

## REVIEW ARTICLE

# An Analytical Review of *Acharya Charaka's* Perspective of Diet in Pramehi W.S.R. to Honey, Semidigested Foods, and Aged Grains

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## ABSTRACT

**Introduction:** *Acharya* did mention the *aushadha* for the *vyadhi* but never skipped the *ahara-vihara* leading to the pathogenesis and necessary for healthy state. The importance of plants consumed in the form of *ahara* is highlighted by *Acharya* themselves at each step while explaining the etiopathogenesis of any disorder along with their cures.

**Objective:** There is an urgent need to revalidate the concepts listed by *Acharya* by the parameters of the present era to facilitate their usage without any hindrances. Portrayal of concept of *ahara-vidhana* in *Prameha*, as given in *Charaka Samhita*, seems impractical and to enlighten the hidden reasons behind such special and contradictory diet concepts.

**Materials and methods:** *Charaka Samhita* and available commentaries were explored for the analytical review of the references and in-depth understanding of the various *ahara* mentioned in the context of diabetes. Further exploration, interaction, and interpretation of traditional knowledge in the light of contemporary core sciences and biomedical sciences.

**Results and conclusion:** Honey in diabetes mellitus (DM) seems to be contrary to the running trends, but compared with sucrose and glucose, because of its lower glycemic index and production of significant higher level of c-peptide, it may be used as sugar substitute in diabetic patients. Grain aging brings changes in the water absorption properties. The starch granules forming the major part of the endosperm of the grain can be damaged causing change in starch functionality and oxidation of components, including fatty acids and proteins. The concept of semidigested food seems to be scientifically rational.

**Clinical significance:** The present integrative review strengthens the concepts of *Acharya* that seem impractical in the

present era. The sound base of the evidences paves way for the clinical implementation of the concepts in the patients of *Prameha* with confidence.

**Keywords:** Diabetes mellitus, Glucose metabolism, Honey and diabetes mellitus, Insulin, Medicinal plants research, *Prameha*.

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## INTRODUCTION

Present day tech-savvy generation loaded with lifestyle disorders is getting conscious about their health and its maintenance too. Emphasis is given on dietetic aspect by every individual and everyone is alert about eating and eating right, but still the lack of awareness is an evil needed to be fought. With the intermixing of the cultures, adaptation, and imitation of their habits, new diets and recipes are introduced in the society. Though a lot of factors influence the state of the health of an individual, still dietary disturbances play a key role. Diet includes plants and each and every *dravya* (substance) is *aushadha* (medicine) according to *Acharya Charaka*.

*Prameha*—A metabolic syndrome diagnosed mainly by the sign and symptoms related to the urine. Metabolic—referring specially to breakdown of food and its transformation to energy. Hence, *Prameha* is directly related to dietetics and is a disorder of its disturbances. Specificity of the *ahara varga* (diets) mentioned in *nidana* (etiopathogenesis) of *Prameha* draws the conclusion that they are stated after keen observations on significant number patients. Diabetes—a Greek word meaning “passing through,” a general term for diseases marked by excessive urination; likewise, “*prabhuta avila mutrata*”<sup>1</sup>—said by *Acharya Sushruta* in *Prameha* makes way for their side-by-side study.

India retains its position of diabetic capital of the world. World Health Organization data state that in year 2000, 171 million people were suffering from diabetes, i.e., 2.8% of the population, among which, India topped the world with the highest number of diabetics (31.7 million). Global prevalence of diabetes among adults

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(aged 20–79 years) by 2010 was estimated to be 6.4%, affecting 285 million adults.<sup>2,3</sup> The age group affected mostly falls under the category of working breadwinners of the family, hence, diabetes not merely affects the health of the population but adversely affects the economy and growth of the nation. Given the disease is now highly visible across all sections of the society within India, there is now the demand for urgent research and intervention—at regional and national levels—to try to mitigate the potentially catastrophic increase in diabetes that is predicted for the upcoming years.

*Prameha*, mentioned as a syndrome in *Ayurveda*, is a cluster of metabolic disorders. A group of 20 disorders categorized into three broad groups according to the predominant *dosha* is defined precisely in sutras that need to be elaborated and studied extensively to understand the mentioned principles and achieve the goal of “*svasthasya svasthya rakshana*” and “*aturasya vikara prashamana*.”

