SNEHA KALPANA

Introduction :

Snehayoni are of two types
A.sthavara- vegetable source
B.jangama- animal source

Types of sneha:

1. Gruta
2. Taila
3. Vasa
4. Majja

'Sneha Kalpana' is the unique formulations of Panchakarma Therapy which are prepared by using either oil, ghee or such other fatty substances as the base.

Aims of sneha Kalpana :

i) To extract the active principles of plants and minerals

into fatty media.

ii) To obtain extra benefits of specific oil/ghee used.

iii) To preserve the drug/drugs for longer time.

iv) To enhance and hasten the absorption of drugs, when

used topically in fatty medias.

Definition :

The medicaments, prepared by using 1 part of kalka dravya, 4 parts of oil/ghee and 16 parts of drava known sneha kalpana dravya is.

कल्कात् चतुर्गुणीकृत्य घतं वा तैलमेव वा।

चतुर्गुणे द्रवे साध्यं तस्य मात्रा पलोन्मिता ॥

Reference :

शा.म.ख 9

Essential Ingredients :

Dravya	Parts
Kalka dravya	1P
Sneha dravya	4P
Drava dravya	16P

General method of preparation :

To prepare any medicated ghee or oil, 1 Part of Kalka dravya, 4 Parts of murcchita ghee/oil and 16 Parts of drava dravya are to be mixed together and boiled on mandagni till only ghee / oil part remains. Then it is filtered and stored.

Specific rules of sneha kalpana :

a) **Drava dravya :**
   - If decoction is the drava dravya then Padavasesa Kashaya should be prepared from Mrdu, Madhyama and Kathina dravyas by adding 4, 8,and 16 Parts of water respectively, as the case may be. Regarding the proportion of Kalka; Sneha and drava dravyas, there is an identical opinion in Brhatrayees**. (Ca.ka.12/104, Su.Ci.31 and As.Sa.Ka.6)**
   - When drava dravyas are more than 5, then each drava dravya should be taken in the sarne quantity as that of Sneha. If the drava dravyas are less than 5, then the total quantity of all the liquids should be 4 times to that of Sneha dravya.

b) **Sneha with Kalka dravya alone** :
   If drava dravyas are not mentioned in any of the Sneha preparations, then water is to be used to replace the drava. It should be four times the quantity of oil used.

c) **Sneha with drava dravya alone :**
   If Kalka dravya is not mentioned in any of the Sneha preparations, then it must be prepared by using the drava (Kasaya) dravya itself.

d) **Sneha with pushpa as kalka dravya :**
   When flowers are used as kalka dravya, in any of the sneha preparation then its quality should be 1/8th to that of oil.

Importance of temperature :

S.No	Stage of Paka based on temperature	Sneha	Uses
01	Ama Paka	• Water content persists (++) • Heterogenous media of water and oil/ghee	No therapeutic uses
02	Mridu Paka	Traces of water present (+)	Nasya
03	Madhyam Paka	• Free from water contents • Froth appearance (oil) or Froth subsidence (Ghee) • Good color • Good odor • Desired taste of drugs.	Sarva karma
04	Khara Paka	• Color may change • Odor may change • Taste may change	Abhayanga
05	Dhagdha Paka	• Essential contents of oil/Ghee partially lost • Loss of color • Loss of odor • Loss of taste	No therapeutic uses

Sneha Murchana:

There is no reference to Murcchana either in Laghu trayees or in Brhatraïes. Ācharya Govindadas, the author of Bhaisajya ratnavali is the first person to mention about this.

दुर्गन्यं विनहन्ति तैलमरुणं सौरम्यमाकुर्वते तस्मात् आमदोषं हरति च सहस वीर्यवत् सौख्यदायि ।

(B.R. Jwara Chikitsa)

· It is a process adopted for ghee/oil to enhance their potency [viryavan saukhyadayi], to remove their bad odour [gandham vinahanti] and amadosa [amadosam harati].

· The research works signify that the murcchana samskara of a ghee/oil decreases the Acid value and increases saponification value.

· A medicated ghee/oil preparation containing low molecular weight fatty acids get absorbed fast and in more percentage.

