’ and the treatment of ‘contagious fever.’ Moreover, he recommends nyendülpa (gnyan ‘dul pa) for the treatment of ‘fever / heat,’ ‘swellings of the nyen-type,’ and ‘diseases caused by small animals.’ Orgyen Tendzin differs slightly from Tendzin Püntsok, in that he also recommends jagöpö, but does not mention nyendülpa at all, adding that some also prescribe the leaves of the purmong nakpo plant. Pema Tendzin states that in general one should use a

Moreover, the Four Tantras has ‘nyen-diseases’ (gnyan nad), whereas A Lump of Crystal: A Rosary of Crystal speaks of a ‘nyen-fever’ (gnyan tshad). The latter is a combination of a ‘nyen-disease’ (gnyan nad) and ‘heat / fever’ (tshad).

178 The plant purmong nakpo, also shortened to purnak (phur nag), has been identified as various species of the Artemisia genus, or a species of the Caryopteris genus. Note that the name Artemisia vestita Wall. is still unresolved, according to the The Plant List (2013). For identifications and references, see purmong nakpo in the Appendix.

179 phur mong srin gsd gnyan lhag nad gdon 'joms, Shel gong shel phreng 14/22, 277/4.

180 Jagöpö can refer to a species of the Delphinium, Megacarpaea, or Dracocephalum genus. The former, however, clearly predominates in academic literature. For identifications and references, see jagöpö in the Appendix.

181 bya rgod spos kyis gdon dag rims tshad sel, Rgyud bzhi 71/3, Shel gong shel phreng 18/4, 325/22.

182 Nyendülpa has been variously identified as a species of the genera of Saussurea, Phyllophyton, Eriophyton, or Oxytropis. For identifications and references, see nyendülpa in the Appendix.

183 nus pas tshad gnyan gag s rin 'dal, Bstan 'dzin phun tshogs Tshab yig I 872/9. This is a quotation from an unnamed botanical text ('khrungs dpe). The same quotation can also be found in A Lump of Crystal: A Rosary of Crystal, Shel gong shel phreng 301/5. However, the actual healing potential in this latter text is to eliminate ‘heat / fever’ and ‘acute pain of the nyen-type,’ gnyan ‘dul pa yis gnyan gzer tsha ba 'joms, Shel gong shel phreng 16/8, 301/1.

184 Orgyen Bstan 'dzin Tshab yig 89/5.
substitute possessing a healing potential like that of musk, but, if such substitutes are also difficult to obtain, one should follow a tradition of practical knowledge. One should use (a) Jagöpö to treat ‘disease inflicted by demons,’ ‘poison,’ and ‘contagious fever,’ (b) Taksha (stag sha) for ‘wounds,’ ‘nyen-diseases,’ such as ‘malignant ulcerous sores’ and (c) Purmong Nakpo for ‘diseases caused by small animals,’ ‘ulcerous sores of the nyen-type,’ and ‘diseases inflicted by demons.’ He stresses that one can also use a substitute to treat ‘heat / fever’ and so on, but there are no appropriate substitutes for musk for either the treatment of ‘nyen-diseases’ that affect the kidneys, small intestine, and large intestine, or the treatment of ‘diseases caused by small animals.’ It is remarkable that Pema Tendzin explicitly notes the limits of substitution practice, pointing out that in some cases substitutes are of no value, and only real musk will be of therapeutic value. The three authors offer medicinal substances that cover the traditional curing potential of musk only in part, missing treatments for ‘kidney disorders,’ for example. However, it is evident that they were deliberately choosing materia medica as substitutes that are strongly aromatic, or even have a musk scent. It is telling that Tendzin Püntsok explicitly describes Purmong Nakpo, Jagöpö and Nyendülpa as possessing the smell of musk.

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185 Taksha is usually identified as a locoweed species. Only one source also identifies taksha as Calophaca crassicaulis (Baker) Kom., which is a synonym of Spongiocarpella nubigena (D.Don) Yakovlev. In Tibetan medicine, one traditionally distinguishes between white or bright taksha (stag sha dkar po) and black or dark taksha (stag sha nag po). This is also partly reflected in modern literature on Tibetan materia medica. For identifications and references, see taksha in the Appendix.

186 Phyag rgyun du / gdon dang dug rigs / rims tshad kyi skabs su / rgod spus btang ba dang / rma dang gnyan rigs / lhug rgod sogs la / stag sha btang ba dang / srin dang / gnyan lhug sogs dang / gdon sogs kyi skabs su / phur mo rigs mang yang / phur mo nag po btang ba dang. Padma bstan ‘dzin Tshab yig 199/11. Pema Tendzin writes taksha and not nyendülpa. Nyendül is a synonym for taksha, which possibly caused Pema Tendzin’s recommendation for this plant.

187 It is the opinion of Pema Tendzin that ‘nyen-diseases’ are related to the cited internal organs. Usually, however, nyen-diseases are seen as separate from diseases of the kidneys and liver.

188 Modern Tibetan authors do not generally add much to descriptions of the curing potential for musk substitutes. In fact, the statement made by Jikmé Püntsok Jungné is even mistaken, ‘Jigs med phun tshogs ‘byung gnas (2003), p. 237. He is in agreement with Tendzin Püntsok regarding the use of the leaves of Purmong Nakpo, but he ignores nyendülpa and mistakenly applies its healing potential to Jagöpö. Blo bzang nyi ma gives Jagöpö only, Blo bzang nyi ma (2006), p. 236.

189 Bstan ‘dzin phun tshogs Tshab yig 1 872/2, 872/3, 872/8. Traditional botanical descriptions, like those in A Lump of Crystal: A Rosary of Crystal, speak of a bad smell
6. Concluding Remarks

One can assume that knowledge about substitution practice probably developed as part of the professional expertise of each individual doctor in the Tibetan medical tradition. Even though materia medica substitution was important throughout the history of Tibetan medicine, it was rarely addressed in Tibetan medical literature. The only known and extant exceptions to this trend are the three treatises discussed above. In an unprecedented fashion, each author methodically addresses the issue of substitution by listing materia medica and their substitutes based on sources and, importantly, also on personal experience and style of practice. It is interesting to note that all three treatises were composed between the eighteenth and early twentieth centuries. Perhaps there was a need for such works as the demand for materia medica substitutes increased. This demand may also be inferred from the criticism of the overprescription of ‘essence medicine’ and ‘medicine of the plains.’ The need for materia medica substitutions may also derive from the fact that some of the authors lived and practiced in the mountainous regions of eastern Tibet, such as Kham. They also reprimanded the use of substances that had to be brought from far-away India and Nepal, pointing out that substitutes were employed for rare and difficult to obtain materia media throughout Tibet’s medical history. It seems that the three authors of substitution treatises each hoped to initiate a change of thinking among their fellow doctors. At the same time, they wanted the substitution procedure to derive from authoritative sources, as there is a real health risk involved when one prescribes an inappropriate substitute. Analyzing these treatises, one finds that precise instructions for substitution are not always explicitly provided or agreed upon. A certain substance could be replaced by either a substance of the same class, or that of another class, for example, and some doctors might prescribe a substance of the same class, while others might prescribe a substance from another class. It is noteworthy that the prescribed substitute is not always a single raw substance, but could also be a produced substance. The criteria for substitution were never systematically discussed in these treatises. To be sure, the authors appear to have agreed that healing potential and taste were the most important criteria, and one should not merely rely on the shape of the substance. But if one analyzes these works closely, it becomes evident that substitution prescriptions derive from criteria that were probably part of each physician’s personal practice, and therefore one finds

(*purmong nakpo*), the smell of musk (*jagö*pä), aromatic smell (*taksha*), and pleasant smell (*nyendülpä*), Shel gong shel phreng 277/13, 295/6, 301/5, 326/3, 326/7.
prescriptions based on the appearance, smell, and even the names of materia medica. Generally speaking, our authors seem to agree that the best substitutes have the same healing potentials as those of the original substances. This was not always the case, however, and the authors appear to have still prescribed substitutes with healing potentials that only partially correspond to those of the original substances. In certain cases such prescriptions are followed by specific instructions for which particular cases one or another substitute is or is not appropriate. Occasionally, it is also expressed that one should refrain from substitutes for specific illnesses, as only the genuine medicinal substance will be helpful for those ailments. Sometimes the healing potential is neglected in favor of a specific application, especially if such an application is attested in an authoritative source, as in the case of using the heart of a hare instead of the ‘heart-shaped zhosha’ for treating ‘heat/fever of the heart.’ In a number of instances, however, the healing potentials of the original substance and that of its substitute do not agree. It is evident that in such cases the criteria discussed above were decisive for the substitution, and the discrepancy between healing potentials can be ignored.

