



Review Article

**THERAPEUTIC CATEGORIZATION AND PHYSICOCHEMICAL PROFILING OF PROPRIETARY AYURVEDIC CREAMS AND HERBAL POWDERS MARKETED IN INDIA**

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**ABSTRACT**

A broad set of proprietary Ayurvedic formulations for forty-seven creams and eighty eight powders/*Churnas* representing multiple therapeutic categories were evaluated to collate category-wise trends and profile key physicochemical parameters. The objective was to propose empirical reference ranges that may support quality assessment and future standard setting initiatives. Routine quality control tests for creams revealed wide variability, with pH ranging from 3.88 to 11.42, total ash (TA) from below detection limit to 49.34%, acid insoluble ash (AIA) 0 to 50.88%, water soluble matter (WSM) 0.24 to 61.20%, and alcohol soluble matter (ASM) 1.20 to 83.12%. Powders similarly showed substantial dispersion, with loss on drying (LOD) 0.14 to 18.40%, water soluble matter (WSM) 2.34 to 99.60%, alcohol soluble matter (ASM) 3.02 to 98.52%, total ash (TA) 1.71 to 96.92%, and acid insoluble ash (AIA) 0.28 to 88.90%. Label declared compositions were available for only two of forty-seven creams and twenty-eight of ninety-eight powders. Thin layer chromatography (TLC) based marker profiling was performed selectively to verify the presence of key botanicals. The compiled ranges obtained from diverse, commercially available products provide preliminary empirical baselines that laboratories and manufacturers may use to identify outliers, prioritize authentication efforts, and design stability or formulation optimization studies. These values should not be interpreted as clinical performance specifications; rather, they serve as a pragmatic starting point toward harmonized physicochemical standardization aligned with contemporary quality control expectations.

**INTRODUCTION**

The global market for herbal and traditional medicines has expanded significantly in recent decades, driven by increasing consumer preference for natural and plant-based therapeutic products. Ayurveda, one of the world's oldest traditional medical systems, utilizes a wide range of plant-derived formulations including powders (*Churnas*), pastes, decoctions, and topical preparations. Ensuring the quality, authenticity, and safety of these formulations is therefore essential for their continued acceptance and integration into modern healthcare systems.

In contemporary pharmaceutical and food industries, chemical analysis plays a crucial role in verifying product composition, purity, and stability. Similar analytical approaches are increasingly applied to Ayurvedic formulations to establish standardized quality parameters. However, while classical formulations described in Ayurvedic texts often follow defined preparation methods, many commercially available products are proprietary formulations developed by individual manufacturers. These proprietary preparations frequently lack clearly defined analytical specifications and standard reference ranges.

The concept of proximate analysis, originally developed for nutritional evaluation of food and feed materials, provides a useful framework for assessing herbal formulations. Parameters such as moisture content, ash value, crude fibre, extractive values, and

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pH can offer valuable information regarding the physicochemical characteristics of plant-based products. Similar analytical approaches are applicable for evaluating Ayurvedic preparations including *Churnas*, *Asavas*, *Arishtas*, *Avalehyas*, and topical herbal formulations.

The present study aims to evaluate selected proprietary Ayurvedic herbal creams and powders using standard physicochemical and analytical methods and to propose approximate ranges for key quality parameters based on laboratory observations.

### MATERIALS AND METHODS

Ayurvedic medicines are designed for both short- and long-term use. Preparations such as *Kalka* (paste), *Svaras* (juice), *Hima* (cold infusion), and *Kavath* (decoction) are used immediately, while *Churna* (powder), *Ghanstva* (extract), *Avaleha* (semi-solid), *Vati* (pills), *Asavas* and *Arishtas* (alcohols), *Taila*, and *Ghritas* (oils and ghee) are preserved for long periods. Metal/mineral preparations undergo lengthy processes like *Shodhan* (purification), *Marana* (trituration), and *Jarama* (calcination), allowing for indefinite preservation.

#### Characteristics & specifications of *Churna*; *Lepa*

*Churna* (or *Chooranam*) is a fine powder made from one or more drugs, which are cleaned, dried, and finely powdered using a mortar and pestle or a disintegrator, then sieved through an 80-mesh sieve. If the formulation contains multiple drugs, each is powdered, sieved, weighed, and mixed separately. *Churnas* are typically administered with specific vehicles such as milk, water, buttermilk, honey, or ghee, depending on the formulation and therapeutic

use. They are stored in airtight containers and generally used within two months.

*Kvatha Churna* (*Kutinir Choornam*) refers to a coarse powder (20-40 mesh) of plant drugs used for decoction. It retains its potency for up to two months and should also be stored in airtight containers. Powders are normally tested for description, macroscopic, microscopic, loss on drying at 105°C, total-ash, acid-insoluble ash, water-soluble extractive, alcohol-soluble extractive, pH, bulk density, tap density; particle size (*Churna* 80-100 & *Kvatha churna* 40-60 mesh), heavy/toxic metals like lead, cadmium, mercury; arsenic; microbial contamination, TLC -with marker (wherever possible), shelf life, pesticide residues, aflatoxins.

*Lepa*, *Malhara*, *Kalimbu*, or *Pasai* (medicated wax, cream, or poultice) is prepared by cleaning raw drugs, finely powdering them, and mixing with oils or waxy materials as per the formulation. The term "*Maltara*" refers to its use in removing "*Mala*" (residues) from "*Vrana*" (ulcers or sores) and is like ointments in modern pharmaceuticals. Oils, ghee, resin, or wax are measured, gently heated, and strained through clean muslin cloth. The finely powdered drugs are then added and triturated to achieve a smooth, homogenous, non-gritty consistency.

Creams normally are tested for description; colour, odour, loss on drying at 105°C, thermal stability, total fatty mater, spread ability, uniformity of content, pH, particle size and microscopic (if powdered drugs incorporated), microbial contamination, TLC, assay (wherever possible), shelf life, rancidity test.