· It is clear that by murcchana samskara the oil/ghee preparations are made more stable [with prolonged shelf life] and quickly absorbable into the system.

Before directly using Sneha for pharmaceutical processings, Sneha is subjected to purificatory process known as Sneha murchana. This applies to both Ghrita and Taila. Through this process the following objectives are achieved

1. Impurities are cleared
2. Offensive odour is removed (Durgandhata)
3. Amadosha is removed
4. Ugrata is nullified
5. Potency of the Sneha is enhanced
6. Efficacy is augumented
7. Good colour and pleasant smell are imparted
8. Gets capability to receive more active principles
9. Toxic effects of crude form of Sneha are removed and Sneha gets refined.

The murchana is usually carried out on mandagni or moderate fire.

1. **<u>Ghritha mūrcchana :</u>**

पथ्या धात्री विभीतैः जलथ रजनी मातुलुङ्गा द्रवैश्च ।

सर्वैः एतैः सुपिष्टैः पलकपरिमितैः मन्दमन्दानलेन ॥

आज्यं प्रस्थं विफेनं परिचपलगतं मूर्च्छयेत् वैद्यराजः ।

तस्मात् आमदोषं हरति च सहसा वीर्यवान् सौख्यदायि ॥

[B. R. Jwararogādhikāra 5/1266]

Ingredients:

1. Haritaki	1 Pala (48 gms)
2. Amalaki	1 pala (48 gms)

3. Vibhitaki	1 Pala (48 gms)
4. Jaladha (Musta)	1 Pala (48 gms)
5. Rajani (Haridra)	1 Pala (48 gms)
6. Matulunga Swarasa	Q.S
7. Ajya (ghee)	1 Prastha (768 gms)
8. Jala	Equal or double quantity of ghritha

Method :

Step 1 : The uncookrd ghee is taken in a vessel and heated over mild fire. It is added with desired quantity of water and heating is continued.

Step 2 : Meanwhile the fine powders of medicinal drugs mentioned above are taken together and added with matulunga rasa to prepare kalka.

This kalka ia added to the mixture of ghritha and jala in the vessel over fire. The mixture is boiled until all sneha siddha lakshana appear and only the ghee part remains.

2. <u>Taila mūrcchana:</u>

तैलं कृत्वा कटाहे दृढतरविमले मन्दमन्दानलैस्तत् तैलं निष्फेनभावं गतमिह च यदा शैत्यभावं समेत्य ।
मञ्जिष्ठा रात्रिलोधैर्जलधरनलिकैः सामलैः साक्षपथ्यैः सूचीपुष्पाङ्घ्रिनीरैः उपहितकथितैर्गन्धयोगं जहाति ॥
तैलस्येन्दुकलांशिकैकविकसा भागोऽपि मूर्च्छाविधौ ये चान्ये त्रिफला-पयोद-रजनी-हीबेर लोधान्विताः ॥
सूचीपुष्पवटावरोहनलिकास्तस्याश्च पादांशिकादुर्गन्धं विनिहन्ति तैलमरुणं सौरभ्यमाकुर्वते ॥

[B. R. Jwararogādhikāra 5/1267-1268]

Ingredients:

1. Tila taila	1 part
2. Mañjiṣṭhā	1/16th part
3. Haridrā	1/64th part
4. Lodhra	1/64th part
5. Mustā	1/64th part
6. Nalika	1/64th part
7. Triphalā	1/64th part each
8. Sūcīpuṣpa mūla rasa	1/64th part
9. Jala	Equal or double quantity as taila

Method:

Step 1: The uncooked 'tila taila' is taken in a vessel which is strong and clean.

The vessel is placed over mild fire and heated until foam starts to appear. Soon the fire is lit off and waited for nişphena-bhāva and śaityabhāva of the oil. (1st and 2nd line of verse)

Step 2: The oil is now placed again over mild fire and desired quan- tity of water is added to it. Meanwhile the fine powder of mañjişţhā and other auşadha dravya is mixed with little quantity of water to prepare kalka.