The *ahara vihara* mentioned in context of *nidana* and *chikitsa* (treatment) of *Prameha* are eye raising. In spite of the imbalanced insulin functions and hence, restriction of carbs and sugars, *Acharya Charaka* prescribed medicines containing *madhu* (honey).<sup>4</sup> The restriction of *Navina anna* and emphasis on the use of *purana dhanya* needs to be analyzed extensively. It is assumed that grain aging should result in certain changes that alters the biochemical changes it undergoes in the human body. The concept of semidigested foods, i.e., feeding barley to animals like horses, etc., and collecting it from their feces, and then giving its preparations to the patients, needs to be understood well.<sup>5</sup>

The present work focused mainly on the specific dietary items, i.e., honey, aged grains, and semidigested barley, which are mentioned by *Acharya Charaka* as effective *pathya* in *Prameha*, but the perception among masses is different and they are reluctant to accept the same. Hence, there was an urgent need to understand the reasons behind such distinct prescription in the light of modern day researches.

## MATERIALS AND METHODS

*Charaka Samhita* and available commentaries were explored for the analytical and critical review of the references and in-depth understanding of the concept of diets mentioned in context of *Prameha*. Previous works done in the related field were studied and inferences were drawn to explain the concepts mentioned by *Acharya Charaka*. Attempts were made to find answers in other sciences to support the concepts.

## RESULTS AND DISCUSSION

*Acharya Charaka*, in the context of treatment of *Prameha*, has mentioned medicinal preparations containing honey as an

ingredient or as *sahapana* (to be taken along with the medicine) for the medicine. Honey is sweet and rich in sugars; hence, it should be contraindicated in the management of DM. But, on the contrary, a lot of evidences are found in various researches that support the fact that honey can be prescribed in diabetic patients. It is observed that antidiabetic drugs in combination with honey scavenge the reactive oxygen species, ameliorate oxidative stress, and reduce hyperglycemia.<sup>6,7</sup> Honey supplementation in diabetic rats ameliorates renal oxidative stress independent of the dose; its hypoglycemic effect is dose-dependent.<sup>8</sup> In addition, honey supplementation ameliorates several metabolic derangements commonly observed in diabetes. It reduces the levels of glycosylated hemoglobin, increases high-density lipoprotein, and reduces level of hepatic transaminases and triglycerides.<sup>9–11</sup> Honey administration increased serum levels of insulin, while it reduced serum concentrations of glucose and fructosamine in diabetic rats. Administration of glibenclamide or metformin drugs in combination with honey resulted in much lower glycaemic levels. When each of these drugs in combination with honey was administered, there was a significant reduction in serum fructosamine, creatinine, bilirubin, triglycerides, and very low-density lipoprotein cholesterol in the diabetic rats. Unlike honey, these antidiabetic drugs produced no effect on serum fructosamine concentrations when administered alone.<sup>12</sup> Combination of antidiabetic drugs with honey also enhanced antioxidant defenses and reduced oxidative damage in the kidney and pancreas of diabetic rats.<sup>13–15</sup> Oxidative stress leads to  $\beta$ -cell dysfunction, which leads to the inability of pancreatic  $\beta$ -cells to secrete sufficient insulin to recompense for insulin resistance.<sup>16</sup>

*Acharya Charaka* advised to feed barley to animals, like horses, etc., and then to collect it from their feces, and give its preparations to the patient. Whole barley is found to have 52.5% digestibility, and 48.2% of the barley kernels recovered in feces.<sup>17</sup> The cell wall of barley consists of cellulose together with tightly bound arabinoxylan.<sup>18</sup> Arabinoxylan-rich fiber appears to act as a rapidly fermentable, soluble fiber. When soluble fiber is fermented, short-chain fatty acids (SCFAs) are produced. In numerous physiological processes, SCFAs are involved, promoting health, stabilize blood glucose levels by acting on pancreatic insulin release and liver control of glycogen breakdown, stimulate gene expression of glucose transporters in the intestinal mucosa, regulating glucose absorption, suppress cholesterol synthesis by the liver, and reduce blood levels of low-density lipoprotein cholesterol and triglycerides responsible for atherosclerosis. Overall, SCFAs affect major regulatory systems, such as blood glucose and lipid levels, the colonic environment, and intestinal immune functions.<sup>19,20</sup>