### RESULTS

**Table 1: Creams - Formulations and composition**

S.No	Name	Composition of the formulation
1	Fair All Fairness Cream	Each gram contains: Extract of <i>Yasti Madhu</i> ( <i>Glycerrhiza Glabra</i> ) root 0.0325g, <i>Kumari</i> ( <i>Aloe Vera</i> ) Leaf 0.0235g, <i>Chandan</i> ( <i>Santalum Album</i> ) bark 0.0025g, <i>Haridra</i> ( <i>Curcuma Longa</i> ) rhizome 0.002g, <i>Ksheera</i> (natural milk) 0.0025g, <i>Godhuma</i> ( <i>Triticum Sativum</i> ) 0.0025g, <i>Kumkum</i> ( <i>Crocus Sativus</i> ) flower 0.0008g.
2	Fair All Night Cream	Each gram contains: Extract of <i>Trapusha</i> ( <i>Cucumis Sativus</i> ) fruit 0.01125g, <i>Kumari</i> ( <i>Aloe Vera</i> ) leaf 0.0235g, <i>Godhuma</i> ( <i>Triticum Sativum</i> ) grains 0.0025g, <i>Usira</i> ( <i>Vetiver Zizinoideis</i> ) root 0.005g, <i>Nibuka</i> ( <i>Citrous Lemon</i> ) fruit 0.00875g

**Table 2: Powders - formulations and composition**

S.No	Name	Composition of the formulation
1	Nagarjuna Tooth Powder	<i>Amra Patra</i> (80w/w), <i>Jambu Patra</i> (19w/w), <i>Nimba Patra</i> (5w/w), <i>Shunti</i> (5w/w), <i>Lavanga tel</i> (0.5w/w), <i>peppermint tel</i> (0.5w/w), <i>Sengajarak</i> , <i>Shank jeerak</i> (25w/w)
2	Humera Shampoo Powder	Each 50g of shampoo powder contains: <i>Uradh</i> (25g), <i>Aamla</i> (3g), <i>Sekaki</i> ( <i>Acacia Monnieri</i> ) (6g), <i>Methi</i> ( <i>Trigonella Foneum</i> ) (3g), <i>Narkachoor</i> ( <i>Zingiber Zerbet rose</i> ) (3g)

3	Sufoof -E -Rahath	Each 100g of powder contains: Fennel ( <i>Foeniculum Vulgar nill</i> ) 12g, ginger (12g), <i>Senna cassia angustifolia</i> (12g), <i>Namkesaidha</i> (rock salt) (10g), <i>Misri</i> (2g), <i>Haleela</i> ( <i>Chebulica Myrobalia</i> ) (10g), <i>Baleela</i> ( <i>Terminalia Belarica</i> ) (10g), <i>Amla</i> ( <i>Embllica Oficinialis</i> ) (12g), <i>Ilpgol</i> (Bhoos), <i>Plantago Ovata</i> forst (20g)
4	Madhunaasthak Churan	<i>Terminalia Chebula</i> (6g), <i>Amalaki</i> (10g), <i>Woodfordia Flori bunda</i> (5g), <i>Mahoushdhadhi</i> (3g), <i>Curumazedoarea</i> (1g), <i>Ratna Purusha</i> (4g), <i>Karavellam</i> (5g), <i>Bergera Koenigh</i> (4g), <i>Acrous Calacmus</i> (1g), <i>Vibheet haki</i> , <i>Methika</i> (4g), <i>Nagakesar</i> (4g), <i>Katuk rohini</i> (4g), <i>Glycerriza Glabra</i> (2g), <i>Krishna tulasi</i> (4g), <i>Cyperus Rotunlus</i> (5g), <i>Berberis Asiatica</i> (1g), <i>Nimba</i> (5g), <i>Manjista</i> (3g), <i>Bhoomyamalaki</i> (6g), <i>Jambu</i> (5g), <i>Shilajit</i> (3g), <i>Piper Longum</i> (3g), <i>Nigella Sativa</i> (3g), <i>Tinospora Cardifolia</i> (3g)
5	Sufoof-E- Saif Mulayyan Powder	<i>Sana makki</i> (21g), <i>Badiyan</i> (27g), <i>Zanjabeel</i> (22.5g), <i>Kala namak</i> (3g), <i>Turbudh</i> (1.5g)
6	Saif's Ziabenol Powder	<i>MagZ-E-Tuqm-E Jamun</i> (12.2g), <i>Gudmar booti</i> (12.12g), <i>Karyapak</i> (6.06g), <i>Barg-e, neem</i> (6.06g), <i>Karela</i> (6.06g), <i>Kalizeeri</i> (6.06g), <i>Kalonji</i> (6.06g)
7	Sufoof - E -Saif Hazim Powder	<i>Badiyan</i> (12g), <i>Zanjabal</i> (18g), <i>Zeera safed</i> (18g), <i>Misri</i> (18g)
8	C-Trimgranules	Each 100 g contains extracts of derived from <i>Guduchi</i> ( <i>Tinospora Cordifolia</i> -25 g, <i>Mustha</i> ( <i>Cyperus Rotundus</i> ) –25 g, <i>Vrishamla</i> ( <i>Gaccinia Indica</i> )-50g
9	Kabz Kure powder	<i>Cassia Angustifolia</i> (28%), <i>Ipomoea Turpehum</i> (5%), <i>Cassia Fistula</i> (20%), <i>Zingiber Officinale</i> (5%), rock salt (10%), <i>Terminalia Chebula</i> (10%), <i>Trachyspermum Ammi</i> (5%), <i>Pimpinella Anisum</i> (5%), <i>Terminalla Belerica</i> (5%), <i>Cumin Cyminum</i> (5%), <i>Ammonium Chloridum</i> (2%)
10	Bahaar Face Powder	<i>Badam</i> (4g), <i>Haldi</i> (13g), <i>Sandal</i> (8g), <i>Narkachor</i> (7g), <i>Gulab pathi</i> (11g), <i>Tukhme bapula</i> (6g), <i>Kachcha chana</i> (8g), <i>Multani mati</i> (12g), <i>Sadab</i> (7g), <i>Tukhme mooli</i> (6g), <i>Jau</i> (12g), <i>Kafe dariya</i> (6g), <i>Kapoor kachri</i> (4g)
11	Chatwal Face Powder	<i>Rubina Cordifolia</i> (12g), <i>Hedychium Spicatum</i> (8g), <i>Quercus Infectoria</i> (5g), <i>Symplocus Racemosa</i> (8g), <i>Myristica Fuagrans</i> (5g), <i>Withania Somnifera</i> (7g), <i>Glycrrhiza Glabra</i> (5g), <i>Terminelia Arjuna</i> (10g), earth clay (25g)
12	Udaramritam	Every 100 g contains 5g of each of following <i>Sunti</i> , <i>Harde</i> , <i>Beheda</i> , <i>Amla</i> , <i>Pippali Mool</i> , <i>Ajmoda</i> , <i>Marich</i> , <i>Kachur</i> , <i>Vachha</i> , <i>Shuddh hing</i> , <i>Saindhav</i>
13	Grovel Hair Wash	Each 100g contains: <i>Rita</i> (30%), <i>Shikakai</i> (30%), <i>Amla</i> (10%), <i>Bhringaraj</i> (10%), <i>Mandara</i> (10%), <i>Methi</i> (10%)
14	Sainee's Herbal Bath Powder	<i>Curcuna Anada</i> , <i>Jerta Masi</i> , <i>Citrus</i> , <i>Cicer Arientinum</i> , <i>Alevera</i> , <i>Mint</i> , <i>Kasturi Haldi</i> , <i>Camphor</i>
15	Sainee's Herbal Face Pack	<i>Curcuna Ananda</i> , <i>Curcuna Zadoria</i> , <i>Rosadamascena</i> , <i>Vemonia</i> , <i>Antheninentica</i> , <i>Citrwa</i> , <i>Nubilis</i> , <i>Cucumber</i> , <i>Aswagandha</i> , <i>Neem</i> , <i>Tulsi</i> , <i>Nagakeswar</i>
16	Sainee's Antidandruff Powder	<i>Tripala</i> Powder, <i>Tulsi</i> , <i>Vepa chekka churna</i>
17	Galog	<i>Madhustrava</i> (20g), <i>Sita</i> (23g), <i>Sahastravirya</i> (10g), <i>Misi-vajrangi</i> (14.50), <i>Gudhmool</i> (3g), <i>Madhura</i> (5g), <i>Sakal</i> (3g), <i>Gopwadhu</i> (5g), <i>Yastimadhuk</i> (1g), <i>Krodkaseruk</i> (1g), <i>Arista</i> (1g), <i>Yastimadhuk</i> (1g), <i>Madhuparns</i> (1g), <i>Bodhini</i> (1g), <i>Homdhanya</i> (1g), <i>Varda</i> (1g), <i>Jaran</i> (1g), <i>Aswsh</i> (1g)
18	Livol	Each 100g contains: <i>Yavtikta</i> (7.0g), <i>Raktapushpa</i> (6.0g), <i>Dhaval</i> (8.0g), <i>Varuni</i> (6.0g), <i>Markav</i> (8.0g), <i>Uragandha</i> (5.0g), <i>Rohini</i> (10g), <i>Manthpak</i> (10g), <i>Dadimpushpak</i> (6g), <i>Gopvadhu</i> (7g), <i>Vayasi</i> (5.0g), <i>Krishna</i> (2.0g), <i>Katurohini</i> (1.0g), <i>Tamalki</i> (4.0g), <i>Vartita</i> (4.0g), <i>Mayurak</i> (5.0g), <i>Pichumand</i> (5.0g), <i>Kiratika</i> (1.0g)
19	Abhaya Churnam	<i>Abhaya</i> (0.5g), <i>Sonthi</i> (3g), <i>Dhaniya</i> (2g), <i>Asmod</i> (2g), <i>Kalanamak</i> (1g), <i>Yala</i> (0.3g), <i>Long</i> (01g), <i>Dalchin</i> (0.1g), <i>Saindha namak</i> (1g)
20	Keshamritam	Every 130g contains 10g of each of following <i>Amla</i> , <i>Aritha</i> , <i>Bhring Raaj Brahmi</i> , <i>Sariba</i> , <i>Harde</i> , <i>Shikakai</i> , mango-seeds, mehendi, <i>Behead</i> , <i>neem-Chhal</i> , <i>Vavding</i> , <i>Methi</i>