This kalka is added to the vessel and the boiling is continued with frequent stirring. Boiling is continued until all snehasiddha lakşaṇa are attained. The oil retains (aruṇa varṇa) reddish color after the process.

Comment:

Author mentions the set of drugs for mūrcchanā process in 3rd and 4th line of verse as mañjişţhā, haridrā, lodhra, mustā, nalika, āmalakī, bibhītakī, harītakī, sūcīpuspa, ānghrī (hrībera) jala. (The term sūcīpuşpānghrinīraih is taken as single word also is meant as sūcī-puşpa mūla rasa by some of the authors).

From 5th line onwards he clarifies about the quantity of the drugs used. First he tells about mañjişţă to be taken as indukalām-śikaikavikasā i.e. 1/ 16th part of oil. In 6th and 7th line he speaks about the ratio of other kalka dravya to be taken as 1/4th of mañjişthā.

The drugs are triphalā, mustā, haridrā, hrībera, lodhra, sūcīpuşpa (ketakī puspa), vaţāvaroha (vaţapraroha is the term used in some books, both mean the same as vaţānkura) and nalikā (tamāla patra).

He doesn't mention about the ratio of water to be added. By explaining the two set of drugs, first set in 3rd and 4th line and second in 6th and 7th line author mystifies the concept. Drugs are same in both the sets except vaţānkura in second group.

Some other opinion is that in the 6th and 7th lines author perhaps speak about the other method followed during his time period with same set of drugs and vaţānkura as additional.

But all the drugs mentioned in later part of the verse are to be considered for tila taila mūrcchanā purpose.

<u>Research activity on Murchana:</u>

The research works signifies that murchana of a ghee/oil decreases the Acid value and increases saponification value. The reduced acid value indicate less percentage of Free fatty acids or in other wards stable nature of fatty acids. The increased saponification value is because of higher content of low molecular weight fatty acids. A medicated ghee/oil preparation containing low molecular weight fatty acids get absorbed fast and in more percentage.

Hence, it is clear that by mūrcchana Samskara the oil/ghee preparations are made more stable (with prolonged shelf life) and quickly absorbable into the system.

<u>Sneha siddhi lakshana:</u>

When Sneha Paka Completes; the following Confirmative tests can be observed:

1. Sneha Kalka becomes wick like, when rolled between two fingers.
2. There should not be any sound when Sneha Kalka is Sprinkled over fire.
3. Foam is observed when taila paka completes; on the contrary it subsides in ghee (grita paka).
4. Specific colour, odour and taste of the ingredients become marked when Sneha Paka is over.

Refrence:
वर्तिवत् स्नेह कल्कः स्यात् अङ्गुल्या विमर्दितः ।
शब्दहीनो अग्नि निक्षिप्तः स्नेह सिद्धो भवेत् तदा ।।
यदा फेनोद्गमः तैले फेन शान्तिश्च सर्पिषि ।
गन्ध वर्ण रसोत्पत्तिः स्नेहः सिद्धः तदा भवेत् ।। (शा.म.ख. – 9)

Types of Sneha Paka :

Though Sneha Pakas are five in number, the most important ones are only **three**:
1. Mrdu Paka
2. Madhyama Paka and
3. Khara Paka.

Remaining **two** are:
1. Amapaka
2. Dagdha Paka.

- **Mrdu Paka** Sneha will have Kalka with little quantity of moisture.
- Kalka of **Madhyama Paka** Sneha will be soft but devoid of moisture content. **Khara paka** sneha will have slightly hard Kalka.
- **Dagdha Paka** Sneha will have hard and brittle Kalka. It causes burning sensation and is unfit for therapeutic purposes
- Sneha with **Ama Paka** will not have any potency. It is heavy for digestion and causes indigestion.