Furthermore, it seems that, in contrast to the present challenges associated with the substitution of mineral and animal materia medica ingredients, such considerations were not of major concern for Tibetan doctors in the past. This is evident in the substitution prescriptions that we have seen in which plants are by far the most common class of materia medica substitutes, probably due to their prevalent use in Tibetan medical formulae. Common situations necessitating materia medica substitution described above include rare substances, their high price, and their excessive use, but sometimes problems in the identification of a substance might also be reason for substitution. In such a case, a doctor might prescribe a substitute in order to avoid misidentification and associated health risks.

It is well known that certain medicinal substances, such as bear’s bile and musk, are rare, expensive and controversial. Materia medica substitutions as outlined in traditional Tibetan medical treatises might offer some solutions for today’s problems, but one must first analyze the proposed replacements. For example, in the case of bear’s bile, all suggested solutions are problematic. It is obvious that one cannot simply replace the bile of a black bear with that of a brown bear. The bile of other animals, such as marmots, wild boars, wild yaks, or dogs with fur patterns like those of bears, would also be inappropriate. Decoctions made from various kinds of bile would also not solve our modern bile problem.

190 On the issue of bear’s bile, see Feng et al. (2009).
especially if they are made from the bile of humans and black bears. The mineral called ‘stone bile’ has not been clearly identified, and it seems unlikely that it ever will be. Most importantly, the plant called ‘black plant bear’s bile,’ usually identified with a species of the Veronica genus, is considered a rare and endangered medicinal plant in two Tibetan regions at least. Thus, in this case, the substitutions prescribed in the past are of little help today. As Sabernig has observed during her fieldwork in the hospital of Kumbum monastery, contemporary doctors use the bile of an ox as a substitute for that of a bear. In other cases, traditional substitution prescriptions might be more promising. It has been reported that today the plant jagöpö is sometimes used as a cheap substitute for musk. Observers of modern Tibetan medical practices might be able to attest as to whether the plant taksha is used as a substitute for musk in the case of healing wounds, as suggested in the treatise of Pema Tendzin. Ethnomedical research has shown that an Oxytropis species is used for treating patients that are suffering from animal bites in Mustang in Nepal, as well as in Himachal Pradesh (and probably also in Ladakh) in northern India. In Tibetan folk medicine Oxytropis plants have also been used for treating incised wounds, indicating that it may have analgesic and anti-inflammatory effects. Perhaps taksha could be a suitable candidate for the substitution of musk in the treatment of wounds.

It is safe to say that the issue of substitution has not yet received the scholarly attention it deserves. The three treatises introduced in this paper could serve as a starting point from which to explore traditional substitution procedures, such that we might better understand their pharmacological bases and criteria for prescription. Such research should also be of interest for the present, as materia medica substitution is still an issue of paramount importance in Tibetan medical theory and practice.

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191 Lu et al. (2011), Lu and Lan (2013). As mentioned above, Ni et al. (2014) identify ‘black plant bear’s bile’ as both Veronica eriogyne H.Winkler and Veronica ciliata Fisch. However, it is Veronica ciliata Fisch. that is ranked in a list of rare and endangered species based on data from Lhokha / Shannan prefecture in Tibet. See Lu and Lan (2013), pp. 1980, 1987.
193 Cardi (2005), p. 28; where she identifies jagöpö as Delphinium brunonianum.
195 Wei and Jin (2010), p. 1535 (Oxytropis falcate Bunge).
Appendix

Western identifications of Tibetan materia medica

chiwa (’phyi ba)

Most scholars state that the chiwa refers to the Himalayan marmot, except one who also mentions the bobak marmot:

(i)  *Marmota himalayana* Hodgson


(ii) 1. *Marmota bobak* Müller,

2. *Marmota himalayana* Hodgson

(chokla (cog la)

The substance chokla is:

(i) *cinnabaris*

chusin dermo (chu srin sder mo)

It can also bear the name nagi (na gi). One author even distinguishes between chusin dermo and nagi, treating them as different materia medica. He states that chusin dermo is wolf’s-foot clubmoss (Lycopodium clavatum L.) and nagi is the Chinese pangolin. But he offers yet a third identification, now for the plant chusin dermo (sngo chu srin sder mo), namely Selaginella tamariscina (Beauv.) Spring. See Luo Dashang (1997), pp. 20ff., 322. The majority take chusin dermo alias nagi as a name for a creature, but Dga’ ba’i rdo rje (1995) discusses the idea that chusin dermo can be the shell of an unidentified lake creature or the Chinese pangolin. One Chinese source gives a spiral shell as an identification. Still another publication gives the gharial crocodile:

(i) Gavialis gangeticus (Parfionovitch et al. (1992), pp. 71, 227, 233),
(iii) a shell of an unknown lake-creature or Manis pentadactyla Linnaeus (Dga’ ba’i rdo rje (1995), p. 374),
(iv) a spiral shell (luo yan螺厣) (Qinghaisheng yaopin jianyan suo (1996), p. 93 vol. 3),
(v) 1. (chu srin sder mo) Lycopodium clavatum L., (Luo Dashang (1997), pp. 20f., 322),
     2. (sbal ba lag pa) Lycopodium japonicum Thunb.,
     3. (sngo chu srin sder mo) Selaginella tamariscina (Beauv.) Spring,
     4. (na gi) Manis pentadactyla Linnaeus
**dachu (da chu)**

In modern literature on Tibetan medical texts, the substance dachu is rarely listed. It is identified as a mercuric sulfide:


**dorjé palam (rdo rje pha lam)**

The authors who list dorjé palam agree that it is a diamond:


**dom (dom)**

The majority of scholars identify dom as the Asian black bear, *Ursus thibetanus*, also *Selenarctos thibetanus*. Two authors state that it could be the brown bear *Ursus arctos* L.:

(i) *Ursus sp.* (Thinley Gyatso and Hakim (2010), p. 248),
(ii) *Ursus arctos* L. (Karma chos ’phel (1993), p. 647),
(iii) 1. *Selenarctos thibetanus* Cuvier, 2. *Ursus arctos* L. (Xizang deng weishengju (1979), p. 100),
(iv) *Ursus thibetanus* (Bod rang skyong ljongs gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 317),
(v) *Selenarctos thibetanus* Cuvier (Yang Jingsheng and Chucheng jiangcuo (1987), p. 67; Zhongguo kexue yuan xibei
The identification of domtri (rdo mkhris) is still disputed. Many authors do not offer any identification, not even mentioning it in their list of materia medica. The identifications of those authors who do vary widely, probably because a systematic survey has never been made. The identification ranges from glauconite (an iron potassium phyllosilicate usually blue green, green and yellow green in color), limonite (an iron ore, brown and yellow in color), yellow ochre, ferruginous shale and siderite (a ferrous carbonate mineral). One identification (Argile glauconicus) remains unclear:

(i) **Glaucnite stone**
   (Parfionovitch et al. (1992), p. 217),
   (Karma chos 'phel (1993), p. 595),
   (Pasang Yonten Arya (1998), p. 111)

(ii) **Limonite**
   (Clark (1995), p. 135),
   (Dga’ ba’i rdo rje (1995), p. 63),
   (Qinghaisheng yaopin jianyan suo (1996), p. 146 vol. 3),
   (Skal ldan nyi ma (2010), p. 110).