21	Manasamritam	Every 110g contain: <i>Ashwagandha</i> 20g, <i>Brahmi</i> 20g, <i>Shatavari</i> 20g, <i>Amla</i> 20g, <i>Shankh pushp</i> 10g, <i>Jatamansi</i> (5g), <i>Vachha</i> (5g), <i>Sarpagandha</i> (5g), <i>Mukta-shukta</i> (5g)
22	Sampoorna Arogyamritam	<i>Chirayata</i> (40g), <i>Kutki</i> (15g), <i>Brahmi</i> (10g), <i>Ashwagandha</i> (10g), <i>Shatavari</i> (10g), <i>Bhumi amalki</i> (5g), <i>Sarpagandha</i> (4g), <i>Nagarmotha</i> (3g), <i>Gokhru</i> (3g)
23	Good morning Powder	<i>Srigandha</i> , <i>Tulasi</i> , <i>Tulasi roots</i> , <i>Turmeric</i> , <i>Chandhana</i> , lime powder, rose powder, <i>Mandhara</i> powder
24	Stomavet Powder	<i>Carum Copticum</i> (8g), <i>Zingiber Officinale</i> 5g), wild cinnamom bark (3g), <i>curcuma aromatica</i> (3g), <i>acorus calamus</i> (3g), <i>pepper officinarum</i> (3g)
25	Maga active	<i>Jala Brahimi</i> -0.33%, <i>Mandukaparni</i> -0.33%, <i>Aswagandha</i> -0.5%, <i>Sariba</i> -0.33%, <i>Amla</i> - 0.165%, <i>Sathavari</i> - 0.5%, <i>Vacha</i> - 0.25%, <i>Vidari Kandha</i> - 0.5%, <i>Yasti madhu</i> - 0.75%, <i>Shanka puspi</i> - 0.33%, <i>Jyotishmati</i> - 0.03%, <i>Guduchi</i> - 0.33, <i>Jatamansi</i> - 0.165, <i>Gokshura</i> , <i>Elachi</i> -0.1%, <i>Dalchin</i> - 0.05%, <i>Sonti</i> - 0.05%, <i>Behada</i> -0.1%, <i>Herada</i> -0.1%
26	Shine Herbal Face Pack	Each 10gms contains: <i>Terme Nelia Arjuna</i> (1.25gms), orange powder (1.25gms), <i>curcuma zedorea</i> (1.25gms), <i>Multani matti</i> (2.5gms), <i>Rubiya kardipoliya linnias</i> (1.25gms), <i>Simplokas resimoja rox burg</i> (1.25gms)
27	Kesh tone (hair powder shampoo)	<i>Sapindus emarginatus</i> (4.25gms), <i>pillanthus emblicalmias</i> (0.5gms), <i>eklipta alba</i> (0.5gms), <i>ajadirakata indica</i> (0.5gms), <i>acacia farensia</i> (4.25gms)
28	Sugandh Shareer (Herbal bath powder)	Each 10gms contains: <i>Phaseolus mungo</i> (1.25gms), <i>cicerarietinum c lans</i> (1.25gms), <i>oryza sativa</i> (2.50gms), <i>hemidissmin indicam</i> (1.25gms), <i>vativesia G.G. Nocidis</i> (1.25gms), <i>berbesiasasiatica</i> (1.25gms), <i>Curcuma zedoriea</i> (1.25gms)