Reference:
स्नेहपाकः त्रिधा प्रोक्तो मृदु मध्यः खरस्तथा ।
ईषत्सरस कल्कस्तु स्नेह पाको मृदुर्भवेत् ।।
मध्य पाकस्य सिद्धिश्च कल्के नीरसकोमले ।
ईषत्कठिन कल्कश्च स्नेहपाको भवेत्खरः ।।
तदूर्ध्वं दग्धपाकः स्यात् दाहकृत् निष्प्रयोजनः ।
आमपाकश्च निर्वीर्यो वन्हिमान्द्य करोगुरुः ।। **(शा.म.ख.-9)**

Suryapaka/Adityapaka

- This is the procedure, where the Sneha is prepared by heating and warm- ing through sunlight. In this process, no heating is involved.
- This is employed in cases where Sneha is to be prepared from drugs which contain volatile components and heat sensitive principles. The aim of designing this process is to extract fat soluble active principles in low and controlled temperature.
- The best example for this procedure are; a. Kaseesadi taila, b. Kutaja patra taila.

Indication of snehas as per their Pakas:

Paka	Purpose
Mridu paka	Nasya purpose
Madhyama paka	All purposes (Nasya,abhyanga, Pana, Basti etc.)
Khara paka	Abhyanga

Gandha paka (patra paka):

- It is the process where in the sneha is flavored by certain select 'gandha dravya'
- The fine kalka' of such drugs are placed in the vessel into which the warm prepared sneha is filtered.
- Later when the sneha is relatively cooler, it is filtered once again and packed into suitable containers.
- This method is also called by the name **'patra paka'.]**

Gandha dravyas:

Elā (Elettaria cardamomum), candana (Santalum album), kunkuma (Crocus sativus), aguru (Aquilaria agallocha), murāmāṁsī, kakkola (Piper cubaba), jaṭāmāmsī (Nordostachys jatamansi), śaṭī (Hedychium spicatium), śweta candana (śrīvāsa), cchada (tejapatra; Cinnamomum zeylanicum), granthiparṇi, karpūra (Cinnamomum camphora), uśīra (Vetiveria zizanioidis), kastūrī (mṛgamada), nakhī, pūtī (Gynandropsis gynandra), śailaja, śubhā, methikā (Trigonella foenum-graecum) and lavanga (Syzygium aromaticum); all these drugs are considered as ‘gandha dravya'.
They are used as for aromatic purpose in ‘śrīviṣṇu taila' and many other sneha preparations.

Gandha Dravya Ratio:

- The wise physicians will add 1/8th (padardha) quantity of 'gandha dravya kalka' to the total quantity of oil.
- However, some physicians are of the opinion that, the 'gandha dravya kalka' should be added equal to that of 'sneha kalka dravya' i.e. 1/4th quantity of that of taila. Both these practices are accepted and followed.

Duration of Completion of Snehapāka:

- The preparations like oil, ghee and Guda (Avaleha) **should not be** completed within a day.
- To gain more potency they should be prepared in more than a day.
- Time taken for the completion of Sneha Kalpa Varies according to the nature of Drava dravyas as shown below.

Drava dravya	Time duration
1. Vrihi (gruel), Mamsa rasa	1 day
2. Milk	2 days
3. Swarasa of different parts of plants	3 days
4. Takra and aranala (fermented gruel)	5 days
5. Moola (roots) and valli (creepers)	12 days

Reference:

घृत तैल गुडादींस्तु नैकाहादवतारयेत् ।
व्युषितास्तु प्रकुर्वन्ति विशेषेण गुणान् यतः ।।
क्षीरे द्विरात्रं स्वरसे त्रिरात्रं तक्रारनालादिषु पञ्चरात्रम् ।
स्नेहे पचेद्वैद्यवरः प्रयत्नादित्याहुरेके भिषजः प्रवीणाः ।
द्वादशाहन्तु मूलानां वल्लीनां क्रममेव च । भै.र.

Snehakalpana-shelf life (saviryata avadhi):

Sixteen months is the shelf life of any sneha kalpana (medicated ghee or oils)
Note: Few books mention the sneha kalpana's shelf life as 'four months:
A clearly mentions the shelf life however,this cannot be agreed as shärangadhara mentions clearly as sixteen months and Adhamalla clarifies the same as below;

हीनत्वं गुटिकालेहौ लभेते वत्सरात्परम्।
हीनाः स्युघृततैलाद्याश्चतुर्मासाधिकात् तथा ।। (Sha Pra Ka 1/52)

Here the later line is written in relation with the earlier one, which claims that the shelf life of ghṛta and taila is 4 months extra to the earlier one.