(iii) **Yellow Ochre**

(iv) **Yellow Ochre**

(v) **Ferruginous shale**

(vi) **Siderite**

(vii) **Gallstone**
Authors identify *dremo* as brown bear or its subspecies the Tibetan or Himalayan blue bear. In one publication two identifications are offered, but one has to see whether the binomial name *Ursus lagomyarius* is still applicable:

(i)  *Ursus arctos Linnaeus*  

(ii)  *Ursus arctos pruinosus Blyth*  

(iii) 1. *Ursus arctos Linnaeus*, 2. *Ursus lagomyarius*  
(Parfionovitch et al. (1992), p. 213).

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**dronshing (sgron shing)**

In the literature on Tibetan materia medica, *dronshing* is identified with trees of the *Larix*, *Pinus*, *Picea* and *Abies* genera:

(A) *Larix*

(i)  (*thang ma sgron shing*)  *Larix potaninii* Batalin  
(Bod rang skyong ljongs gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 650),  

(ii)  *Larix potaninii* Batalin  
(Gurmet Namgyal and Phuntsog (1990), p. 315),

(B) *Pinus*

(iii)  *Pinus sp.*  
(Thinley Gyatso and Hakim (2010), p. 278),

(iv)  *Pinus roxburghii* Sarg.  
(Tenzin Dakpa (2007), p. 51),

(v)  *Pinus gerardiana* Wall. ex D.Don  
(Tsering Dorjee Dekhang (2008), p. 134),

(vi)  *Pinus tabuliformis* Carrière  
CZAJA: THE SUBSTITUTION OF MATERIA MEDICA IN TIBETAN MEDICINE


(C) *Picea, Larix*


(D) *Pinus, Picea, Abies, Larix*


(Xizang deng weishengju (1979), p. 54),
(Clark (1995), p. 153),
(Qinghaisheng yaopin jianyan suo (1996), p. 106 vol. 1)
dumnak domtri (ldum nag dom mkhris)

The dumnak domtri is usually identified with a species of the Veronica genus. Some authors give in addition species of the Stachys and Nepeta genera:


(ii) Veronica himalensis D. Don (Institute of Traditional Medicine Services (1999), p. 31),

(iii) Veronica ciliata Fisch. ssp. zhongdianensis Hong (Yang Jingsheng and Chucheng jiangcuo (1987), p. 378),


(v) 1. Veronica eriogyne H.Winkler, 2. Veronica ciliata Fisch. (Ni et al. (2014)),


gowo (go bo)

All scholars are in agreement that the bird called gowo is the Gypaetus barbatus (hemachalanus) Hutton:

gurgum (gur gum)

The plant gur kum or gur gum consists of two types. The so-called Kashmiri gur kum refers to saffron crocus (Crocus sativus), while the non-Kashmiri type from Tibet or Nepal refers to safflower (Carthamus tinctorius). In medical writings it is often not clear which type is meant unless a geographical region is mentioned—both saffron and safflower were regarded as variations of the same plant in Tibetan medicine. In botanical publications, this distinction is not always clear:

(i) Carthamus tinctorius L.  
(Bod rang skyong ljongs gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 470;  
Xizang deng weishengju (1979), p. 44;  
Dawa (1999), p. 102;  
Bod ljongs sman rtsis khang gso rig zhib ’jug khang (2007), p. 522;  
Berling (2008), p. 40;  
Tsering Dorjee Dekhang (2008), p. 39;  
Thinley Gyatso and Hakim (2010), p. 246),

(ii) Crocus sativus L.  
(Parfionovitch et al. (1992), pp. 219, 235, 261;  
Pasang Yonten Arya (1998), p. 34),

(iii) 1. Crocus sativus Linn.,  
2. Carthamus tinctorius L.  
(Yang Jingsheng and Chucheng jiangcuo (1987), pp. 252, 272;  
Gurmet Namgyal and Phuntsog (1990), p. 315;  
Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (1991), p. 44;

**honglen (hong len)**

There is a clear divide in the identification of honglen. Some regard it as a plant belonging to the genus *Lagotis* (A), some to the genus *Picrorhiza* (B). Some give species from both genera (C). The latter suggestion is often based on the Tibetan distinction between a superior type (*hong len mchog*) and inferior type (*hong len dman pa*), or between *honglen* and brownish *honglen* (*hong len smug po*). It is remarkable how widely the identifications vary. Only a few authors agree with each other:

**(A) Lagotis**

(i) $Lagotis$ sp.

(ii) $Lagotis$ glauca Gaertn.

(iii) $Lagotis$ integra W.W.Sm.

(iv) $Lagotis$ kunanwurensis (Royle ex Benth.) Rupr.

(v) 1. (*hong len*) *Lagotis* yunnanensis Franch. (recte: W.W. Sm.), 2. (*hong len pho ldum*) *Lagotis* brevituba Maxim.


3. Lagotis ramalana Batalin,
4. Lagotis wardii W.W.Sm.,
5. Lagotis alutacea W.W.Sm.,

(B) Picrorhiza

(ix) Picrorhiza kurrooa Benth.  (Institute of Traditional Medicine Services (1999), p. 7;
Tsering Dorjee Dekhang (2008), p. 133),

(x) Picrorhiza kurrooa Royle ex Benth. (Kala (2003), p. 155;
Berling (2008), p. 96),

(xi) Picrorhiza scrophulariaeflora Pennell (Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (1991), p. 447),

(C) Lagotis, Picrorhiza

(xi) 1. Lagotis sp.,
Thinley Gyatso and Hakim (2010), p. 164),

(xii) 1. (hong len smug po), picrorhiza scrophulariiflora Pennell,
2. (hong len) Lagotis sp. (Bod rang skyong ljong sgs brje u yon ilhan khang gi ’phrod bsten cus (1973),
pp. 182, 185),
(Tenzin Dakpa (2007), p. 267f.),

(xiii) 1. (hong len mchog), picrorhiza kurrooa Royle ex Benth., 2. (hong len dman pa) Lagotis cashmeriana Rupr.

(xiv) 1. (hong len) Lagotis sp.,
2. (hong len smug po), picrorhiza scrophulariaeflora Pennell (Gurmet Namgyal and Phuntsog (1990), p. 320),

(xv) 1. (hong len mchog), picrorhiza scrophulariiflora Pennell, 2. (hong len dman pa) Lagotis brevituba Maxim.

(xvi) 1. (hong len mchog), picrorhiza scrophulariiflora Royle (incorrect name),
2. (hong len dman pa) Lagotis brevituba Maxim., (Bod ljongs sman rtsis khang gso rig zhib ’jug khang (2007),
pp. 487f.),
(Parfionovitch et al. (1992), pp. 221, 235),
Modern scholars agree that the jagö is the cinereous vulture. Two authors simply state that the jagö is a (Himalayan) vulture:


CZAJA: THE SUBSTITUTION OF MATERIA MEDICA IN TIBETAN MEDICINE

jagöpö (bya rgod spos)

Jagöpö can refer to a species of the *Delphinium*, *Megacarpaea*, or *Dracocephalum* genus. The former, however, clearly predominates in academic literature:

**(A) Delphinium**


(ii) *Delphinium cashmerianum Royle* (Parfionovitch et al. (1992), p. 223; Clark (1995), p. 158);

(iii) *Delphinium chrysotrichum Finet & Gagnep.* (Pasang Yonten Arya (1998), pp. 43, 155);

(iv) *Delphinium sp.* (Tenzin Dakpa (2007), p. 149);

(v) 1. *Delphinium brunonianum Royle*,
    2. *Delphinium delavayi Franch*.,
(B) Delphinium, Megacarpaea

(vi) 1. Delphinium brunonianum Royle,

(C) Delphinium, Dracocephalum

(vii) 1. Delphinium chrysotrichum Finet & Gagnep.,

jangpa (byang pa)

Modern authors disagree about which species jangpa refers to. Some are of the opinion that jangpa is Mylabris phalerata Pallas, but others identify it with Mylabris cichorii Fabricius. Two scholars give both species. Furthermore, the authors of two publications prefer not to specify it further:

(i) Mylabris sp. (Parfionovitch et al. (1992), pp. 71, 227, 273),
(iv) 1. Mylabris phalerata Pallas,
jangpül (byang bul)

Most modern authors agree that bul tog is the evaporite mineral trona. Others identify it with natron, an alkali salt, or sodium carbonate:

(i) trona

(ii) alcali sodae

(iii) natron
   (Parfionovitch et al. (1992), p. 219; Pasang Yonten Arya (1998), p. 151),

(iv) sal soda

kharutsa (kha ru tshva)

In modern literature, kharutsa is identified with halite. The exact denomination varies. One author only gives a type of rock salt commonly known as black salt:

(i) Halitum violaceum

(ii) Red Halite
   (Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (1991), p. 555),

(iii) Purpure holite / Purpurea holitium
   (Qinghaisheng yaopin jianyan suo (1996), p. 4 vol. 2)
Tian Shuqin (1997), p. 252),
(Parfionovitch et al. (1992), pp. 221, 235;
Luo Dashang (1997), p. 10),

**khukta (khug rta)**

There are clearly two opinions regarding the identification of this bird. It is identified with *Riparia riparia* (Linnaeus) or a *Hirundo* species. In some publications, both identifications are offered. The notion that it is a type of cuckoo, *Cuculus melanoleucus*, is just given by one author. Presumably, it just derives from Tibetan-Sanskrit dictionaries, where *khukta (khug rta)* is equated with *cātaka*:

(ii) *Hirundo sp.* (Parfionovitch et al. (1992), p. 227),
(iii) *Hirundo daurica japonica Temminck et Schlegel* (Dga’ ba’i rdo rje (1995), p. 359),
(iv) 1. *Riparia riparia* (Linnaeus),
(v) 1. *Cuculus melanoleucus*,
2. *Riparia riparia*,

**(khyuyak, khyu g.yag)**

The domestic yak is rarely mentioned in publications on Tibetan *materia medica*. There are only two authors who list it:

lagang (gla sgang)

The identifications for lagang vary widely. Plants of the Polygonum, Cyperus, and Geranium genera are favored:

(A) Juncus

(i) Juncus amplifolius A.Camus (Bod rang skyong ljongs gsar brje u yon lhan khang gi ‘phrod bsten cus (1973), p. 427),

(B) Polygonum

(ii) Polygonum bistorta Linneaus (Thinley Gyatso and Hakim (2010), p. 183),

(C) Geranium

(iii) Geranium spp. (Institute of Traditional Medicine Services (1999), p. 88),

    2. Geranium napuligerum Franch.

(D) Cyperus


(vi) 1. Cyperus scariosus R.Br., (Parfionovitch et al. (1992), pp. 73, 229),
    2. Cyperus rotundus Linneaus

(E) Geranium, Cyperus

    2. Cyperus rotundus Linneaus

(F) Polygonum, Cyperus

(viii) 1. (gla sgang rgod pa) Cyperus (Qinghaisheng yaopin jianyan
rotundus Linnaeus,
2. (gla sgang g.yung ba), polygonum paleaceum Wall.

(G) Polygonum, Geranium

(ix) 1. (mon lug gla sgang), polygonum sphaerostachyum Meisn.,
2. (gla sgang g.yung ba) Geranium pylzovianum Maxim.

(x) 1. (gla sgang) Geranium napuligerum Franch.,
2. (gla sgang) Geranium pylzovianum Maxim.,
3. (gla sgang yung ba), polygonum paleaceum Wall.

latsi (gla rtsi)

The musk deer is generally identified with the dwarf musk deer (that is, the Chinese forest musk deer), the Alpine musk deer, or the Siberian musk deer. Some authors give more than one identification:


(iii) Moschus sifanicus Büchner (Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (1991), p. 482),

(v) 1. Moschus berezovskii Flerov
2. Moschus sifanicus Przewalski

(vi) 1. Moschus moschiferus Linnaeus,
2. Moschus sifanicus Przewalski,
3. Moschus berezovskii Flerov

**ligadur (li ga dur)**

The identifications mainly focus on the genera Bergenia, Geranium, and Rhodiola. Some authors also name species of the genera Rheum, Cyperus, and Erodium. This wide range is due to the fact that in Tibetan tradition there are two types of ligadur (alias gadur): a superior type (ga dur mchog) and an inferior type (ga dur dman pa). A few authors clearly acknowledge this in their identifications, but most do not:

(A) Bergenia

(i) *Bergenia purpurascens* (Hook.f. & Thomson) Engl. (Yang Jingsheng and Chucheng jiangcuo (1987), p. 265; Pasang Yonten Arya (1998), pp. 8, 87, 117, 152, 182 (li ga dur is omitted by mistake. It is, however, mentioned under its alternative names.),

(ii) *Bergenia stracheyi* (Hook.f. & Thomson) Engl. (Zla ba (2005), p. 21),

(B) Geranium


(iv) *Geranium pratense* L.
(v) *Geranium tuberaria* Cambess. (Tsarong (1994), p. 51),

(vi) 1. *(ga dur)* *Geranium wallichianum D.Don ex Sweet,
2. *(ga dur dman pa)* *Geranium nepalense* Sweet

(Institute of Traditional Medicine Services (1999), p. 41),

(Dawa (1999), pp. 178, 180),
(vii) 1. (ga dur mchog) Geranium wallichianum D.Don ex Sweet,
2. (ga dur dman pa) Geranium nepalense Sweet

(C) Rhodiola, Geranium

(viii) 1. (ga dur) Rhodiola kirilowii (Regel) Maxim.,
2. (ga dur) Rhodiola wallichiana (Hook.) S.H. Fu var. cholaensis (Praeg.) S.H. Fu,
3. (ga dur dman pa) Geranium pratense L.

(D) Rhodiola, Bergenia, Geranium

(ix) 1. Rhodiola kirilowii (Regel) Maxim.,

(x) 1. (ga dur) Bergenia purpurascens (Hook.f. et Thomson) Engl.,
2. (ga dur dman pa) Rhodiola kirilowii (Regel) Maxim.

(xi) 1. (ga dur mchog) Bergenia praecipitis Wang T.P. (incorrect name),
2. (ga dur dman pa) Geranium ptyzovianum Maxim.

(xii) 1. (li ga dur) Geranium pratense L.,

(E) Bergenia, Polygonum

(xiii) 1. Bergenia purpurascens (Hook.f. et Thomson) Engl.,
2. Polygonum sinomontanum Sam.
CZAJA: THE SUBSTITUTION OF MATERIA MEDICA IN TIBETAN MEDICINE

(F) Rheum, Cyperus

(xiv) 1. (ga dur) Rheum emodi Wall., (Gurmet Namgyal and Phuntsog (1990), pp. 314, 319)
2. (li ga dur) Cyperus pangorei Rotth.

(G) Geranium, Erodium, Bergenia, Rhodiola

2. Erodium stephanianum Willd.,
3. Bergenia crassifolia (L.) Fritsch,
4. Rhodiola wallichiana (Hook.) S.H. Fu

manu (ma nu)

The plant manu is identified as Inula racemosa Hook.f. or Inula helenium L.. Some authors give both identifications. One author adds that it could also be a species of the Iris and the Aristolochia genera:


The peacock is usually identified as the green peafowl, *Pavo muticus* Linnaeus, sometimes as its subspecies *Pavo muticus imperator* Delacour. One author only writes that it is the Indian or blue peafowl, *Pavo cristatus* Linnaeus:

(i)  *Pavo muticus* Linnaeus


(ii) *Pavo muticus imperator* Delacour


(iii) *Pavo cristatus* Linnaeus

mutik (mu tig)

Similar to nyachi, opinions about the scientific identification of mutik vary widely. Two authors just provide the basic meaning that it is a pearl, while others state that it is the pearl of a specific pearl oyster or freshwater mussel:

(i) pearl

(ii) Pteria margaritifera L.

(iii) Pinctada margaritifera L.