**Table 3: Creams - trends in analytical test parameters in ayurvedic compositions**

S.No	Name of the Formulations	pH	TA	AIA	WSM	ASM
<b>Category 1 - Fairness / Skin-Glow Creams</b>						
1	Fair All Fairness Cream	6.02	0.54	NIL	7.06	52.40
2	Fair All Night Cream	5.85	0.60	NIL	5.56	47.05
3	Xtra Fair Cream	6.86	1.62	0.35	61.20	51.80
4	Fairy Dot Cream	6.00	3.37	2.34	17.49	53.63
5	Fair All Skin Glowing Cream	6.06	0.35	NIL	40.52	37.36
6	Charmi Herbal Fairness Cream	6.04	1.22	BDL	15.74	27.64
7	Cutesy Fairness Cream	4.97	0.02	BDL	3.00	41.50
8	Jealousy Fairness Cream	5.84	1.20	0.64	6.74	32.48
9	Kalonji Fairness Cream	4.34	1.93	BDL	7.68	52.20
<b>Category 2 - Moisturising Creams</b>						
10	Veena's Herbal Moisturising Cream	6.58	0.66	BDL	10.92	4.08
11	Almond Moisturising Cream	6.82	0.17	BDL	3.02	33.18
12	Glory Herbal Moisturizer	6.48	0.14	BDL	12.12	23.50
<b>Category 3 - Crack-Heel / Foot-Care Creams</b>						
13	Breach Foot Crack Cream	-	6.00	3.00	14.33	10.20
14	Krack Cream	6.82	0.12	NIL	1.04	22.88
15	Sainee's Crack Cream	6.16	2.26	NIL	0.24	31.96
16	Qure natural - Foot Crack Cream	5.95	0.007	NIL	1.56	46.54
17	Heal Fast Aloe Crack Cream	4.21	0.56	BDL	1.06	83.12
<b>Category 4 - Pimple / Anti-Acne Creams</b>						
18	Grovel Pimples Cream	7.06	0.64	BDL	33.00	71.40
19	Kalonji Pimple Cream	5.46	1.86	BDL	6.92	21.96

<b>Category 5 - Face Packs (Wet Packs)</b>						
20	Papaya Wet Face Pack	7.84	37.09	35.59	3.26	10.86
21	Fruit Wet Face Pack	7.36	41.53	40.36	2.48	10.64
22	Cucumber Wet Face Pack	7.33	33.04	31.32	5.38	17.68
23	Anti - Pimple Face Pack	6.47	34.90	30.80	0.90	16.70
24	Varcyhes Aloe Vera Face Pack	4.83	35.1	9.000	32.28	10.60
<b>Category 6 - Facial Scrubs</b>						
25	Apricot Facial Scrub	4.68	0.05	BDL	12.76	21.04
26	Marigold Facial Scrub	6.63	0.02	BDL	21.52	21.98
27	Neem Facial Scrub	6.68	BDL	BDL	1.26	20.28
28	Almond Facial Scrub	5.53	BDL	BDL	4.76	24.68
29	Oatmeal Facial Scrub	5.56	BDL	BDL	0.60	17.88
30	Aloe Vera Facial Scrub	5.76	BDL	BDL	0.75	18.62
<b>Category 7 - Cleansing Milks</b>						
31	Agri Gold Spa Cleaning Milk	3.88	BDL	BDL	15.92	19.10
32	Glory Herbal Deep Pore Cleansing Milk	6.91	BDL	BDL	3.66	19.40
<b>Category 8 - Other Herbal / General Creams</b>						
33	Aruna Cream	-	3.97	1.02	3.00	4.50
34	Ananda Cream	-	0.08	NIL	0.40	2.40
35	Sino Care Cream	-	0.08	NIL	0.80	5.60
36	Gloderm	-	1.52	NIL	0.80	4.60
37	Niram Cream	-	0.03	NIL	0.40	4.20
38	Crown Cream	-	0.08	NIL	0.40	1.20
39	Charma Rakshine	4.22	32.88	18.45	10.00	8.50
40	Oshadhi Face Cream	-	2.87	2.42	5.66	17.52
41	Tender Touch Cream	8.13	1.32	0.30	37.2	44.06
42	Glory Lime Fresh	11.42	4.55	1.59	30.3	64.36
43	Glory Special Ice Cool Cream	7.85	BDL	BDL	18.02	35.14
44	Capcin Cream	5.80	BDL	NIL	7.86	37.14
45	Glory Lemon All Purpose Cream	6.66	0.44	BDL	8.30	41.54
46	Glory Sandal Herbal Face Pack	7.79	49.34	50.88	2.20	7.02
47	Swarna Herbal Face Cream	7.30	1.03	NIL	1.79	4.08

**Table 4: Powders - trends in analytical test parameters in Ayurvedic compositions**

S.No	Name of the Formulations	LOD	WSM	ASM	TA	AIA
<b>Category 1 - Tooth Powders</b>						
1	Nagarjuna Tooth Powder	2.93	46.76	36.08	31.10	3.40
2	Dantkure	3.94	91.76	63.18	6.72	2.14
3	Boss Tooth Powder	6.99	47.00	27.64	13.31	3.05
4	Rupa Amrutha Face Powder	1.33	2.40	4.20	95.10	88.9
5	Vikas Red tooth Powder	4.60	21.34	12.40	50.59	21.03
6	Cochine Tooth Powder	8.62	21.00	14.5	28.15	4.65
7	Udaramritam	7.70	22.50	26.00	12.50	4.35
8	Dantoor Red Tooth Powder	6.35	13.60	13.20	58.80	52.00
9	Oshadhi Tooth Powder	6.78	33.40	51.10	7.02	4.11

<b>Category 2 - Shampoo Powders / Hair-Wash / Hair-Care Powders</b>						
10	Humera Shampoo Powder	6.89	75.95	60.04	5.80	0.90
11	Grovel Hair Wash	3.64	54.00	83.60	5.28	0.66
12	Saines Anti dandruff Powder	3.95	49.64	23.98	16.16	11.26
13	Keshamritam	6.30	32.00	27.80	5.95	3.16
14	Shabnam's Kesh tone Hair shampoo	3.62	99.60	75.28	6.89	1.29
15	Kaalanatural-Natural Hair Dyer	2.52	37.12	40.84	9.50	5.71
16	Tarika Ayurvedic Pimple Remover	5.12	8.64	14.28	71.98	71.31
17	Cenna Herbal Shampoo	7.50	20.50	12.40	16.85	16.00
<b>Category 3 - Face Powders / Face Packs</b>						
18	Bahaar Face Powder	5.10	22.72	26.12	20.96	10.31
19	Chatwal Face Powder	3.22	31.32	24.60	41.28	36.41
20	Sainee's Herbal Face Pack	5.53	34.24	10.24	5.28	2.20
21	Poornas Face Glow Powder	6.70	34.24	15.92	29.42	23.07
22	Rupa Amrutha Face Powder	1.33	2.40	4.20	95.10	88.9
23	Shabnam's Shine Herbal Face Pack	5.37	28.28	14.16	16.84	13.86
24	Nikhil Face Pack Powder	2.83	24.40	17.52	3.09	1.12
25	Oshadhi Face Pack	6.83	6.50	20.25	19.52	15.00
26	Glow Hill Powder	4.47	73.60	27.14	24.11	6.27
<b>Category 4 - Bath Powders / Body Powders</b>						
27	Sainee's Herbal Bath Powder	5.93	16.04	6.16	1.73	0.98
28	Swarna Herbal Bath Powder	5.16	16.52	12.24	3.23	0.84
29	Shabnam sugandh shareer bath	6.14	27.56	11.60	2.40	0.76
30	Snanatural-Bath Powder	3.69	30.64	12.96	42.02	40.76
31	D.K Herbal bath Powder	3.74	31.36	22.96	6.41	2.89
<b>Category 5 - Digestive / Laxative Churnas</b>						
32	Sufoof -E -Rahath	5.67	51.82	98.52	13.54	1.07
33	Sufoof-E- Saif Mulayyan Powder	7.45	53.85	30.04	15.61	0.28
34	Sufoof - E -Saif Hazim Powder	5.31	64.22	47.62	6.90	0.66
35	EasyLax Powder	3.80	66.95	53.80	5.18	0.70
36	Purg Yog Powder	6.64	69.40	35.60	7.05	2.02
37	Khabz Kusha Churna	6.06	89.76	82.20	20.77	1.66
38	Kabz Kure Powder	6.32	65.10	50.28	14.58	0.79
39	Pancha Sakara Churna	9.33	71.74	48.68	17.14	1.58
40	Udaramritam	7.70	22.50	26.00	12.50	4.35
<b>Category 6 - Diabetic / Sugar-Control Powders</b>						
41	Madhunaasthak Churan	5.13	31.60	31.06	9.58	2.67
42	Saif's Ziabenol Powder	6.45	37.60	35.16	8.55	1.96
43	Safoof-e-Zabetis	4.68	40.00	50.00	7.49	1.72
44	Kalonji-Sugar Powder	4.09	39.76	48.26	6.48	0.78
45	Dinatural-Diabetic food supplement	6.55	42.16	23.00	7.30	2.28
46	T.H.P.Madhu Mehanivarini	5.91	8.40	5.80	2.67	2.13
47	Madhu Riha Churnam	4.66	59.00	43.80	11.39	3.43
48	Madhufinite	4.45	74.52	74.92	13.62	1.74