Even in Gūdārthadīpikā commentary same view is substantiated as below.

चतुर्मासाधिकाद् वत्सरात् परं षोडशमासादुपरीत्यर्थः । (Śā. Pra. Kha.1/52; Dīpikā Tīkā)

Moreover four months shelf life is untrue if thought on practical grounds also. No sneha preparation is discarded after four months of its preparation.

Sneha kalpanā- general dosage and adjuvants:

One pala (48 g) is the general dosage of 'snehakalpanā' administered along with suitable adjuvants like warm water, honey, sugar, medicinal powders, decoctions etc.

..तस्य मात्रा पलोन्मिता ॥ (Śā. Ma. Kha. 9/1)

Depending on the digestion capacity of the patient the dose has to be finalized. Uttama mātrā, madhyama mātrā, jaghanya mātrā as 1 pala, 3 karşa and 2 karşa respectively.

देया दीप्ताग्नये मात्रा स्नेहस्य पलसम्मिता । मध्यमाय त्रिकर्षा स्याज्जघन्याय द्विकार्षिकी ।।

(Śā.U.Kha 1/7)

Examples:

Ghrta yoga:	Taila yoga:
• Amrta ghrta	• Arka taila
• Aswagandhã ghrita	• Anutaila
• Brahmni ghrta	• Bhallataka taila patana
• Changeri ghrita	• Bhringaraja taila
• Draksã ghrita	• Cakramarda taila
• Jatyadi ghrita	• Jatyadi taila
• Kshirashatpala ghrita	• Kasisãdi taila

• Pañcagavya ghrita	• Ksirabalã taila
• Pañchatikta ghrita	• Mahanarayana taila
• Phala ghrita	• Maricãdi taila
• Pippali ghrita	• Närayana taila
• Shatavari ghrita	• Pañcaguna taila
• hunthi ghrita	• Pinda taila
• Triphalã ghrita	• Sadbindu taila

Classification:

According to source	Jangama - Jalachara, Pasu-pakshi Sthavara Tila, Priyala, Abhisuka, Vibhitaki, Danti, Hareetaki, Eranda, Madhuka, Sarshapa, Kusumbha, Bilwa, Arka, Mulaka, Atasi, Niko- chaka, Karanja, Sighru.
According to action	Sodhana, Samana, Brimhana
According to paka	Mridu, Madhya, Khara, Dagdha
According to administration	Bahya, Abhyantara
According to combination	Yamaka, Trivrit, Maha.

Anu Taila:

जीवन्तीजलदेवदारुजलदत्वक्सेव्यगोपीहिमं दार्वीत्विङ्मधुकप्लयागुरुवरीपुण्ड्राह्वविल्योत्पलम् । धावन्यौ सुरभि स्थिरे कृमिहरं पत्रं तूटिं रेणुकां किञ्जल्कं कमलाद्वलां शतगुणे दिव्येऽम्भसि क्काथयेत् ॥ तैलाद्रसं दशगुणं परिशेष्य तेन तैलं पचेत सलिलेन दशैव वारान् । पाके क्षिपेच्च दशमे सममाजदुग्धं नस्यं महागुणमुशन्त्यणुतैलमेतत् ॥ **(A.Hr.Su 20/37-38)**

Ingredients: Each one part of-

1. Jīvantī (Holostemma adakodien),
2. Jala (Plectranthus vettive-roides),
3. Devadāru (Cedrus deodara),
4. Jalada (Cyperus rotundus),
5. Twak (Cinnamomum zeylanicum),
6. Sevya (Vetiveria zizanioi-des),
7. Gopi (Hemidesmus indicus),
8. Hima (Santalum album),
9. Dārvī (Coscirium fenestratum),
10. Madhuka (Glycyrrhiza glabra),
11. Plava (Cyperus esculentus),
12. Agaru (Aquilaria agallocha), 13. Vari (Asparagua recemosus),
14. Pundrahva (Siccharum officinarum),
15. Bilva (Aegle marmelos),
16. Utpala (Nymphaea stellata)
17. Dhāvanī (two varieties) (Solanum anguivi and Solanum xanthocarpum),
18. Surabhi (Phoenix pusilla),
19. Sthira (two varieties) (Desmodium gangeticum and Pseudarthria viscida),
20. Krmihara (Embila ribes),
21. Patra (Cinnamomum tamala),
22. Trṭi (Elettaria cardamomum), 23. Reṇukā (Piper wallichii),
24. Kamala pilaments (Nelumbo nucifera) and
25. Balā (Sida rhombifolia)