(iv) Pinctada martensii (Dunker)

(v) 1. Pinctada martensii (Dunker),
    2. Hyriopsis cumingii (Lea)

(vi) 1. Pteria martensii (Dunker)
    2. Cristaria plicata (Leach)

(vii) 1. Margarita,
     2. Pinctada martensii (Dunker),
     3. Hyriopsis cumingii (Lea)

(viii) 1. Pteria martensii (Dunker)
     2. Hyriopsis cumingii (Lea)
     3. Cristaria plicata (Leach)
     4. Anodontia woodiana (Lea)

muzi (mu zi)

Most authors agree that the Tibetan muzi usually refers to sulfur. There is only one publication offering further identifications:

(i) sulphur

(ii) sulphur

(iii) sulphur

(iv) sulphur

(v) sulphur

(vi) sulphur

(vii) sulphur

(viii) sulphur
Four similar identifications are offered for netso in the literature. Netso can refer to the red-breasted parakeet (*Psittacula alexandri*), or its subspecies *Psittacula alexandri fasciata* Müller. Other options include the Lord Derby’s parakeet (*Psittacula derbiana* Fraser), or possibly the grey-headed parakeet (*Psittacula finschii* Hume):

(i) *Psittacula alexandri Linnaeus*  
   (Dga’ ba’i rdo rje (1995), p. 366),  
   (Parfionovitch et al. (1992), pp. 235, 213, 173;  
   Qinghaisheng yaopin jianyan suo (1996), p. 158 vol. 3;  
   Luo Dashang (1997), p. 316),

(ii) *Psittacula alexandri fasciata* Müller  

(iii) *Psittacula derbiana* Fraser

(iv) 1. *Psittacula alexandri Linnaeus*  
    2. *Psittacula derbiana finschii* Hume
    (The latter identification *Psittacula derbiana finschii* Hume is not consistent. It should be *Psittacula derbiana* Fraser or *Psittacula finschii* Hume.)
All modern sources state that *ngo chusin dermo* is a certain species of spikemosses (Selaginella), but they disagree over which exactly:


(iii) 1. *Selaginella doederleinii*

There are diverse opinions about what the scientific classification of *nyachi* might be. Sources variously identify *nyachi* as mother of pearl, the shell of an abalone or ormer (*Haliotis diversicolor Reeve*), the pearl of the cockscomb pearl mussel (*Cristaria plicata [Leach]*) , the nacre or pearls of various pearl oysters (*Pteria martensii [Dunker]*), *Pteria margaritifera L.*) and of freshwater mussels (*Hyriopsis cumingii [Lea], Anodonta woodiana [Lea]), *Margaritifera dahurica* (Middendorff):

(i) *mother of pearl* (Parfionovitch et al. (1992), p. 217 mother of pearl;
(ii) *Haliotis diversicolor* Reeve

(iii) *Cristaria plicata* (Leach)

(iv) *Pteria martensii* (Dunker)

(v) 1. *Cristaria plicata* (Leach),
    2. *Margaritifera dahurica* (Middendorff)

(vi) 1. *Pteria margaritifera* L.
    2. *Pteria martensii* (Dunker)
    3. *Concha margaritifera Usta*
    4. *Hyriopsis cumingii* (Lea)
    5. *Anodonta woodiana* (Lea)

**Nyendülpa (gnyan 'dul pa)**

*Nyendülpa* has been variously identified as a species of the genera of *Saussurea*, *Phyllophyton*, *Eriophyton*, or *Oxytropis*:

(i) *Saussurea gnaphalodes* (Royle ex Royle) Sch.Bip.

(ii) *Phyllophyton complanatum* (Dunn) Kudo

(iii) 1. *Phyllophyton complanatum* (Dunn.) Kudo,
    2. *Eriophyton wallichii* Benth.,
    3. *Oxytropis reniformis* P.C.Li or *Oxytropis microphylla* (Pall.) DC.
nyeshing (nye shing)

Scholars are in agreement that nyeshing is a plant in the genus Asparagus, but they disagree about which species. Some authors offer two or three identifications. The only exception is Parfionovitch et al. (1992) and Clark (1995). Parfionovitch et al. (1992) also adds Notopterygium forbesii H.Boissieu. Clark (1995) gives the additional identification of Polygonatum falcatum A.Gray:

(i) Asparagus sp

(ii) Asparagus myriacanthus F.T.Wang et S.C.Chen

(iii) Asparagus filicinus Buch.-Ham. ex D.Don

(iv) Asparagus adscendens Roxb.

(v) Asparagus cochin chinensis (Lour.) Merr.

(vi) 1. (nye shing) Asparagus spinosissimus F.T.Wang & S.C.Chen (incorrect name),
     2. (nye shing tsher ma med pa) Asparagus filicinus Buch.-Ham. ex D.Don

(vii) 1. Asparagus filicinus Buch.-Ham. ex D.Don,
     2. Asparagus longiflorus Franch.

(viii) 1. Asparagus filicinus Buch.-Ham. ex D.Don,
      2. Asparagus brachephyllus Turcz.

(ix) 1. Asparagus brachephyllus Turcz.,
     2. Asparagus filicinus. Buch.-Ham. ex D.Don.,
     3. Asparagus myriacanthus F.T.Wang et S.C.Chen


(Bod rang skyong ljongs gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 560).


(x) 1. Asparagus racemosus Willd., 2. *Notopterygium forbesii* H.Boissieu (Parfionovitch et al. (1992), pp. 71, 179, 227),


nyingzhosha (snying zho sha)

Most authors give Choerospondias axillaris (Roxb.) B.L. Burtt & A.W. Hill, the Nepali hog plum, for the ‘heart-shaped zhosha.’ Some also give *Spondias axillaris* Roxb., but the latter plant is identified with the former and regarded as an synonym. One can also find the opinion that ‘heart-shaped zhosha’ refers to the yellow hog plum, *Spondias lutea* L., a synonym of *Spondias mombin* L., or the Indian hog plum, *Spondias pinnata* (Linn.f.) Kurz.: 


(ii) *Spondias axillaris* Roxb. (Clark (1995), p. 149),


(iv) *Spondias pinnata* (Linn.f.) Kurz. (Gurmet Namgyal and Phuntsog (1990), p. 315).
The scholars who list pakgö all agree that it is the wild boar:


Pangma may refer to plants belonging to the genus *Lonicera* or the genus *Lycium*. Only one author provides additional identifications, Clark (1995). In Tibetan medicine, different types of pangma are known, such as the black pangma (*’phang ma nag po*), white pangma (*’phang ma dkar po*), and the pale pangma (*’phang skya*):

(A) *Lonicera*

(i) *Lonicera sp.* (Tenzin Dakpa (2007), p. 138),
(iii) 1. *Lonicera myrtillus* Hook. f. et Thoms.,
(iv) 1. *(’phang ma)* *Lonicera spinosa* (Decne.) Jacq. ex Walp., 2. *(’phang skya)* *Lonicera rupicola* Hook. f. et Thoms. (Chen Jiahui and Yang Yong (2010), p. 136f.),
(v) 1. *(’phang ma nag po)* *Lonicera myrtillus* Hook. f. et Thoms., (Bod ljongs sman rtsis khang gso rig zhib ’jug khang (2007),
(vi) 1. (‘phang ma) Lonicera maackii (Rupr.) Maxim.,
2. (‘phang skya) Lonicera saccata Rehder

(vii) 1. (‘phang ma dkar po) Lonicera hypoleuca Decne.,
2. (‘phang ma nag po) Lonicera saccata Rehder

(viii) 1. Lonicera maackii (Rupr.) Maxim.,
2. (‘phang ma skya bo) Lonicera saccata Rehder,
3. (‘phang ma nag po) Lonicera japonica Thunb.

(B) Lycium

(ix) 1. Lycium chinense Mill.,
2. Lycium halimifolium Mill.

(x) 1. (‘phang nag ’bras bu) Lycium ruthenicum Murray,
2. (‘phang skya) Lycium barbarum L.,
3. (‘phang skya) Lycium dasystemum Pojark.,
4. (‘phang skya) Lycium chinense Mill.