<b>Category 7 - General Health / Rasayana / Immunity Powders</b>						
49	C-Trimgranules	5.61	87.57	87.43	17.08	0.39
50	Galog	-	60.48	29.78	11.48	2.78
51	Livol	8.01	65.50	37.74	23.03	8.05
52	Abhaya Churnam	8.02	30.50	14.00	18.55	8.82
53	Stomavet Powder	0.85	96.38	17.53	92.80	7.35
54	Maga active	1.20	93.47	94.38	1.71	0.50
55	Bio-Vota Powder	2.46	60.60	49.80	1.72	1.15
56	Safoof-E-Damma	6.62	49.28	28.80	9.55	2.40
57	Safed Musli Powder	3.22	57.00	41.04	20.50	12.00
58	Triphala	7.75	89.12	79.00	3.60	0.86
59	Manasamritam	7.58	48.02	33.00	11.39	3.80
60	Shwasanamritam	8.78	44.16	28.88	12.81	13.39
61	Sampoorna Arogyamritam	5.22	42.10	31.74	11.00	4.14
62	Lytenatural-Obesity Powder	6.84	64.40	16.48	11.89	4.96
63	Vikas Vergu churnam	8.13	69.26	43.16	22.05	13.43
64	Sashanka Kiran Modak	3.40	80.40	28.40	4.20	2.95
65	Bruhat Methee Modak	3.35	79.52	32.20	2.54	1.20
66	Jamby Rasayanam Churnam	9.95	44.81	32.31	10.31	5.70
67	Zinda-Taqat	6.87	31.45	19.92	7.20	3.20
68	K.P.R.D Powder	6.31	15.50	27.60	5.10	2.40
69	Cenna Mix	6.60	21.00	8.40	10.75	5.00
70	Cenna Siniti's	7.40	25.50	15.00	10.48	4.75
71	Sukha Jeevanam	18.40	10.00	8.60	4.12	1.92
72	Sobe	12.10	72.50	3.20	62.42	60.00
73	Mandar choor	7.90	25.00	12.20	3.45	2.00
74	Siladanthi	8.20	76.50	23.60	28.22	11.08
75	Swarna Sanjeevini	5.52	9.60	9.60	13.42	2.50
76	Madhu Sanjeevini	8.06	4.20	5.54	15.96	8.72
77	Revito	13.85	87.82	63.60	10.93	3.09
<b>Category 8 - Joint-Pain / Special Medicated Powders</b>						
78	Eczema Yog Powder	5.78	61.40	47.00	1.72	1.15
79	Joint Pain Churna	3.95	79.12	52.20	11.80	3.51
80	Safoof-e-Silan	3.16	61.30	64.10	3.44	0.55
81	Akseer -E-Meda	7.80	26.00	38.00	7.30	0.62
82	Akseer -E-Jigar	3.35	51.90	52.00	3.48	1.43
83	Vataharini Churnam	4.20	9.10	6.70	4.95	2.08
<b>Category 9 - Cosmetic Powders (Beauty / Fairness)</b>						
84	Bahaar Face Powder	5.10	22.72	26.12	20.96	10.31
85	Swarna Herbal Face Powder	6.03	15.60	5.20	70.30	66.50
86	Veena's Herbal Face Powder	0.14	2.34	3.02	96.92	-
87	Good Morning Powder	5.40	44.95	36.38	15.13	2.70
88	Rupa Amrutha Face Powder	1.33	2.40	4.20	95.10	88.9
89	Danta Amrutha tooth Powder	2.83	5.20	6.20	17.90	-
90	Tarika Ayurvedic Pimple Remover	5.12	8.64	14.28	71.98	71.31

91	Dantamritam	13.20	27.50	23.00	31.50	9.10
92	Saundaryamritam	8.50	27.00	27.20	4.68	4.22
93	Sampoorna Arogyamritam	4.10	25.00	16.40	11.00	7.35
94	Cenna Facial Nutrient	7.20	19.50	21.00	16.00	15.00
95	Epic Facial Nutrient	9.20	14.50	7.00	2.00	0.95

**DISCUSSION**

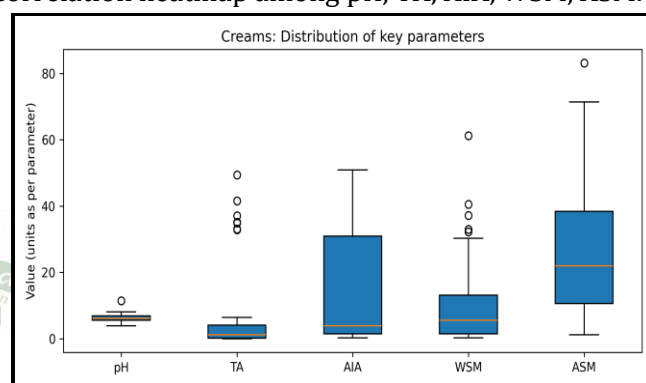
Proprietary Ayurvedic topical creams (Table 1) and herbal powders (Table 2) marketed in India were collected and were stored under appropriate laboratory conditions prior to analysis. The following physicochemical parameters were evaluated using standard laboratory procedures (Table 3 for creams and Table 4 for powders): pH, moisture content, total ash (TA) content, acid insoluble ash (AIA), water soluble matter (WSM), and alcohol soluble matter (ASM). These parameters provide important indicators of product quality, purity, and stability. These techniques help determine the presence and approximate concentration of bioactive constituents present in the formulations. These parameters varied depending on the formulation composition and therapeutic category.