**Table 1:** Pathya/Apathya as prescribed by Acharya Charaka

Pathya (Do's)	Apathya (Don'ts)
Vishkira, Pratuda, Jangala Mansaras (quail, rooster, partridge, woodpecker, cuckoo, etc.) Yava (barley)	Gramya-Anoopa-Udaka Mansarasa (mutton, pork, fish, prawn, etc.)  Dadhi (curd), milk, and milk products
Purana Shali Shashtika Trina Dhanya (Sava, Kanguni) Sarshapa Tail (mustard oil)	Freshly harvested grains Sugandhaka-Hayanaka-Mahavrihi (types of rice), Yavaka Freshly harvested Harenu (pea), Masha (black gram) with ghrita
Mudga (green gram)	Pishtanna (food prepared from flour), Shaka (vegetables)

Natural resistant starch consumption by humans is found to have the following results: Decreased glycemic response in healthy individuals, decreased glycemic response in diabetics, and increased insulin sensitivity in healthy individuals, individuals with type II diabetes as well as insulin-resistant individuals.<sup>21,22</sup> One study found a 50% increase in insulin sensitivity in overweight men consuming 15 gm of resistant starch/day for 4 weeks.

*Anna dravya* is advised to be taken in *purana* (aged for more than an year after harvesting) condition by the *Acharya* in almost every situation and *Navina anna* (freshly harvested grains) is prohibited or mentioned in the *nidana* (etiological factor) of various diseases. This principle of *purana dhanya* consumption has something to do with the changes that occur in the grains on storage after harvest (grain aging). According to the thesis "The storage of grain & ageing of flour & their effect on flour functionality" submitted to Oregon State University by Omar Miranda-Garcia in the year 2013, water and sucrose's solvent retention capacity (SRC) shows small but significant increase across storage period of 24 weeks, increase in water and sucrose SRC, and decrease in carbonate SRC after storage and overall decline in lactic acid SRC, which may indicate a decline in gluten performance over a period of 6 months. Works with intact cereal seeds indicate that as seeds age, their ability to metabolize glucose into CO<sub>2</sub>, polysaccharides, and proteins decreases. There was rapid decline in percentage utilization of glucose into CO<sub>2</sub> and ethanol insoluble material by whole seed.<sup>23</sup>

*Pathya* and *Apathya* diet in *Prameha* patient as per *Acharya Charaka* is tabulated in Table 1.

## CONCLUSION

The present study proved the relevance of diets prescribed by *Acharya Charaka* in present era and its benefits with special reference to concept of *ahara-vidhana* in *Prameha*. The study also enlightened the reasons behind

special and contradictory diet concepts like prescription of medicines with honey in *Prameha*, which seems to be contrary to the running trends. Honey as an adjunct to antidiabetic drugs is found to ameliorate cellular oxidative stress and improves metabolic derangements and glycemic control.

Concept of semidigested food (grains collected from the feces of the animals like horses, etc.) seems to be scientifically rational. The low digestibility of the barley accounts for its availability in the feces of the animals like horses, etc., and the changes in the cell wall of the barley after passing the gut of the animals account for the decreased glycemic response and increased insulin sensitivity.

Though any direct relation of grain aging and its effect on diabetes could not be found, increase in water and sucrose SRC, decrease in carbonate SRC after storage, and overall decline in lactic acid SRC indicate a decline in gluten performance that needs to be further studied to find some link between the grain aging and its healthy effects on diabetics as there are several references demonstrating a link between the two. Food supplementation with gluten-containing foods before age 3 months, however, was associated with significantly increased islet autoantibody risk (adjusted hazard ratio, 4.0; 95% confidence interval, 1.4–11.5;  $p = 0.01$  vs children who received only breast milk until age 3 months).<sup>24</sup> Rapid decline in metabolization of glucose into polysaccharides and proteins over storage indicates the conversion of glucose present in the fresh grain and hence, decline in its conversion rate due to utilization of present glucose.