Method of preparation:

- Wet drugs are chopped to smaller pieces and dry drugs are taken in coarse powder form along with hundred parts of 'rain water' (divya ambhasa).
- The mixture is boiled and reduced to 1/10th parts. Same quantity of 'tila taila' is added to the filtered decoction and boiled with frequent stirring to evaporate all the water content.
- This process is repeated for ten times taking fresh decoction each time. During the tenth time, equal quantity of 'goat's milk' is added and the process is completed.
- The oil is filtered and stored in suitable airtight containers as 'aṇu taila'.

Dosage and therapeutic utility:

Its dosage is same that of 'nāvana nasya' (refer Nasya Kalpanā chapter).
It is very much useful in 'jatrūrdhvagata vyādhi'. Its use strengthens all sense orgsns and prevents 'hair graying', 'hair fall' and brings more radiance to the person.

Note: It is called aṇutaila since it has ability to enter the minutest channels of the sense organs.
अणुषु तैलम् अणुतैलम् । अणूनीन्द्रियस्रोतांसि प्रविशतीत्यर्थः ।
(A. Hr. Sū. 20/37-38; Arunadatta Tīkā)

Śatadhauta and sahasradhouta ghṛta:

अथवा शतधौतेन सर्पिषा क्षीरजेन वा ।। (Śā. U. Kha.13/44)

Method of preparation:

- Goghrta (ghee) of required quantity is taken in a clean stainless steel vessel and added with cold water to the level of ghrta.
- The ghee is rubbed with pressure by down facing palm in circular fashion until the cold water turns warm because of vigorous rubbing.
- Later the warm water is decanted out from the vessel and added with cold water again. The process of rubbing is repeated for the second time.
- This same process of rubbing the ghee with cold water is repeated for 100 or 1000 times to obtain 'śata-dhauta' and 'sahasra-dhouta ghṛta' respectively.
- Per day the process may be repeated for 4 to five times.
- As the rubbing process goes on for many times, the breakage and reunion of bonds in fatty cells of ghee when rubbed with water will yield butter like product

Therapeutic utility:
Śhatadhauta' and 'sahasra-dhouta ghrta' is used for application in 'visarpa' (herpes zoster). It is also applied in many 'pittaja ailments' associated with burning sensation and pain.

Shelf life:
Special mention about the shelf life of shatadhauta and sahasradhouta ghrta is not found in the classics but can be same as that of any medicated ghee (16 months).

Sneha âvartana:

- Avartana literally means 'repetition'., Sneha which is repeated subjected for processing (paka) along with 'kalka dravya' and 'drava dravya' is called 'avartita sneha'.
- This concept of sneha avartana' prevails from 'Samhita period'. Dashapaki (anutaila), shatapaki (kshirabala 101)and sahasrapaki tailapaka'is indicative of the number of times the process is repeated.
- With repetition of process, practically each time we find considerable
- loss in the quantity of sneha.
- Nevertheless, the dosage of'avartita sneha'is also greatly reduced as the 'ävartita sneha' possesses more active principles in concentrated form.

Advantages of 'avartita sneha' are;
·The reduced dosage;
·Quicker action;
·Utmost therapeutic efficacy

Disadvantages of avartana:
- Higher cost effectiveness;
- Time factor for pharmaceutical procedure;
- More fuel;
- More manual labour;

Note: The 'śatadhauta and sahasradhouta ghṛta' can be considered under the concept of 'āvartita sneha'.

