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A Conceptual Exploration of Food Colour Toxicity in Light of Dushi Visha

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Abstract:

In modern food industries, synthetic food colours are extensively used to enhance visual appeal, often at the cost of health. These chemical additives, though permitted within certain limits, may accumulate in the body and lead to chronic toxic effects. From an Ayurvedic perspective, this scenario resonates with the concept of *Dushi Visha*—a type of subtle, low-potency poison that neither kills immediately nor gets completely eliminated from the body, but remains latent and causes gradual systemic damage. This conceptual study aims to correlate the toxicity of synthetic food colours with the principles of *Dushi Visha* described in Ayurveda. *Dushi Visha* is characterized by its ability to accumulate in the body, remain asymptomatic for long durations, and trigger disease upon exposure to specific aggravating factors such as stress, poor diet, or seasonal changes. Similarly, synthetic dyes such as Tartrazine, Sunset Yellow, and Carmoisine have been linked to various health issues including allergies, behavioral disorders, and carcinogenicity. Chronic exposure to these agents mimics the latent action of *Dushi Visha*, manifesting in nonspecific symptoms and weakening of *Agni* (digestive fire), *Ojas* (vitality), and immunity over time. This paper

explores the mechanisms of food colour toxicity through both modern toxicological and Ayurvedic lenses, highlighting the relevance of *Dushi Visha* in understanding chronic, low-grade poisoning in today's context. Integrating classical wisdom with contemporary evidence may offer holistic approaches for prevention, detoxification, and policy formulation regarding food safety.

Keywords: Food colour, Toxicity, Dushi Visha, Ayurveda, Synthetic dyes, Chronic poisoning

Introduction:

Ayurveda, a science originating from Vedas, balances science, religion, and philosophy, consisting of eight branches, including toxicology, focusing on individual physical function.

Toxic substances, particularly in food colors, are prevalent in our daily routine due to societal consumption and use of easily available items. “Cumulative toxicity refers to the gradual build-up of toxic substances in the body over an extended period, ultimately resulting in serious physiological and psychological ailments. This modern understanding closely mirrors *Dushi Visha* as described by Acharya Sushruta—

poisons of low potency that resist complete elimination, remain latent within the body, and slowly impair its systems under conducive conditions.”(1)In the modern day, dushivisha is an explosive subject. It is a facts every individual is exposed to pollutants in one way or another in the fast-paced world of today. Long-term use of specific medications and therapies, certain occupations, and contaminated air can all contribute to exposure. Some components of the substance are not fully eliminated from the body following exposure. With repeated or chronic exposure, these retained substances can accumulate over time, potentially leading to cumulative toxicity.(2)

The *Samhitas* discuss **Dushivisha** as a form of latent or chronic toxicity, emphasizing the significant role of persistent exposure to natural, synthetic, and semi-synthetic agents in its development and manifestation within the human body. In recent times, the widespread use of synthetic food colours in processed foods has raised significant health concerns. These chemical additives, while enhancing the visual appeal of food, are often linked to toxic effects on human health, including carcinogenicity, allergic reactions, and organ damage. In Ayurveda, such persistent, low-grade toxins can be conceptually correlated with **Dushi Visha** — a type of poison that is weak, accumulative, and capable of causing chronic diseases over time. Dushi Visha does not produce immediate symptoms but gradually disturbs the physiological balance, mirroring the insidious nature of food colour toxicity. This study intends to investigate the toxicological effects of food coloring from an Ayurvedic perspective, with a special emphasis on the idea of Dushi Visha and its applicability to current dietary risks.

Aim & Objective:

- To explore the concept of *Dushivisha* as described in classical Ayurvedic texts.
- To study the adverse health impacts of synthetic food colorants on the human body.
- To establish a relationship between the Ayurvedic principle of Dushivisha and the modern scientific concept of cumulative toxic effects of food colorants.
- To raise awareness in society about the potential health risks associated with the use of food colorants.

Material and Methods

An Ayurvedic compilation is used to compile a summary of the literature on Dushivisha. A survey of the research on food coloring's cumulative toxicity has been compiled from numerous sources and contemporary science. A variety of websites are browsed for research articles. For the debate, all of the compiled material has been rearranged and rigorously examined, and an effort has been made to reach some useful conclusion.