Forty-seven samples of creams are analysed for which only two had formulations mentioned on the label claim. Ninety-five samples of powders or *Churnams* are analysed for which only twenty-eight had formulations mentioned, limiting meaningful cross-brand comparisons and hindering validation of expected extractive patterns and root cause analysis for outliers. Regulatory and industry groups could consider minimum disclosure (key botanicals, intended extract ratios, presence of clays/minerals, and solvents/carriers) to enhance traceability and consumer trust. These ranges are not claims of efficacy or safety; they are analytical descriptors to support quality screening and authentication. Clinical use must rely on medical judgment and established evidence.

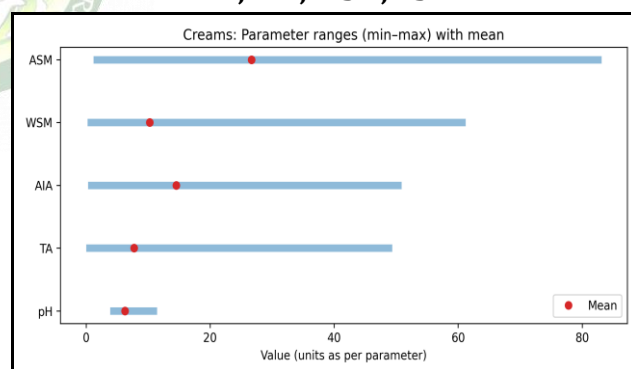
While we expect very similar types of results for some formulations, prepared in a very similar way, the type of ingredients used differed in all cases and the results are found to vary largely, making it difficult for any uniform conclusion to arrive at. However, the final findings can be taken as a measure of the test parameter in that range and serve as a guide. A statistical review of the data set indicates wide variability across creams and powders.

**Creams:** There are many types of creams for different purposes, the testing parameters are the same for all of them, but they differ in their values, as the formulations are different for every product as given in Table - 4. For all the forty-seven creams (fairness/skin glow; moisturizing; crack heel/foot care; pimple care/anti-acne; facial packs; facial scrubs; cleansing milks and other herbal/ general creams), the observed

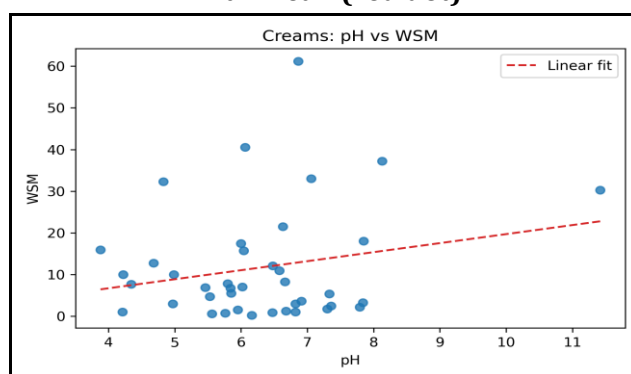
ranges are pH 3.88 to 11.42 (mean 4.98); TA - below detection limit (BDL) to 49.34%; AIA - 0 to 50.88%; WSM - 0.24 to 61.20% and ASM - 1.20 to 83.12%. Figure 1 shows - Distribution (boxplots) of pH, TA, AIA, WSM, ASM; Figure 2 shows - Parameter ranges (min-max) with mean (red dot); Figure 3 shows - Scatter of pH vs WSM with linear trend; Figure 4 shows - Scatter of pH vs ASM with linear trend and Figure 5 shows - Correlation heatmap among pH, TA, AIA, WSM, ASM.



**Figure 1. Creams - Distribution (boxplots) of pH, TA, AIA, WSM, ASM**



**Figure 2. Creams - Parameter ranges (min-max) with mean (red dot)**



**Figure 3. Creams: Scatter of pH vs WSM with linear trend**

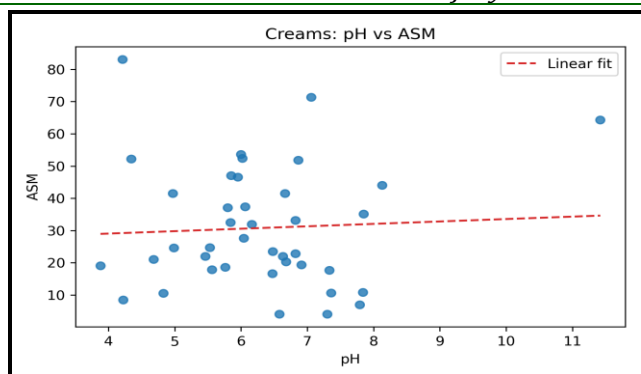


Figure 4. Creams: Scatter of pH vs ASM with linear trend

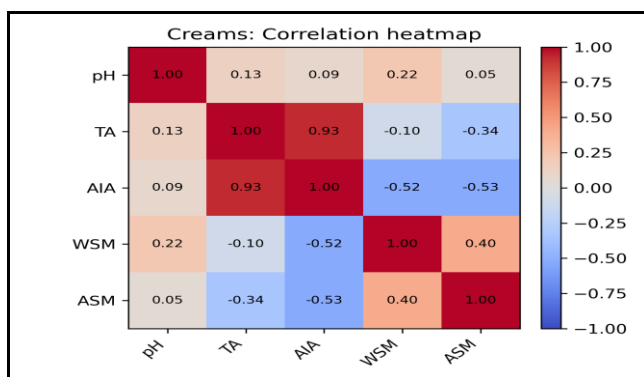


Figure 5. Creams: Correlation heatmap among pH, TA, AIA, WSM, ASM

#### Expected trends for

**Fairness/Skin-Glow Creams:** pH: Mildly acidic to neutral ( $\approx 5-7$  suggesting generally skin-compatible formulations); TA & AIA: Very low, because fairness formulations use plant extracts, oils, and emulsifiers rather than minerals, WSM: Moderate to high (water-based extracts, aloe vera, milk solids), ASM: Often high due to resinous phytochemicals, essential oil fractions, and oil-soluble actives like saffron or sandalwood.

**Moisturizing Creams:** pH: 5.5–6.8 (skin-friendly); TA/AIA: Almost zero- indicating clean emulsions with no inorganic fillers, WSM: Low to moderate (depending on hydrating humectants), ASM: Moderate (oil, ghee, vitamin-rich components).

**Crack-Heel/Foot-Care Creams:** pH:  $\sim 5-7$ , TA/AIA: Slightly higher than moisturizers but still low; WSM: Low to moderate; ASM: Often very high due to presence of lipophilic or emulsified fractions, waxes, oils, glycerides, and resinous fractions within cosmetic like matrices.

