SANDHANA KALPANA
(FERMENTATIVE PRODUCT)

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CONCEPT OF S. KALPANA

DEFINITION

SANDHANA --- *Sandheeyate yad iti sandhanam*

KALPANA --- Process

द्रवेषु चिरकालस्थं द्रव्यं यत्सन्धितं भवेत्
आसवारिष्टभेदैस्तु प्रोच्यते भेषजोचितं

(Sharangdhara)

FERMENTATION

Incomplete oxidation of sugar into alcohol & CO_2 in the absence of O_2 by Enzyme Inverase and zymase, secreted by yeast cells.

$$C_6H_{12}O_6 \xrightarrow{\text{zymase}} 2C_2H_5OH + 2\,CO_2$$

FERMENTATION

- Zymology = Science of Fermentation.

- First Zymologist : –Louis pasteur.

  In 1857 ,connected Yeast to fermentation =Respiration without air.

- Germon Zymologist, Edward Buchner.(Nobel prize winner.)1907

  Fermentation by Zymase of Yeast.

YEAST

It is Anaerobes.

-unicellular

- Depending upon strains of yeast tolerance varies from 5-21%

-brewer S yeast 5% alc tolerate

-wine yeast tolerate upto 12%

- Yeast dies when alc exceeds its tolerance level and due to insufficient nutrients.
- - yeast grows in pH 3-6.
- **Imp Microbes for Fermn.**-Yeast-Saccurus cerevisiae.
  -Zymomonas mobilis.
- Yeast Sacchromyces cervisicae found in dhataki puspa.
- Inoculum of yeast comes from dhataki puspa.

SIGNIFICANCE OF SANDHAN KALPANA

- Acts self generated alcohol as preservative.
- Aqueous & Alcohol soluble Plant principles extractable.
- Stimulate & Activate enzymatic activity in the body.
- Liquid form-Facilitates easy admin of drug to children.
- Make drug-Readily absorbable.
- Jaggery, Grapes etc enhance palatability & nutritional value.

SAMHITA PERIOD

CHARAK SAMHITA

- In charaka Sutrastana 27th chapter - description of Phanita,

Seedhu, Sura, Souvira, Tusodaka, Maireya, Medaka, Dhanyamla etc.

- Defn of Asava-
  ऐषानाम् आसवानां आसुत्वाद् आसव संज्ञा (Ch Su.25)

- Asava yonis.-9- Dhanyasava-6, Phalasava-26,Mulasava-11
  Sarasava-20, Puspasava-10, Kandasava-4, Patrasava-2,Twagasva-4 and Sarkarasava-1

- 30 Asavarishtas-Containers, Fumigation, Process of Fermn, Duration, Place of Fermn, Tests of completion etc.

Classical reference

आसवारिस्तयोर्यत्र न गुणं लभ्यते तदा \
एकद्वित्रिश्रितं कृत्वा दाप्येद्गुनवृधये //

Ayurveda sakhya

CLASSIFICATION OF SANDHANA KALPANAS

SANDHANA KALPANAS

Madya kalpas
(Alcoholic prepns)
a) Sura-Prasanna
Kadambari
Jagala
Medaka
Surabeeja
b) Seedhu
c) Vaaruni
d) Asavarishtas

Shukta kalpas
(Acidic prepns)
a) Shukta
b) Tushambu
c) Sauveera
d) Kaanjeeka
e) Sandaaki

DIFFERENCE BETWEEN MADYA & SHUKTA KALPANAS

Madya kalpas	Shukta kalpas
Alcoholic fermn-by yeast.	Acidic fermn - Acid Bacilli
Fermn completes after 15 days	Completes within 15 days
Except Sura, Fermenting sources used are-Sugar, Jaggery etc sweet substances	Mainly - Carbohydrates

Different between Asava and Arista

Asava	Arishta
1.Usually Kwatha not prepared	1 Generally Kwatha is prepared
2.Usually prepared with Seeta veerya dravyas	2. Ushna veerya dravyas
3. It is drava pradana	3.It is dravya pradana
4.Potency is less	4. More because of agni samskara
5. Sp Gravity is less	5. Sp Gravity is more
6. Preferable for pittaja persons	6. For vata kaphaja persons

In samhita period difference between Asava and Arishta is not mentioned.

Eg:-

- **Madwasava, duralabhashav, madhukasava -use of Kwatha (Charaka samhita.)**
- **No kwatha preparation in takrarista. (Charaka samhita.)**
- **In Mrdvikarista ,Kwatha nirmana not mentioned (Susrutha Samhita)**

FACTORS INFLUENCING FERMENTATION PROCESS

- Fermn pots & their preparation.
- Ingredients & their Qty.
- General method of preparation of Asavarishtas.
- Onset & Completion of fermentation.
- Place, Season,Time, Duration of fermn.