Observation and Results :

A substance that induces harmful effects or causes distress upon entering the body is termed a *Visa* (poison).(3) In modern scientific terms, a poison is defined as any substance that, when ingested, inhaled, or otherwise introduced into the body, can produce harmful or deleterious effects on human health.(4) Almost any substance has the potential to be poisonous. *Bhavaprakasha* adopts the core classification of poisons as described in the *Samhitas*, with a distinct approach to *Krtrimavisa*. Poisons formulated from non-toxic materials are termed *Garavisa*, whereas those prepared from toxic substances are referred to as *Dushivisa*.(5) Dushi visha (cumulative toxicity) is a less potent *Krtrima visha* (artificial poison) that vitiates bodily tissues, contributing to various health issues, especially skin diseases. Ayurveda Acharyas explain that this visha accumulates in the body for long periods and shows its effects when favorable conditions are present. Treatment principles include Dushivishari Agada, an herbomineral formulation.

Modern toxicology classifies poisons into four categories based on their effects: **fulminant, acute, sub-acute, and chronic poisoning.** Fulminant poisoning results from an extremely large dose, leading to the rapid appearance of severe symptoms and often sudden death. **Acute poisoning** develops from a single large intake or several small intakes within a short span, producing immediate and intense manifestations. **Chronic poisoning** emerges slowly due to prolonged or repeated exposure to small amounts, with symptoms appearing gradually and subtly. **Sub-acute poisoning** displays characteristics that overlap between acute and chronic types (6) In Ayurveda, the term **Dushi** originates from the Sanskrit root “*Dusa*” with the suffixes “*-nic*” and “*-in*”, and it denotes a weaker or less virulent poison that progressively damages body tissues.(7)

Dushi is a word that meaning unhygienic or having the ability to vitiate. Dushi visha, a mild, slow-acting artificial poison, can cause various health issues due to its prolonged presence in the body. Exposure to certain conditions, such as Anupadesha, kala, and diet, can vitiate the body's dhatus. Despite its mild potency, it can cause skin diseases like Aru, Kitibha, and Kotha.(7–9) According to Dushivisa's definition Dushivisa is the poison that vitiates Dhatus due to things like Desha (environment), Kaala (season), eating, and resting during the day. (10) When poisons such as *Sthavara*, *Jangama*, or *Kritrima* are not entirely eliminated from the body, and their potency becomes diminished either by the influence of anti-poisonous remedies or due to the action of natural factors like fire (*Davagni*), wind (*Vata*), or heat from the sun (*Tapa*), their inherent toxic properties weaken. In this attenuated state, the poison is described as *Dushivisha*.(11) Because of its mild potency, *Dushivisha* is not immediately fatal and may persist in the body for several years when encapsulated by *Kapha*. In its latent state (*Avyakta Avastha*), the toxin exhibits reduced *Veerya* (strength), preventing sudden death. Instead, *Kapha* encloses it in the form of *Aavritta*, allowing the poison to remain dormant for a long duration, with clinical manifestations appearing gradually over time. (12)

During the Prakopkala phase, the condition intensifies, especially on overcast days or with exposure to wind and cold. In its preliminary stage, known as Purvarupa, it may present with early symptoms such as sleepiness, fatigue, frequent yawning, looseness of joints, nausea, and body discomfort.(10)

In its advanced stage (Rupa Awastha), the condition may present with diarrhea, discoloration of the skin, persistent thirst, loss of appetite, fainting, vomiting, speech difficulties such as stammering, dizziness, and abdominal fluid accumulation (ascites), characteristic of Dusyodara.(13) Due to a blood disease, Dushivisa causes urticarial rashes, pustules, and Kitibha. Because poison affects each Dosha, it quickly kills a life.(14)