(Qinghaisheng yaoxin jianyan suo (1996), pp. 193 vol. 3, 293 vol. 1),

(Pasang Yonten Arya (1998), p. 143),

(Zla ba (2005), p. 81f.),

(Parfionovitch et al. (1992), pp. 69, 225),


(C) Lonicera, Lycium

(xi) 1. Lonicera myrtillus Hook. f. et Thoms.,
2. Lycium lanceolatum Veill.

(D) Elaeagnus, Lycium, Leonurus

(xii) 1. Elaeagnus pungens Thunb.,
2. Lycium barbarum L.,
3. Lycium chinense Mill.,
4. Leonurus heterophyllus Sweet
The plant *pangyen* is traditionally classified according to the color of its flowers. The following types can be found: white *pangyen* (*spang rgyan dkar po*), small white *pangyen* (*spang rgyan dkar po chung ba*), pale yellow *pangyen* (*spang rgyan me tog ser skyal*), dark blue *pangyen* (*spang rgyan sngo nag*), the multicoloured *pangyen* (*spang rgyan khra bo*), bluish-green *pangyen* (*spang rgyan sngon po*) and the dark *pangyen* (*spang rgyan nag po*). Most publications follow this Tibetan classification and suggest different identifications accordingly, and this same scheme is used as it is more clear and accessible than listing each author just under the heading of *pangyen*. It is noteworthy that all authors fully agree that in each case it is a *Gentiana* species:

(A) (*pangyen* in general)

(i) *Gentiana tubiflora* (G.Don) Griseb.  
(Tsarong (1994), p. 71),

(ii) 1. *Gentiana algida* Pall.,  
2. *Gentiana sino-ornata* Balf.f.,  
(Thinley Gyatso and Hakim (2010), p. 190),

(iii) (*spang rgyan rigs*) *Gentiana algida*  
*pall var. przewalskii* (Maxim.) Kusnez.  
(Gurmet Namgyal and Phuntsog (1990), p. 317),

(B) (*spang rgyan dkar po*)

(iv) *Gentiana algida* Pall.  
(Bod rang skyong ljong gsar brje u yon lhan khang gi ’phrod bsten cuš (1973), p. 264,  
Gurmet Namgyal and Phuntsog (1990), p. 316,  
Zhongguo kexue yuan xibei gaoyuan shengwu yanjusuo (1991), p. 186,  
Clark (1995), p. 159,  
Qinghaisheng yaopin jianyan suo (1996), p. 162 vol. 3,  
Dawa (1999), p. 164,  
Institute of Traditional Medicine Services (1999), p. 28,  
Bod ljongs sman rtsis khang gso rig zhib ’jug khang (2007), p. 380),
Gentiana algida var. przewalskii (Maxim.) Kusnezov

Gentiana szechuenyii Kantiz

1. Gentiana algida pall. var. przewalskii (Maxim.) Kusnezov
   2. Gentiana szechuenyii Kantiz

Gentiana argentea (D. Don) Griseb

Gentiana nubigena Edgew.

1. Gentiana argentea
   2. Gentiana algida Pall.

Gentiana szechuenyii Kantiz

1. (spang rgyan dkar po) Gentiana szechuenyii Kantiz.
   2. (spang rgyan dkar po chung ba) Gentiana algida Pall.

Gentiana nubigena Edgew.

1. Gentiana nubigena Edgew.
   2. Gentiana purdomii Marq.

Gentiana sino-ornata Balf.f.

   2. Gentiana yunnanensis Franch.

(C) (spang rgyan me tog ser skya)

(D) (spang rgyan sngo nag)

Gentiana filistyla Balf. f. et Forrest

(Bod rang skyong ljong gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 264)

(Bod rang skyong ljong gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 307)

(Bod rang skyong ljong gsar brje u yon lhan khang gi ’phrod bsten cus (1973), p. 307,
Parfionovitch et al. (1992), p. 223,
Karma chos ’phel (1993), p. 321,
Bod ljongs sman rtsis khang
(xvii) Gentiana stipitata subsp. tizuensis (Franch.) T.N.Ho
(xviii) Gentiana sino-ornata Balf.f
(xix) 1. Gentiana tizuensis Franch.,
2. Gentiana sino-ornata Balf.f.,

(F) (spang rgyan sngon po)

(xx) Gentiana veitchiorum Hemsl.

(xi) Gentiana filistyla Balf.f. et Forrest

(xii) Gentiana stipitata Edgew.

(xiii) 1. Gentiana stipitata Edgew.,
2. Gentiana tizuensis Franch.

(xiv) 1. Gentiana arthusa var. delicata C.Marquand, Gentiana heptaphylla Balf.f. et Forrest,
2. Gentiana veitchiorum Hemsl. var. altorum (H.Sm.) Marq.,
3. Gentiana sino-ornata Balf.f.,

(G) (spang rgyan nag po)

(xxv) Gentiana wardii W.W.Sm.

(xxvi) Gentiana nubigena Edgew.

(xxvii) Gentiana veitchiorum Hemsl.
All scholars agree that **payak tsawa** refers to *Lancea tibetica* Hook. f. et Thoms.:


**purmong nakpo** (phur mong nag po)

The plant *purmong nakpo*, also shortened to *purnak* (phur nag), has been identified as various species of the *Artemisia* genus, or a species of the *Caryopteris* genus. Note that the name *Artemisia vestita* Wall. is still unresolved, according to the *The Plant List* (2013):

(A) *Artemisia*

1. *Artemisia vestita* Wall. (Bod rang skyong ljongs gsar brje u yon lhan khang gi ’phrod
CZAJA: THE SUBSTITUTION OF MATERIA MEDICA IN TIBETAN MEDICINE

The overwhelming majority of authors regard ramnyé as a species of the genus Polygonatum. Tenzin Dakpa (2007) alone sees it as a plant of the Aconogonon genus:

(i) Polygonatum cirrhifolium (Wall.) Royle

(B) Caryopteris

(vii) Caryopteris trichosphaera W. W. Smith
(ii) *Polygonatum verticillatum* (L.) All.


(iii) *Polygonatum sibiricum* Delar. ex Redoute

(Bod ljongs sman rtsis khang gso rig zhib ‘jug khang (2007), p. 649),

(iv) 1. *Polygonatum verticillatum* (L.) All.,
2. *Polygonatum cirrhifolium* (Wall.) Royle

(Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (1991), p. 337),

(v) 1. *Polygonatum cirrhifolium* (Wall.) Royle,
2. *Polygonatum pratii* Baker


(vi) 1. *Polygonatum sibiricum* Redouté,
2. *Polygonatum cirrhifolium* (Wall.) Royle

(Karma chos ‘phel (1993), p. 168),

(vii) 1. *Polygonatum cirrhifolium* (Wall.) Royle,
2. *Polygonatum verticillatum* (L.) All.,
3. *Polygonatum cathcartii* Baker

(Yang Jingsheng and Chucheng jiangcuo (1987), p. 558),

(viii) 1. *Polygonatum verticillatum* (L.) All.,
2. *Polygonatum cathcartii* Baker,
3. *Polygonatum officinale* All.,
4. *Polygonatum cirrhifolium* (Wall.) Royle,

(Clark (1995), p. 176),

(ix) 1. *Polygonatum cathcartii* Baker,
2. *Polygonatum cirrhifolium* (Wall.) Royle,
3. *Polygonatum erythrocarpum*

(Luo Dashang (1997), p. 284)
Hua,

4. Polygonatum graminifolium
   Hook.,
5. Polygonatum verticillatum (L.)
   All

(x) Aconogonon runcifolium


**ribong (ri bong)**

All publications provide the identification of the Tibetan woolly hare,
*Lepsus oioistlus Hodgson*. There is one author only who speaks of a hill
pigeon. This is obviously a mistake:

(i) *Lepsus oioistlus Hodgson* (Xizang deng weishengju (1979),
   p. 64;
   Zhongguo kexue yuan xibei
   gaoyuan shengwu yanjusuo
   (1991), p. 541;
   Parfionovitch et al. (1992),
   pp. 213, 227 etc.;
   Karma chos 'phel (1993), p. 633;
   Dga' ba'i rdo rje (1995), p. 353;
   Qinghaisheng yaopin jianyan
   suo (1996), p. 252 vol. 2;
   Thinley Gyatso and Hakim
   (2010), p. 140 Lepsus sp.),

(ii) *Columba rupetris Pallas* (Bod ljongs sman rtsis khang gso
    rig zhib 'jug khang (2007),
    p. 820).