Modern concept of oils and fats:

FATS & OILS

Fats, oils and waxes belong to the group of naturally occurring compounds called 'lipids' (Greek-lipid=fat).
Lipids are those constituents of animals and plants which are soluble in organic solvents (chloroform, benzene, hexane, carbon tetrachloride etc) but insoluble in water.

The lipids which yield fatty acids and alcohols on hydrolysis with aqueous base (saponified) are referred to as further divided into two classes: simple lipids. These can be:
1. Fats and oils: that yield long chain fatty acids and glycerol upon hydrolysis.
2. Waxes: that yield long chain fatty acids and long chain alcohols upon hydrolysis.

Fat:
· Is an important part of diet;
· It provides fatty acids and energy;
· It helps body to absorb 'Vitamin A, D and E';

Fatty acids: (four main types)
1. Poly-unsaturated fatty acids: Available in common vegetable oils, soybean, corn, sunflower, fish etc;
2. Mono-unsaturated fatty acids: Available in cashew, almond, peanuts etc;
3. Saturated fatty acids: Available in common vegetable oils, soybean, corn, sunflower, cashew, almond, peanuts, fishetc;
4. Trans fatty acids: Dairy products, beef (meat of cow, bull or ox), lamb (flesh of lamb) etc.

Note: Most fats and oils contain all the above four fatty acids in different ratios. More consumption of 'trans fat' results in increase of LDL (low density hypoproteins) in the body.
This increased LDL in the body is harmful in many ways as said below;
· It reduces the response of RBC to insulin;
· Decreases the efficacy of B-cells and T-cells;
· Interferes with reproduction;
· Decreases the cream in the milk of lactating mothers.

Additional information:

- Fats and oils are one among the three major food factors needed for human body the other two being proteins and carbohydrates.
- Fats and oils are widely distributed in foods and are of great nutritional value. They provide concentrated reserve of energy in animal body for maintaining the optimum body temperature.
- One gram of metabolized fat or oil yields 9 kcal of energy. Not only edible fats and oils hold a place of pride in human diet but they are used as raw materials for the manufacture of soaps and synthetic detergents, paints, varnishes, polishes, glycerol, lubricants, drying oils, cosmetics, printing inks, linoleum oil cloth and pharmaceuticals.
- At the present time the human race uses an estimated 40 million tonnes fats and oils per year which reflects both their nutritional and industrial importance.)
- Chemically ghee is the complex lipid molecule containing triglycerides, free fatty acids, phospholipids, sterol, sterol esters, fat soluble vitamins, tocopherol, carbonyls, carotenoids, hydrocarbons etc.

Preservation:
Oils are preserved in air-tight and well-closed containers of glass, polythene, aluminum make.
Ghee is stored in broad-mouthed containers as it is having the nature of solidifying at lower temperature.

Characteristics of ghrita:

- Melting point: 35^{0}c
- Colour ranges from yellow to white depending upon the caro- tene content.
- Contains about 8% lower saturated fats (which are not found in any other edible oil or fat).
- Rich source of vitamins a, d, e and k.
- Contains 4.5% linoleic acid an essential fatty acid for human growth.
- Digestability co-efficient/rate of absorption is 96%
- Contains caesine which elevates cholesterol and triglycerides, but it is removed during processing.
- Contains beta-carotene-an anti-oxidant
- Due to it's lipophilic (capability of dissolving or absorbing lipids) action, facilitates drug delivery to target organs
- Facilitates drug entry into cell, mitochondria, microsome, nuclear membrane
- Crosses blood-brain barrier
- Provides essential nutrients, critical anti-oxidants and easily assimilable fats.
- Good medium for absorption, transport and delivery of drug
- Keeps epithelial tissue intact, keeps outer layer of eye ball moist and prevents blindness
- Universal anti-dote for most of the poisons
- Contains long chain of pufa hence preservative property