The long-term effects of *Dushivisha* on the body manifest as a range of symptoms reflecting systemic toxicity. Common clinical features include a persistent sensation of intoxication following meals, indigestion, loss of appetite (anorexia), and the appearance of circular skin eruptions and urticaria. Neurological symptoms such as mental confusion may occur alongside physical signs like tissue wasting (*Dhatukshaya*), edema of the face and limbs, ascites, vomiting, diarrhea, skin discoloration, fainting, intermittent high-grade fever, and excessive thirst. Certain poisons may also induce severe neuropsychiatric disturbances including insanity, abdominal bloating, depletion of reproductive fluids (*Shukra Kshaya*), muffled voice, and a variety of skin disorders classified under *Kustha* in Ayurvedic medicine.(15,16)

Cosmetics are widely employed to improve personal appearance by cleansing, revitalizing, and enhancing the skin's natural radiance. They are formulated with a diverse array of chemical components, such as active ingredients, colorants, preservatives, and other functional additives. The spectrum of cosmetic products is vast, encompassing skincare creams and lotions, facial and body cleansers, body washes, nail polishes, deodorants, and numerous other beauty and personal care items.(17)

Also some artificial chemical food colours in maisurpaka,jelebi ,gulabjam ,cakes,cookies etc like items they are given below :

Colour	Effects	Food items
Tartrazine (yellow No.5)	Asthma, hives, and skin rashes in children behavioral problems and hyperactivity, including symptoms similar to ADHD. Additionally, oxidative stress and DNA damage in cells might result from prolonged exposure.	Drinks, sweets, chips, and cereals
Sunset yellow FCF (Yellow No.6)	Hypersensitive reactions, genotoxic effect in continuous consumption.	Ice creams, snacks, sweets, and fizzy beverages
Allura Red AC (Red No.40)	Behavioral problems in children, including hyperactivity, excessive consumption may impact renal and liver function.	Processed foods, jams, candies, and soft beverages.
Erythrosine (Red No.3)	Thyroid cancers in animals and its disruption of thyroid function. When used in excess, it can potentially have mutagenesis consequences and disrupt hormonal balance.	Glazed cherries, sweets, and baked goods.
Brilliant Blue FCF (Blue No.1)	Occasionally produce allergic reactions and may penetrate the blood-brain barrier, which could have an impact on neural health. Additionally, research indicates that at high doses, it may cause DNA damage and oxidative stress.	ice cream, candy, and beverages a vivid blue hue.
Indigo carmine (Blue No.2)	It may impact blood pressure levels and result in brain tumors, skin irritation, nausea, and vomiting. Even though its limited usage has been permitted, there are still concerns about its possible long-term repercussions.	chocolates, cereals, and snacks contain indigo carmine.
Fast Green FCF (Green No.3)	Potential organ toxicity and some studies have shown its carcinogenic potential and its ability to interfere with reproductive health in animals	canned vegetables, dairy products, and certain sweets

Discussion:

Toxicity indicates the potential of a substance to cause harm in humans or animals, while **chronic toxicity** refers to the harmful outcomes produced by repeated or long-term exposure. In the case of synthetic food colorants, the body is often unable to completely eliminate these chemicals, leading

to their gradual accumulation and the development of **cumulative toxicity** with time. Such toxicity manifests through a wide range of health disorders. Notably, these clinical features closely parallel the **Ayurvedic concept of Dushivisha**.⁽¹⁸⁾ According to **Acharya Sushruta**, Dushivisha presents with symptoms

like impaired digestion, anorexia, recurrent skin eruptions, urticaria, mental disturbances, progressive tissue depletion (*Dhatukshaya*), edema of the face and extremities, ascites, vomiting, diarrhea, skin discoloration, syncope, recurrent fever, and excessive thirst. Moreover, certain toxic influences may also lead to psychological imbalance, abdominal bloating, depletion of reproductive essence (*Shukra Kshaya*), altered voice, chronic dermal conditions (*Kustha*), and multiple systemic pathologies.(19)