**ridag naru (ri dvags gnar ru)**

The majority of authors agree that *ridag naru* refers to the horn of the
Himalayan blue sheep (*Pseudo nayaur Hodgson*). One author gives three
identifications that are somehow confused. The Burrhel sheep (*Ovis naiur*
) is just another name for *Pseudo nayaur Hodgson*. The *Rupicapra rupicapra* is a
chamois:

(i) *Pseudois nayaur Hodgson* (Zhongguo kexue yuan xibei
    gaoyuan shengwu yanjusuo
The identification of *ruta* as *costus* is by and large agreed, with a few exceptions. When the chosen binomial names differ they generally represent synonyms. *Aucklandia lappa* Decne. is a synonym of *Saussurea costus* (Falc.) Lipsch., *Saussurea lappa* (Decne.) Sch.Bip. is a synonym of *Saussurea costus* (Falc.) Lipsch and *Saussurea lappa* (Decne.) C.B.Clarke is a synonym of *Aucklandia lappa* Decne. Clark (1995) gives *Costus speciosus* as one option. *Costus speciosus* (J.Koenig) Sm. is a synonym of *Cheilocostus speciosus* (J.Koenig) C.D.Specht, and does not belong to the genus *Costus* but the genus *Cheilocostus*. Two authors distinguish between a white and black *ruta*, and the former is said to be *Vladimiria souliei* (Franch.) Ling, which is a synonym for *Dolomiaea souliei* (Franch.) C.Shih. The black *ruta* is *Aucklandia lappa* Decne, also known as *Saussurea lappa* (Decne.) Sch.Bip. One publication erroneously states that *ruta* is *Inula racemosa* Hook. f.

(i)  *Aucklandia lappa* Decne.  
    (Xizang deng weishengju (1979), p. 13;  
    Zhongguo kexue yuan xibei gaoyuan shengwu yanjusuo (1991), p. 346;  
    Luo Dashang (1997), p. 246;  
    Bod ljong sman rtsis khang gso rig zhib ‘jug khang (2007), p. 147;  
    (Gurmet Namgyal and Phuntsog (1990), p. 319;  
    Parfionovitch et al. (1992), pp. 221, 235;  
    Zla ba (2005), p. 134;  
    Berling (2008), p. 112;  

(ii)  *Saussurea lappa* C.B. Clarke  
    (1991), p. 510;  
    Parfionovitch et al. (1992), pp. 71, 213, 227, 233;  
    Karma chos ‘phel (1993), p. 629;  
    Dga’ ba’i rdo rje (1995), p. 341;  

*ruta* (*ru rta*)

(ii)  *Burrhel sheep*: *Ovis nahir*:  
    *Rupicpra rupicpra*: *Chamois*:  
    *Pseudo nayaur* Hodgson
(iii) *Saussurea costus* (Falc.) Lipsch.

(iv) *Saussurea lappa* syn. *Aucklandia lappa*

(v) 1. *Saussurea lappa*,
    2. *Costus speciosus*

(vi) 1. (*ru rta dkar po*) *Vladimiria souliei* (Franch.) Ling,
    2. (*ru rta nag po*) *Aucklandia lappa* Decne / *Saussurea lappa* (Decne.) C.B.Clarke

(vii) *Inula racemosa* Hook. f.

The identifications for the plant provide some *Ferula* species. The statement by Gurmet Namgyal and Phuntsog (1990), p. 319 is clearly a mistake:

(i) *Ferula assa-foetida* L.  
    (Zhongguo kexue yuan xibei gaoyuan shengwu yanjusuo (1991), p. 372;  
    Dga’ ba’i rdo rje (1995), p. 156;  
    Thinley Gyatso and Hakim (2010), p. 137),

(ii) *Ferula tetterima* Kar. et Kir.  
    (Xizang deng weishengju (1979), p. 50;  
    Karma chos ’phel (1993), p. 124;  
    Clark (1995), p. 146),

(iii) *Ferula narthex* Boiss.  
    (Luo Dashang (1997), p. 172;  
    Bod ljongs sman rtsis khang gso rig zhib ’jug khang (2007),

(iv) *Ferula sinkiangensis* K. M. Shen
(v) 1. *Ferula assa-foetida* L.,
2. *Ferula sinkiangensis* K.M.Shen

(vi) 1. *Ferula sinkiangensis* K. M. Shen,
2. *Ferula fukanensis* K. M. Shen

(vi) *Caesalpinia spiaria* Roxb. (invalid name)

soja (so bya)

Some authors state that *soja* is the great cormorant or the subspecies *sinensis*. Others partly agree, but add another identification, namely an anser species, a gull species, or a heron. One author simply writes that it is a heron:

(i) *Phalacrocorax carbo* Linneaus (Zhongguo kexue yuan xibei
    gaoyuan shengwu yanjusuo (1991), p. 546;
    Qinghaisheng yaopin jianyan
    suo (1996), p. 280 vol. 2),

(ii) *Phalacrocorax carbo sinensis* (Blumenbach) (Karma chos ‘phel (1993),
    p. 706;
    Luo Dashang (1997), p. 310),

(iii) 1. *Anser sp*.,
2. *Phalacrocorax carbo-sinensis* Blumenbach

(iv) *Heron* (Parfionovitch et al. (1992),
    p. 227),

(v) 1. *Heron*,
2. *Larus canus* Kamtschatschensis,

somshing (som shing)

The *som*-tree has been identified as a *Pinus* sp., *Abies* sp. or *Cedrus* sp. However, it is rarely discussed in the literature on *materia medica*:

(i) (shing gsom) (Parfionovitch et al. (1992),
    pp. 73, 229),

1. *Pinus sp*.,
2. *Abies sp.*
(iii) \( (som \text{ thang shing}) \, Cedrus \, deodara \) (Roxb. ex D.Don) G.Don

\( (g\text{som thang shing}) \) Abies delavayi Franch.

\( \text{Pasang Yonten Arya} \) (1998), p. 282,

\( \text{Tsering Dorjee Dekhang} \) (2008), p. 43.

\( \text{taksha (stag sha)} \)

Taksha is usually identified as a locoweed species. Only one source also identifies taksha as Calophaca crassicaulis (Baker) Kom., which is a synonym of Spongiocarpella nubigena (D.Don) Yakovlev. In Tibetan medicine, one traditionally distinguishes between white or bright taksha (\( \text{stag sha dkar po} \)) and black or dark taksha (\( \text{stag sha nag po} \)). This is also partly reflected in modern literature on Tibetan materia medica:

\( \text{(A) Oxytropis} \)

(i) \( \text{Oxytropis chiliophylla Royle} \)

(Bod rang skyong ljongs gsar brje u yon lhan khang gi ‘phrod bsten cus (1973), p. 283),

(ii) \( \text{Oxytropis falcata Bunge} \)

(Bod ljongs sman rtsis khang gso rig zhib ‘jug khang (2007), p. 690),

(iii) \( \text{Oxytropis microphylla (Pallas) DC.} \)

(Kala (2003), p. 151;
Thinley Gyaltsen and Hakim (2010), p. 242;
Chen Jiahui and Yang Yong (2010), p. 88),

(iv) \( \text{(stag sha dkar po) Oxytropis microphylla (Pallas) DC.} \)

(Dawa (1999), p. 240),

(vi) 1. \( \text{Oxytropis chiliophylla Royle} \),
2. \( \text{Oxytropis falcata Bunge} \)

(Xizang deng weishengju (1979), p. 82;
Tian Shuqin (1997), p. 237),

(vii) 1. \( \text{Oxytropis chiliophylla Royle} \),
2. \( \text{(stag sha nag po) Oxytropis falcata Bunge} \)

(Karma chos ‘phel (1993), p. 291),

(viii) 1. \( \text{Oxytropis tragacanthoides Fisch. (incorrect name),} \)
2. \( \text{Oxytropis yunnanensis Franch.} \)

(Yang Jingsheng and Chucheng jiangcuo (1987), p. 301),

(ix) 1. \( \text{Oxytropis falcata Bunge,} \)
2. \( \text{Oxytropis microphylla (Pallas) DC.} \)

(Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (1991), p. 123),

(x) 1. \( \text{(stag sha) Oxytropis reniformis} \)

(Dga’ ba’i rdo rje (1995),
P.C. Li,
2. (stag sha dkar po) *Oxytropis microphylla* (Pall.) DC.