Composition

- Moisture-14.48%
- Fats-32.4%
- Protein-36.0%
- Lactose-12.0%
- Ash-5.2%
- Triglycerides-97-98%
- Di-glycerides-0.25-0.4%
- Mono-glycerides-0.016-0.035%
- 9. Keto-acid-glyceride-0.015-0.018%
- Free-fatty acids-0.1-0.44%4
- Sterols-0.22-0.41%
- 12. Phospholipids-0.2-1.0%
- Vit-K-1x10.4 gm/100 gms
- Butyric acid-4.5-6.0%
- 20. Caprylic acid-0.9-1%
- Caproic acid-1-1.36%
- 21. Capric acid-1.5-1.5%
- 23. Myristic acid-21-33%
- Keto-acid-glyceride-0.015-0.018%
- Free-fatty acids-0.1-0.44%4
- 13. Sterols-0.22-0.41%
- Phospholipids-0.2-1.0%
- 10. Glycerylesters-0.011-0.015%
- 14. Vit-A-2500 10/100 gms
- 15. Vit-D-8.5 x 10.7 gms/100 gms
- 16. Vit-E-24 x 10.3 gm/100 gms
- 10. Glycerylesters-0.011-0.015%
- Vit-A-2500 10/100 gms
- Vit-D-8.5 x 10.7 gms/100 gms
- 16. Vit-E-24 x 10.3 gm/100 gms
- 25. Stearic acid-11-11.5%
- 27. Oleic acid-27-27.5%
- 22. Lauric acid-6-7%
- 24. Palmitic acid-19-19.5%
- 26. Arachidic acid-0.5-0.8%
- 28. Linoleic acid-4.5%

Note:

- 80-90% diseases are degenerative diseases due to excessive production of free-radicals of reactive O_2, species, ghee contains, vit-E and betacarotene well known anti-oxidant.
- Ghrita which is 10 years old is designated as purana ghrita or sarpi in ayurvedic classics.
- Ghrita of 111 years of storage is known as kumbha sarpih and beyond that period is known as Mahasarpi.
- Apart from being preservative because of the long PUFA chain, ghrita when processed with other drugs, incorporates in itself the characters of those drugs without losing it's own. This assimilation property is not seen in other Sneha dravyas.
- Hence Ghrita was given prime importance in ayurvedic classics. The older the ghrita, the effective it is therapeutically.
- The purity of Ghrita is expressed in terms of polanski number, which is defined as the number of millilitres of 0.1 KOH required to neutralize the in- soluble fatty acids, not volatile with steam distillation, obtained from 5 gms of fat. This polanski number is usually negligible in pure ghee.

Taila

- It is the oily portion extracted from drugs for the purpose of sneha paka, the taila should be new one, otherwise the oil gets rancid on storage and becomes unfit for therapeutic usage.
- Of all the oils, Tila taila was rated as the best one suited for therapeutics. It is extracted from the seeds of sesamum indicum, a herb which is wildly cultivated in Asia and many other tropical countries.
- It is one of the official oils in European pharmacopoea, British pharmacopoea and British pharmacopoea index.
- According to ayurvedic texts, it is the best for pacification of vata and at the same time does not aggravate kapha. It possesses ushna guna and good for skin and yoni dosha.
- It provides firmness (Sthiratwa) to the body.

- Just like ghrita, taila also assimilates the properties of the drugs that are processed with it but in the process it loses its own properties and hence was rated as inferior to ghrita.
- Taila is used both for external and internal administration like Abhyanga, Nasya, Karna-purana, Gandusha, Vasti, Akshi tarpana etc.

Characters of taila:

1. Pale yellow colour
2. Pleasant edour and bland taste
3. Density-0.916-0.92
4. Solidifies at 5˚c
5. Insoluble in water, slightly soluble in alcohol
6. Soluble in chloroform, ether, petroleum-ether, carbon-di-sul- phide
7. Liquid fats (Glycerides of Oleic, Linoleic acids) content is 70%
8. Solid fats content in 12-14% (sterin, palmitin, myristine, sesamine, sesamol)
9. Contains large quantity of PUFA and linoleic acid

Purity of Tila taila is tested by mixing 2 ml. of Tila taila with 1 ml. of Hcl containing 1% w/w of glucose and then allowed to stand for five minutes. Then it turns to pink colour if the oil is genuine and original