FERMENTATION POTS & THEIR PREPARATION

- **Common materials used for fermaentation pots-**Metal, Wood, Porcelain, Plastic, St. steel.

1. Mritpatra considered the best , but it should not prepared with kshareeya soil.
2. Use long standing wooden material for sandhana patra nirmana
   Eg:-Sagwan tree

- **Sterilization.**-Fumigation. Application Madhu\Ghrita, etc and then Using Guggulu, vacha, sarsapa, Rumimastagi, Rala etc for fumugation

INGREDIENTS & THEIR QUANTITY.

- **Aqueous Herbal extracts - 1 drona (1024 Tolas)**
- **Sweet substances - 1 Tula(400 Tolas.): 20-40%**
- **Honey - 1\2 Tula(200 Tolas).**
- **Prakshepaka dravyas - 1/10 Tula(40 Tolas.)**

GENERAL METHOD OF PREPN OF ASAVARISHTAS

Drugs- in coarse powder form.

Soak overnight in sterile water.

Add specific qty of water+ Jaggery+ Pr dravyas & mix well.

Shift to sterile Fermenting pot.

Tie the mouth With clean cotton cloth. Keep in clean dry warm place.

Stir every day till fermentation sets in.

Seal the pot ,Keep undisturbed for 15 days.

After 15 days, Remove the seal, test for completion of fermn.

PLACE, SEASON, & DURATION

- **Place**.-Inside heap of Paddy\ Barley\Husk\Dry grass; Under ground
- Pot should be kept at a temperature 25-35°C(90-93°F)

- **Season**.-Autumn, Spring
- **Duration**.-7 days-6 months.(gugulasav(su)-6month, Astashatarista(ch)- 7 days.)
- **Shelf life**.-No Expiry.

Role of sweetening agents

- Sweet substances facilitate the process of fermentation.
- Among all the sweetening substances, jaggery is said to be good and older jaggery (*Purana Guda*) is considered to be material of choice, whenever *Guda* is indicated.
- Besides jaggery, other sweet substances like *Madhu*, *Sharkara*, *Phanita* (Molasses) etc are also used.

Role of drava dravya in Asava-arishta nirmana:-

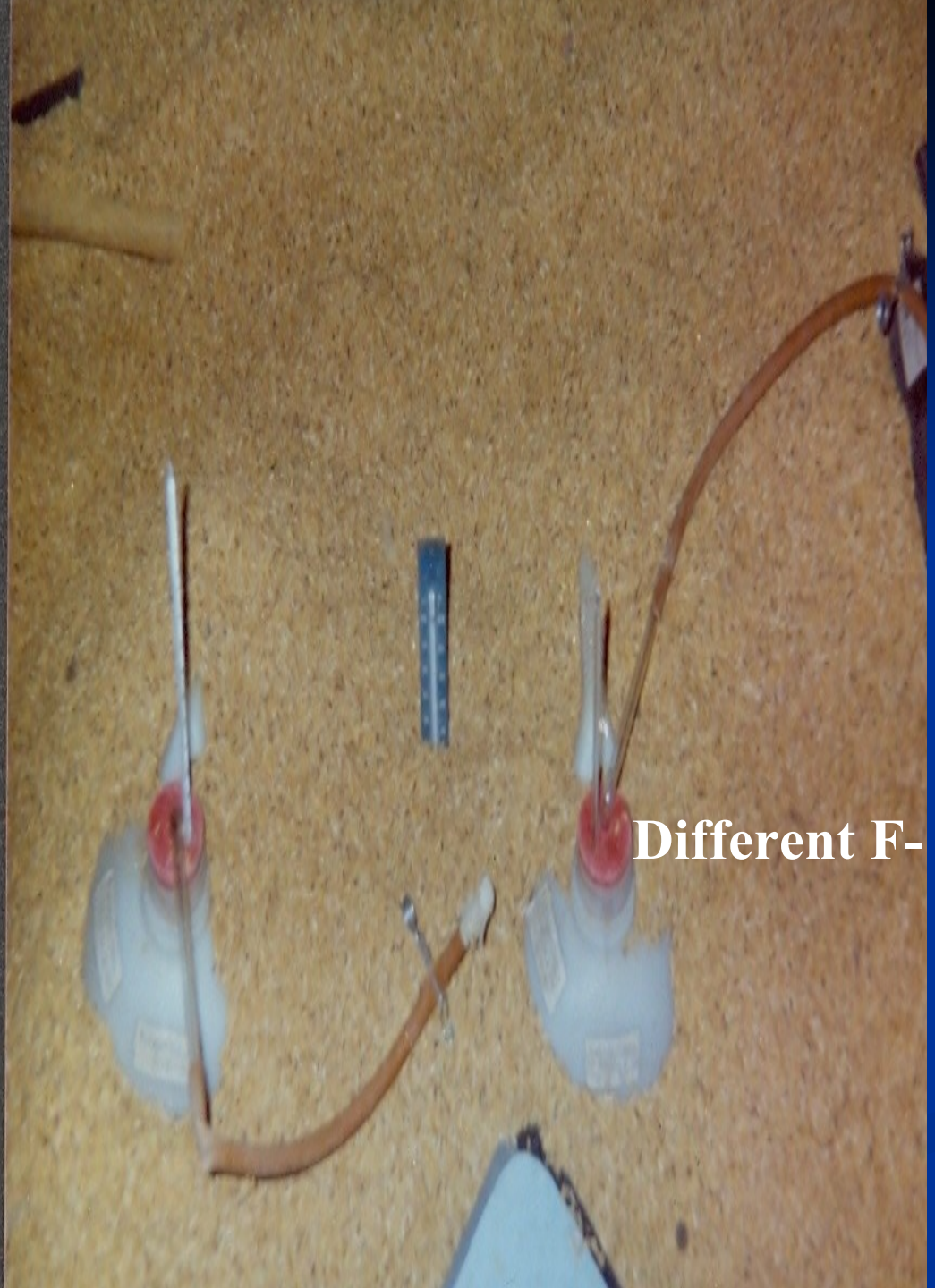
- Drava dravyas like *Kwatha, Swarasa* etc is an essential part of every Asava-arishta preparation for the required activity of favorable microorganism.
- Liquid acts as solvent for the fermentation media and provides water which forms one of the constituents of culture media.