**Pimple/Anti-Acne Creams:** pH: Slightly acidic ( $\sim 5.5-6.5$ ); TA/AIA: Low; WSM/ASM: Moderately high depending on neem, turmeric, clay, or herbal extracts.

**Face Packs (Wet Packs and sandal-based formulations):** pH: 5–8; TA & AIA: Significantly high because these formulations include multani mitti, kaolin, or other mineral/earth clays; WSM: Low (clays do not dissolve in water); ASM: Low to moderate.

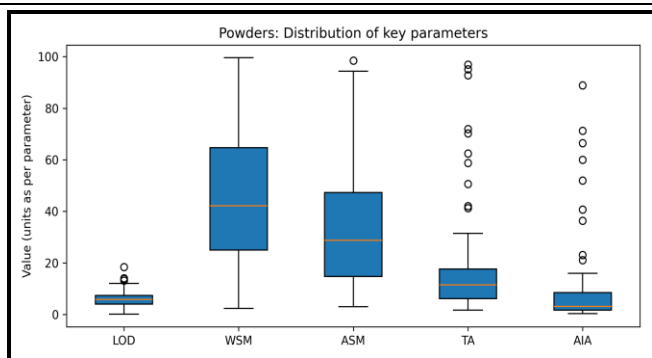
**Facial Scrubs:** - pH: Neutral to mildly acidic; TA/AIA: Very low unless scrub contains clay; WSM: Moderate; ASM: Moderate.

**Cleansing Milks:** pH: 4–6 (slightly acidic); TA/AIA: Minimal; WSM: High due to hydrophilic cleaning agents; ASM: Moderate.

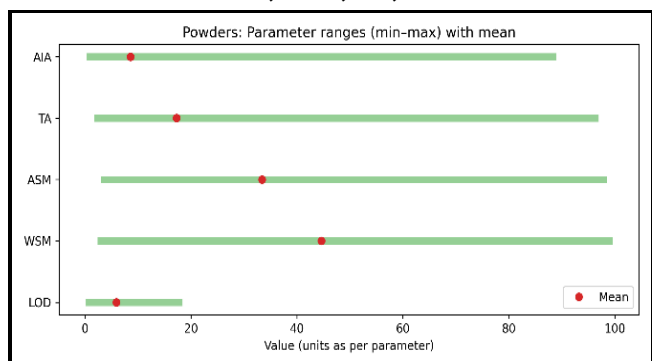
**Other Herbal/General Creams:** Mixed patterns depending on formulation; Some show elevated ash due to herbal powders; ASM varies widely due to diverse plant oils/resins.

**Interpretation:** Fairness creams show extract-rich compositions with minimal mineral content. High ASM suggests significant lipophilic actives or cosmetic emulsions. Moisturizers behave like classic emulsion creams with balanced hydrophilic-lipophilic components. Low ash indicates absence of clays or powders. Crack-heel creams are lipid-heavy, promoting occlusion and barrier repair. High ASM supports their nature as oily, protective formulations. Anti-pimple formulations strike a balance of water-based herbal actives and moderate lipophilic fractions. Clay-based products show higher ash. Wet packs behave like mineral-dominant formulations. High ash values confirm clay or mineral presence-completely expected. Scrubs are mainly emulsion-type bases with mild abrasives or exfoliating plant particles, reflected in low ash and moderate water and alcohol soluble matters. Cleansing milks are water-continuous emulsions with surfactants or botanical hydrosols, hence very low ash and high WSM. Other herbal and general category reflects heterogeneous formulations, combining herbs, waxes, and extracts, leading to wide parameter variability.

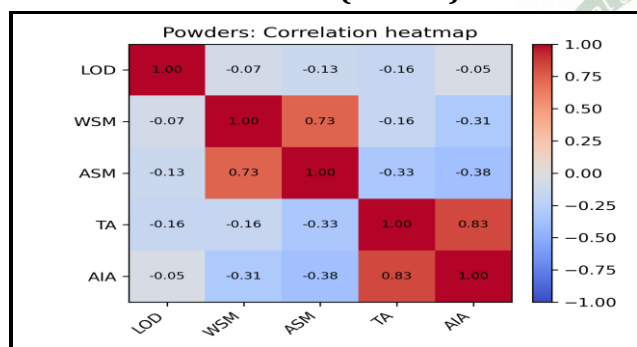
**Powders or Churnams:** In Ayurveda powders are generally called *Churnams*. In these, apart from alcohol soluble matter and water-soluble matter, to know the ash content in the powder, loss on drying, total ash and acid insoluble ash are also analysed. If the ash is present, then it is checked for solubility in acid to know the inorganic matter. In loss on drying, the lost moisture content after drying is noted as given in Table 5. Physicochemical profiles of powders (*Churnas*), for all ninety-eight powders (such as bath powder, *Churna* (general), face powder/pack, granules/*Modak*, hair/shampoo, metabolic (diabetes), metabolic (weight), other powders, tooth powder), showed LOD - 0.14 to 18.40%, WSM - 2.34 to 99.60%, ASM - 3.02 to 98.52%, TA - 1.71 to 96.92% and AIA - 0.28–88.90%. Figure 6 shows Distribution (boxplots) of LOD, WSM, ASM, TA, AIA; Figure 7 shows Parameter ranges (min–max) with mean (red dot); Figure 8 shows Correlation heatmap among LOD, WSM, ASM, TA, AIA; and Figure 9 shows Scatter of WSM vs ASM with linear trend.



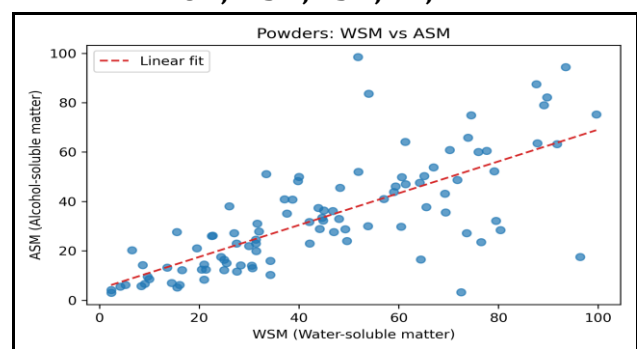
**Figure 6. Powders: Distribution (boxplots) of LOD, WSM, ASM, TA, AIA.**



**Figure 7. Powders: Parameter ranges (min-max) with mean (red dot)**



**Figure 8. Powders: Correlation heatmap among LOD, WSM, ASM, TA, AIA**



**Figure 9. Powders: Scatter of WSM vs ASM with linear trend**

**Expected trends for**

**Tooth Powders:** TA & AIA extremely high due to substantial mineral content such as clays, calcium salts, charcoal, WSM/ASM: Variable depending on spices or herbs, LOD: Low (dry powders).

**Hair-Wash/Shampoo Powders:** LOD: Moderate (*Shikakai, Ritha* absorbs moisture), WSM: High (because saponins dissolve), ASM: Moderate, TA/AIA: Low.