Prolonged exposure to synthetic food additives, particularly **artificial colorants**, has been associated with a broad spectrum of adverse health outcomes. Documented complications include respiratory irritation, dermatological reactions such as contact dermatitis, hypersensitivity responses, and neurological disturbances. At the cellular level, chemical dyes may induce DNA damage in skin cells, thereby elevating the risk of carcinogenesis, including **skin cancer**. Additional health concerns linked to these substances encompass **asthma, ovarian malignancies, endocrine disruption, developmental anomalies, and hormonal imbalances**, as well as congenital defects such as **cleft palate and cryptorchidism (undescended testis)**. Evidence further suggests their involvement in **thyroid dysfunction, precocious puberty in females, reduced sperm count in males, and neurological impairments**, including deficits in speech, motor coordination, memory, mood regulation, and sleep. Toxic effects may also compromise major organs, contributing to **hepatic and renal damage**, along with malignancies of the **bladder and breast**. Moreover, behavioral and cognitive concerns—most notably **attention deficit hyperactivity disorder (ADHD)** and temperamental instability—have been observed in children with heightened sensitivity to artificial food dyes. Such findings underscore the potential for significant health risks in vulnerable populations (Stevens et al., 2013; EFSA, 2009; McCann et al., 2007).(20,21)

Food is essential for human consumption, and color is a significant attribute that influences

consumer preferences. However, there is controversy around the use of food coloring additives, particularly when excessive dosages are utilized. The health dangers associated with synthetic chemicals are driving up demand for natural hues. Only approved natural food coloring and similarly synthesized food coloring are subject to regulations in the EU.(22)

Curcumin, derived from *Curcuma longa* L., gives food products a yellow or orange-yellow color. It consists of curcumin, derivatives, and natural oils and resins. Does not dissolve in water or diethyl ether.(23)

A high-temperature carbonization technique with steam activation is used to create vegetable carbon, commonly referred to as "vegetable black" (E153), from green bamboo. Uses include vegetable meals, cheese rind, fish paste, crustacean paste, smoked fish, flavor-infused beverages, sweets, edible ices, and confections. It is insoluble in water and organic solvents.(24) Riboflavin, a food colour and thermally stable, gives yellow color and can affect food aroma and taste. Recommended daily intake is 0.5 mg/kgbw.(25)

Natural water-soluble food coloring that ranges from purple to blue, anthocyanins are produced by the phenylpropanoid pathway and are present in edible fruits and vegetables such as blueberries, blackberries, strawberries, currants, raspberries, and grapes.(26) A naturally occurring xanthophyll called lutein is utilized as a food coloring to give foods a reddish-yellow hue. It is derived from edible fruits, plants, grass, lucerne, and *Targets erecta* and is fat-soluble and antioxidant. Fats, oils, and waxes can all be found in extracts.(27)

Naturally derived color

Natural pigments are intensely colored substances found widely in various plants and animals. They represent a chemically and physically diverse group of compounds, each with unique structural characteristics and biological functions (Delgado-Vargas & Paredes-López, 2003).

Natural coloring agents may be grouped based on their underlying chemical composition or structural characteristics :

Sr.No	Grouping of chemicals	Common Name	Resulting Colour
1	Anthraquinone dyes and quinone dyes	Shellac resin, <i>Rubia tinctorum</i> , <i>Caesalpinia sappan</i> , carmine	red
2	carotenoids	Capsicum Species, Saffron (<i>Crocus sativus</i>) annatto <i>Bixa orellana</i>	Orange red or yellow
3	Chromene dyes	Kamala (<i>Mallotus philippinensis</i>)	Orange -yellow
4	Flavone dyes	Acacia ,Palash (<i>Butea monosperma</i>) <i>Lodhra</i> (<i>Symplocos racemosa</i>), Marigold	Yellow and brown
5	Indigoid	Indigo, Mollusk	Blue, tyrian purple
6	Benzopyrone dyes	Longwood	Purple, black
7	Iso-quinolone dyes, Colorants	Barberry Species, lycopene, gentisin	Yellow
8	Naphthoquinone dyes	Hennar, walnut, pitti, Shikone	Brown and purple grey
9	Oxyindol glycosides	Beetroot (<i>Beta vulgaris</i>)	Red

Artificial colour (28)