Role of Dhatakipuspa in fermentation:-

- Dhataki puspa facilitate fermentation due to its sweetening nature.
- Flowers should be added in wet state.(dalhan)
- It will give strength for bacillus.

Dose of Asavarishtas:-

Should advice 2 to 4 tolas along with double quantity of water. When we are consuming the Asavarishtas that should not hold as kawal or gandusha.



Different F- pots kept for fermentation

Tests to know onset & completion of Fermentation.

Observations	**Onset**	**Completion**
Pr. Drugs	Floating	Sunken.
Effervesence.	Present	Absent
Hissing sound	Present.	Absent.
Sour taste	Mild	Prominent
Burning candle	Extinguish.	Continue to burn
Lime water	Turns to milky	No change

Lime Water Test

$Ca(OH)_2 + Co_2 \square CaCo_3 + H_2O$

- Sandhana Karma phala:-(Benefit of fermented preparation):-
- Asukaritwa,
- madyaguna yukta,
- Vyavayi, vikasi,
- Chirakalika.

low dose it will give

- Utsaha,
- Bala-varnakanti,

Sphoorti and vajikarana.

Difference between new & old Madya kalpana

NEW

-Abhishyandi.

- Heavy for digestion.

- Vitiates doshas.

-Not good for health.

- Causes burning sensation.

-

- Unpleasant odour & colour.

OLD

–Cleanses body channels.

-Light for digestion.

-Alleviates Vata & Kapha.

-Good appetiser.

-Eradicates Krimi.

-Pleasant odour.

MADYA UNFIT FOR USE(spoiled)

- Thick.
- Causing burning sensation.
- Bad odour & Taste.
- Having krimies.
- Heavy for digestion.
- Newly prepared.
- Teekshna & Ushna.
- Preserved in Durbhajana.
- Which is not good for Heart.
- With less Drugs.
- Polluted, Sticky, Last portion of madya.

MADYA FIT FOR USE

- Preserved for sufficient time.
- With specific taste.
- Having digesting capacity.
- Vata kapha hara.
- Good appetizer.
- Mood elevator.

STANDARDISATION PARAMETERES

- Organoleptic characters.
- Physico chemical
- pH value.
- Sp. Gr. At 25°C
- Total sugar, Reducing & Non reducing
- Ash value- Total & Acid insoluble.
- Total solid content
- Brix value
- Alcohol content.
- Test for methanol
- Total Acidity
- Test for Heavy metals
- Microbial Contamination
- Test for Specific pathogens
- Pesticide Residue
- Phyto chemical Studies.
- Chromatographical study.
- Shelf life

Regulatory references

- Rule 161(a)

Kapurasav- 15ml
Ahiphensav- 15ml
Mrigmadasav- 15 ml

- Rule 161(b)

Mritsanjeevani sura- 16% 30 ml
Mahadrakshasav- 16% 120 ml

Rule 168- max percentage of alc <12%

THAN Q