(xi) 1. (stag sha nag po) *Oxytropis reniformis* P.C. Li,
2. (stag sha dkar po) *Oxytropis microphylla* (Pall) DC.

(xi) 1. *Oxytropis palustris* Bunge,
2. *Oxytropis chiliophylla* Royle,
3. *Oxytropis microphylla* (Pallas) DC.

(Qinghaisheng yaopin jianyan suo (1996), p. 115 vol. 1;
Luo Dashang (1997), p. 139),

(B) *Oxytropis, Calophaca*

(xiii) 1. (stag sha dkar po) *Oxytropis chiliophylla* Royle,
2. (stag sha dkar po) *Oxytropis microphylla* (Pall.) DC.,
3. (stag sha nag po) *Oxytropis microphylla* (Pall.) DC.,

(Parfionovitch et al. (1992), pp. 67, 79, 223, 235),

(C) *Oxytropis, Potentilla, Calophaca*

2. *Calophaca crassicaulis* (Baker)
3. *Oxytropis chiliophylla* Royle

(tangshing (thang shing))

The tangshing is mostly regarded as a *Pinus* species, but it is also identified as a tree of the *Abies* or *Picea* genus:

(A) *Pinus*

(i) (thang ma sgron shing) *Pinus sp.* (Parfionovitch et al. (1992), p. 173),
(iii) 1. *Pinus densata* Mast.,
(iv) 1. (*thang nag*) Pinus armandii Franch.,
2. (*ri mtho'i thang shing*) Pinus densata Mast.

(v) 1. (*thang shing, sgron shing*) Pinus densata Mast.,
2. Pinus yunnanensis Franch.

(vi) (*thang shing*)
1. Pinus armandii Franch.,
2. Pinus densata Mast.,
3. Pinus griffithii McClell. (invalid name)

(B) *Abies*

(vii) (*thang khrag*) *Abies delavayi* Franch.

(viii) (*thang 'bras*)
1. *Abies delavayi* Franch.,
2. *Abies squamata* Mast.,

(C) *Picea, Abies*

(ix) (*thang khrag*)
1. *Picea crassifolia* Kom.,
2. *Abies delavayi* Franch.

*tilnak (til nag)*

White and black *til* are not usually differentiated in Tibetan literature on *materia medica*. In fact, black *til* is rarely singled out, and white *til* is not discussed at all. All authors agree that *til* refers to *Sesamum indicum* L. Two give the synonym *Sesamum orientale* L.:

(i) *Sesamum indicum* L.

(Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bsten cus (1973), p. 370),

(Yang Jingsheng and Chucheng jiangcuo (1987), p. 162),

(Luo Dashang (1997), p. 30),

(Dga’ ba’i rdo rje (1995), p. 132),

(Luo Dashang (1997), p. 29),

(Qinghaisheng yaopin jianyan suo (1996), p. 185 vol. 1).

(Xizang deng weishengju (1979), p. 81 (*til nag*);
Zhongguo kexue yuan xibei gaoyuan shengwu yanjusuo (1991), p. 117;
The overwhelming majority of modern studies state that *triyangku* is a dragonhead species. One author writes that it can also be a species of the *Callicarpa* genus:


Berling (2008), p. 60; Thinley Gyatso and Hakim (2010), p. 230; Chen Jiahui and Yang Yong (2010), p. 120; (Parfionovitch et al. (1992), p. 221),

(ii) 1. *Dracocephalum tanguticum Maxim.*
  2. *Dracocephalum nutans L.*

(iii) 1. *Dracocephalum tanguticum Maxim.*, 2. *Callicarpa macrophylla Vahl*


**tsala (tsha la)**

There is a general consensus in the modern literature that *tsha la* refers to borax—only one publication suggests that it refers to *Tincalconit* (in English, but then gives the Chinese term for borax, *pengsha*, as an equivalent):

(i) **borax**


(ii) **Tincalconit**

tsel (mtshal)

The substance tsel is Hydragyrum sulphidum alias cinnabaris:

(i) Hydragyrum sulphidum


(ii) cinnabaris


yakgö (g.yag rgod)

There is some confusion in publications on Tibetan materia medica regarding the domestic and wild forms of the yak. Many authors identify the wild yak as Bos grunniens Linnaeus even though this represents the domestic yak. Only some give the correct Bos mutus Przewalski. Notably, some authors also suggest identifying the wild yak as the takin, Budorcas taxicolor Hodgson. For a thorough discussion of both forms of the yak, see Leslie and Schaller (2009):

(i) Bos grunniens Linnaeus


(ii) Poephagus mutus Przewalski

(Zhongguo kexue yuan xibe gaoyuan shengwu yanju suo (1991), p. 524),

(iii) Bos mutus Przewalski

(Parfionovitch et al. (1992), pp. 227, 233),

(iv) Budorcas taxicolor Hodgson

(Clark (1995), p. 177),

(v) 1. Bos grunniens Linnaeus,
2. Budorcas taxicolor Hodgson

(Xizang deng weishengju (1979), p. 91).
Zapo is certainly a flowering plant of the genus *Urtica*, but there is disagreement about which species. In Tibetan works on *materia medica*, it is stated that there are two types, a so-called wild one and a cultivated one. The former grows in the mountains and the latter in valleys. This is reflected in two publications, which only distinguish between two types of *zapo*:

(i) *Urtica sp.*
(ii) *Urtica laetevirens Maxim.*

(Xizang deng weishengju (1979), p. 72);
(Karma chos ’phel (1993), p. 231;
(Qinghaisheng yaopin jianyan suo (1996), p. 419 vol. 1;
(Tian Shuqin (1997), p. 156;
(Bod ljongs sman rtsis khang gso rig zhib ’jug khang (2007), p. 528),

(iii) *Urtica macrorrhiza Hand.-Mazz.*

(Gurmet Namgyal and Phuntsog (1990), p. 318),

(iv) *Urtica triangularis Hand.-Mazz.*

(Dga’ ba’i rdo rje (1995), p. 272;
(Pasang Yonten Arya (1998), p. 219),

(v) *Urtica hyperborea Jacq. ex Wedd.*
(vi) *Urtica tibetica W.T. Wang*

(Zla ba (2005), p. 119),
(Zhongguo kexue yuan xibei gaoyuan shengwu yanjusuo (1991), p. 312).,
(Bod rang skyong ljongs gsar brje u yon lhan khang gi’ phrod bsten cus (1973), p. 362),

(vii) 1. (*zva po*) *Urtica macrorrhiza Hand.-Mazz.*, 2. (*zva po lo ma nyag can*) *Urtica triangularis Hand.-Mazz.*

(Yang Jingsheng and Chucheng jiangcuo (1987), p. 534),


(Luo Dashang (1997), p. 40),


(Parfionovitch et al. (1992), pp. 213, 229),

(x) 1. (*zva rgod*) *Urtica cannabina L.*, 2. (*zva g.yung*) *Urtica macrorrhiza*
Hand.-Mazz.

(xi) 1. (zva 'brum rgod pa) Lamium album L.,
2. (zva 'brum) Urtica dioica L.


zetsa (ze tsha)

There is general consent among all authors that zetsa is nitre. There is only one author who also suggest mirabilite, a hydrous sodium sulfate mineral:

(i) nitre


(ii) 1. saltpetre,
2. mirabilite

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CZAJA: THE SUBSTITUTION OF MATERIA MEDICA IN TIBETAN MEDICINE


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