Colour	Artificial colours	Natural Colours
Violet	Allura red (E129)+ Brilliant blue (E 133)	Grapes Fruits (Draksha)
Indigo and Blue	Indigotine blue (E132)	<i>Clitoria ternatea</i> (Aparajita)
Green	Fast green FCF (E 143)	Spinach (Palakya)
Yellow	Sunset Yellow (E110)	<i>Curcuma longa</i> (Haridra)
Orange	Sunset Yellow+Allura red	African marigold or Mexican marigold (Jandu)
Red	Allura red (E 129)	Annatto (Sindoori)

Conclusion:

The Ayurvedic concept of *Dushivisha* can be effectively correlated with the modern understanding of cumulative toxicity. Unlike acute poisoning, *Dushivisha* does not produce immediate symptoms. Instead, its harmful effects appear gradually as the toxic substance

accumulates in the body over time. Repeated exposure to such toxins can result in a range of adverse effects, impacting multiple systems of the body—most notably the skin, gastrointestinal tract, nervous system, and others. Similarly, synthetic food dyes are known to cause varying degrees of toxicity, depending on the specific chemical compound and the quantity consumed.

Certain dyes, particularly those containing azo groups, have been associated with potential health risks such as neurodevelopmental issues and carcinogenicity, as reported in some studies. Although regulatory bodies have set safety limits for these dyes, long-term and excessive use remains a concern due to the possibility of accumulation and delayed toxicity. In addition to food additives, cosmetic products containing artificial colors may also contribute to cumulative toxicity. Prolonged use of such chemical-based products can lead to systemic health issues and chronic disorders, further reinforcing the Ayurvedic notion of slow-acting, residual toxins (*Dushivisha*). therefore, it is essential to exercise caution in the use of synthetic food colors and chemical-laden cosmetics in daily life. Opting for natural and plant-based alternatives can help reduce the risk of long-term toxic effects and promote better health in alignment with both modern toxicology and Ayurvedic principles.

While synthetic food colours enhance the visual appeal of food, many are associated with adverse health effects ranging from mild allergic reactions to serious long-term conditions like cancer and organ toxicity. These effects are often subtle and accumulative, aligning with the Ayurvedic concept of **Dushi Visha**, which describes slow-acting, residual toxins that disturb the body's natural balance over time. Here we can conclude that avoided using of Synthetic food colour and we can use nature food coloured.

References:

1. Sushrit, Sushrit Samhita, Kalpsthana 2/33 Hindi Commentary by Kaviraj Ambikadatta Shastri, Sanskrit Sansthan Publication Varanashi, Reprinted in 2007, Page 26. In.
2. ATSDR (Agency for Toxic Substances and Disease Registry). (2018). Toxicological Profile Information Sheet. U.S. Department of Health and Human Services. In.
3. Sushruta Samhita of Maharsi Sushruta by Prof. K.R.Srikantha Murthy Vol.III Susrut Kalpasthana.

4. Parikh's Textbook of Medical Jurisprudence & Toxicology by Dr.C.K.Parikh, Page No. 645, Published by CBS Publisher & Distributors Revised Reprint, 1986. In.
5. Bhavapraksa Part second of Shri Bhavmisra by Bhisagratna Pandit Sri Brahma Sankar Misra Vishadhikar, Verse 47, Page No.744 Published by Chaukhamba Sanskrit Sansthan Seventh Edition 2000. In.
6. Klaassen, C. D. (Ed.). (2013). Casarett & Doull's Toxicology: The Basic Science of Poisons (8th ed.). McGraw-Hill Education. In.
7. Textbook of Agada tantra, U.R. Sekhar Namburi.
8. Sushruta Samhita, Nibandha Sangraha and Nyaya Chandrika commentary by Jadavji Trikamji Acharya, Chaukhamba Orientalia, Varanasi, Edition, 2002; 23. In.
9. Sharma P. Charaka Samhita. Varanasi: Chaukhambha Orientalia, 2004; 4. In.
10. Sushruta Samhita of Maharsi Sushruta by Prof. K.R.Srikantha Murthy, Vol.III, Susrut Kalpasthana Chapter 2, Verse No33, Page No 424, Chaukhambha Orientalia, 1st edition 2002. In.
11. Astanga Hrdayam of Acharya Vagbhata's Translated by Prof. K R Srikantha Murthy, Vol. III, Chapter 35, verse 33, Page 333, Published by Krishnadas academy, 3rd edition, 2000. In.
12. Astanga Hrdayam of Acharya Vagbhata's Translated by Prof. K R Srikantha Murthy Vol. III Chapter 35 verse 34 Page 333 Published by Krishnadas academy, 3rd edition 2000. In.
13. Sushruta Samhita of Maharsi Sushruta by Prof. K.R.Srikantha Murthy, Vol.III, Susrut Kalpasthana Chapter 2, Verse No 27, Page No 423, Chaukhambha Orientalia, 1st edition 2002. In.
14. Charak Samhita Agnivesa's Treatise Refined & Annotated by Charaka & Redacted by Drdhabala Edited by Prof. Priyavat Sharma, Vol II, Charaka Chikitsasthanam, Chapter 23, Verse 31, Page No.367 Published by Chaukhambha Orientalia, Sixth Edition, 2001. In.
15. Sushruta Samhita, Nidana Sthana. In.