**Face Powders/Face Packs:** - Very high TA/AIA (due to clays like multani mitti), WSM: Low, ASM: Low.

**Bath Powders:** LOD: Moderate, WSM: Medium, TA/AIA: Low to moderate depending on clay content.

**Digestive/Laxative Churnas:** LOD: Moderate - high (due to hygroscopic herbs); WSM/ASM: High-indicating high extractive matter; TA/AIA: Low.

**Diabetic/Sugar- Control Powders:** WSM/ASM: High (indicates abundance of extractable phytoconstituents or soluble carriers such as bitter principles, alkaloids, gymnemic acids. Descriptive analyses support the presence of distinct physicochemical signatures correlating with product categories, aiding in quality benchmarking and outlier detection.), TA: Low-moderate; LOD: Moderate.

**General Health/Rasayana Powders:** WSM & ASM: Highly soluble (adaptogens like *Ashwagandha, Amla, Shatavari*); TA/AIA: Low, LOD: Moderate-high (due to polysaccharides in hygroscopic herbal formulations).

**Joint-Pain & Medicated Powders:** - TA/AIA: Slightly higher (due to Bhasma-type components or mineral-bearing herbs); WSM/ASM: Moderate: LOD: Variable.

**Cosmetic Powders (Beauty/Fairness):** TA/AIA: Very high (clays), WSM/ASM: Moderate, LOD: Low.

**Interpretation:** Tooth powders are mineral-heavy, intentionally abrasive, reflected in high inorganic ash levels. Hair wash and shampoo powders contain natural surfactants (saponins), giving high WSM and low mineral ash. Cosmetic powders rely on earths and minerals, reflected in high mineral ash. Bath powders combine pulses, seeds, and herbs, showing balanced organic-inorganic profiles. Digestive and laxative *Churnas* are herb-dominant, high in soluble phytochemicals (glycosides, tannins, alkaloids). Diabetic and sugar control powders have high extractive matter indicating active antidiabetic phytochemicals from *Gymnema, neem, jamun*, etc. General health powders often contain resins, aromatic herbs, and minerals, reflected in higher ash; *Rasayana* powders are phyto-nutrient dense, rich in both water- and alcohol-soluble metabolites and cosmetic powders resemble face packs, dominated by mineral-rich components.

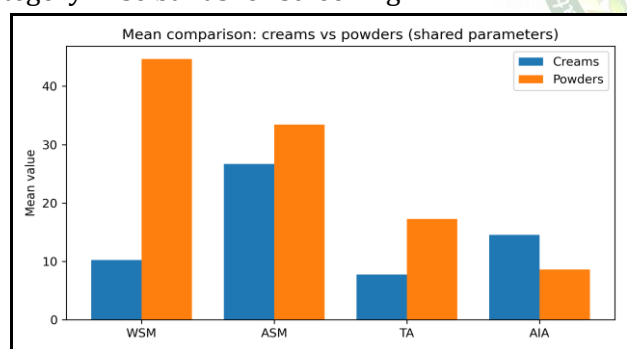
**Overall insight**

The results demonstrate that physicochemical evaluation provides valuable insights into the quality and consistency of these formulations. Variations in analytical parameters may arise due to differences in plant species, geographical sources, harvesting seasons, and manufacturing practices. Establishing

approximate ranges for key parameters is particularly important for proprietary products that lack official pharmacopoeia standards. Such analytical benchmarks can assist manufacturers, researchers, and regulatory authorities in ensuring the authenticity and quality of herbal medicines. Also, integration of traditional Ayurvedic knowledge with modern analytical techniques can enhance scientific validation and global acceptance of herbal formulations.

Creams have high TA/AIA indicating clay-based or mineral-based formulations, high ASM due to resin/oil-rich cosmetic and crack-heel preparations and high WSM because of hydrophilic extract-rich emulsions. Powders - high TA/AIA for tooth powders and face packs (mineral heavy), high WSM/ASM for herbal digestive, diabetic, and *Rasayana* formulations and Low LOD for all stable, dry powders. Figure 10 shows mean comparison: creams vs powders for shared parameters (WSM, ASM, TA, AIA).

Observed dispersion reflects heterogeneous composition (herb/mineral ratios, excipients), processing diversity (decoction vs. powder vs. emulsified cream), and label under reporting. TA or AIA variability mirrors inorganic/mineral loading, WSM and ASM bracket polar vs. non-polar extractives, LOD flags moisture/volatiles and aids stability prediction. Such variability is expected in proprietary vs. pharmacopoeial monographs and underscores the need for product specific benchmarks or at minimum category wise bands for screening.



**Figure 10. Mean comparison: creams vs powders for shared parameters (WSM, ASM, TA, AIA)**

The ranges compiled can help: 1) Flag outliers for root-cause investigations (raw-material authenticity, grinding/sieving, extraction ratios, carrier/mineral loading, or adulteration), 2) Guide release testing where no monograph exists, by setting provisional acceptance windows until validated specifications are established and 3) Prioritize marker /TLC development for high-risk categories (e.g., fairness/pimple creams with high ASM or mineral-rich face/tooth powders with high AIA).

The most important observation is Ayurvedic formulations do not have any side effects. If the value goes above or below the approximate ranges for samples given, it can be considered as an outlier, and

the composition of the formulation may be checked. When indicated by the formulation and purpose, TLC Rf bands and visualization notes confirmed expected markers (e.g., azadirachtin for neem; guggulsterones for *Commiphora mukul*; gingerols for *Zingiber officinale*; glycyrrhizin/glycyrrhetic acid for *Glycyrrhiza glabra*; characteristic withanolides for *Withania somnifera*; *Tinospora cordifolia*, *Tribulus terrestris*, *Aegle marmelos*, *Cissus quadrangularis*, *Rubia cordifolia*, *Vitex negundo*, *Moringa oleifera*), using appropriate solvent systems as practiced in the laboratory standard operating procedures facilitate qualitative identity confirmation alongside macro/micro morphology.

## CONCLUSION

The present study highlights the importance of physicochemical and analytical evaluation in ensuring the quality and standardization of proprietary Ayurvedic herbal formulations. By establishing approximate analytical ranges for commonly used parameters in creams and herbal powders, this study provides a foundation for future research and regulatory development.

Standardization of proprietary formulations will contribute to improved quality control, reproducibility, and scientific credibility of Ayurvedic medicines. Further studies involving advanced analytical techniques and clinical validation are recommended to strengthen the evidence base for these traditional therapeutic products.

This work consolidates empirical ranges for core physicochemical parameters across 145 proprietary Ayurvedic products (47 creams; 95 powders) tested in a single laboratory. Given the heterogeneity and incomplete labelling in the market, these ranges provide initial, data-driven baselines that can help laboratories and manufacturers detect outliers, design more consistent formulations, and prioritize identity testing until comprehensive monographs and validated markers are available.

## Acknowledgements

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