16. Sharma, P. V. (1994). Agada Tantra (Ayurvedic Toxicology). Chowkhamba Sanskrit Series. In.
17. Draeos, Z. D. (2018). Cosmetic Dermatology: Products and Procedures (3rd ed.). Wiley-Blackwell. In.
18. Sushruta Samhita, Kalpa Sthana, Chapter 2, verses 25–28 – Classical description of Dushivisha Lakshanas. In.
19. Sushruta Samhita of Maharsi Sushruta by Prof. K.R.Srikantha Murthy, Vol.III, Susrutkalpasthana, Chapter 2 Verse No 27, Page No 423, Chaukhambha Orientalia, 1st edition, 2002. In.
20. McCann, D., et al. (2007). Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children: A randomized, double-blinded, placebo-controlled trial. The Lancet, 370(9598), 1560-1567. [https://doi.org/10.1016/S0140-6736\(07\)61306-3](https://doi.org/10.1016/S0140-6736(07)61306-3).
21. Stevens, L. J., et al. (2013). Mechanisms of behavioral, atopic, and other reactions to artificial food colors in children. Nutrition Reviews, 71(5), 268-281. <https://doi.org/10.1111/nure.12023>.
22. Commission Regulation (EU) No. 231/2012 of 22 March 2012. Laying Down Specifications for Food Additives Listed in Annexes II and III to Regulation (EC) No. 1333/2008 of the European Parliament and of the Council. J. Eur. Union 2012, L83, 1–294. In.
23. FAO. Curcumin. Residue Monograph Prepared by the Meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA), 61st Meeting 2003. Available online: <http://www.fao.org> (accessed on 10 August 2021). In.
24. Commission Regulation (EU) No. 1129/2011. Amending Annex II to Regulation (EC) No. 1333/2008 of the European Parliament and of the Council by Establishing a Union List of Food Additives. J. Eur. Union 2011, L295, 1–177. In.
25. Scientific Opinion. On the Re-Evaluation of Riboflavin (e 101 (i)) and Riboflavin-50-Phosphate Sodium (e 101 (ii)) as Food Additives. EFSA J. 2013, 11, 3357. [Google Scholar] [CrossRef].
26. Belitz, H.D.; Grosch, W. Química de Los Alimentos. Spanish Translation of “Lehrbuch der Lebensmittelchemie”, 2nd ed.; López, R.C., Lorenzo, P.L., Rabinal, P.R., Escobar, J.E., Eds.; Editorial Acirbia: Zaragoza, Spain, 1988; ISBN 8420008354 9788420008356. [Google Scholar].
27. Shegokar, R.; Mitri, K. Carotenoid lutein: A promising candidate for pharmaceutical and nutraceutical applications. J. Diet. Suppl. 2012, 9, 183–210. [Google Scholar] [CrossRef] [PubMed].
28. A comprehensive insight to natural food colourants www.wjpr.net, Vol 10, issue 4 ,2021, ISO 9001:2015 Certified Journal Dr. Sneha Shaji et.al.

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