The diets mentioned in the texts though seem eye raising but on reviewing the concepts stated by the *Acharya* in the light of modern researches, it is evident that the diets listed are rational and scientific in all aspects. It is required to broaden the horizons of understanding the concepts rather than questioning them, as the principles are listed by *Acharya* after a lot of research and keen observations.

## CLINICAL SIGNIFICANCE

The potential of *Ayurvedic* philosophy and medicine needs to be recognized and converted into real-life treatment paradigm. The sound base of the evidences paves way for the clinical implementation of the concepts in the patients of *Prameha* with confidence.

This literary review serves as a conceptual interface between *Ayurveda* and modern science. The approach of *Ayurveda* is science based and *pramana vigyana* is the ancient concept of evidence base. The principles documented in the text are tested through thorough research and then stipulated. There is a lot of scope of research

in Ayurveda to revive it, but it needs its own research design to test and validate its fundamental concepts as well as its treatments. The references used in the present work are not the direct researches done to validate the principles stated here, but this review is suggestive of the need of such researches to strengthen the principles stated by the *Acharya*.

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## हिन्दी सारांश

### आचार्य चरक का प्रमेह रोग में आहार विषयक विश्लेषणात्मक विवेचन, विशेषरूपेण मधु, अर्धपचित आहार एवं पुराण धान्य के संदर्भ में।

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आधुनिक जगत में विकास व प्रगति के अधीन मनुष्य की दैनिकचर्या एवं स्वास्थ्य के स्तर में अत्याधिक परिवर्तन दृष्टिगत हो रहे हैं। आज के युग में संस्कृतियों के मिश्रित होने के कारण नवीन आहार एवं व्यंजन समाज में देखने को मिल रहे हैं जिसके कारण खान-पान की आदतों में भारी बदलाव हो रहे हैं। यह व्यक्ति के दोषों की स्थिति को प्रभावित करता है एवं आहार का मिथ्याचरण एक महत्वपूर्ण भूमिका निभाता है। वर्तमान समय में आहार संबंधी पहलुओं पर अत्याधिक ध्यान दिया जा रहा है व सभी लोग खान-पान के विषय में सतर्क हैं परन्तु जागरूकता की कमी रूपी बुराई से लड़ने की आवश्यकता आज भी है। प्रस्तुत पत्र में चरक संहिता में प्रमेह के संबंध में वर्णित आहार-विधान का चित्रण कर आचार्य द्वारा निर्धारित आहार की आज के परिपेक्ष में प्रासंगिकता को उजागरित करना एवं विशेष तथा विरोधाभासी आहार अवधारणाओं के पीछे संभावित सिद्धान्तों का संकलन करना परम उद्देश्य रहा।

प्रमेह के विषय में उल्लेखित आहार की अवधारणा की गहराई समझ, विश्लेषणात्मक एवं महत्वपूर्ण समीक्षा हेतु चरक संहिता की उपलब्ध टीकाओं एवं संदर्भों का अध्ययन किया गया। इसी क्षेत्र में किए गए अन्य शोध कार्यों का अध्ययन चरक संहिता में वर्णित अवधारणों को समझने हेतु किया गया। अन्य पद्यतियों व आधुनिक विज्ञान के क्षेत्र में हुए शोध का अध्ययन कर आज के परिपेक्ष में आचार्य चरक द्वारा वर्णित सिद्धान्तों को समझने का प्रयास किया गया।

अध्ययन में ज्ञात हुआ कि मधुमेह रोग में शहद को ग्लूकोस व शर्करा की तुलना में चीनी के विकल्प के रूप में प्रयोग किया जा सकता है क्योंकि शहद का glycaemic index कम होता है एवं अधिक मात्रा में c-peptide की उत्पत्ति करने के कारण यह प्रमेह के रोगी में लाभदायक है। इसमें प्रतिक्रियाशील आक्सीजन, oxidative तनाव व hyperglycemia कम करने की शक्ति तथ्यों में सामने आई। शहद के प्रयोग के परिणामस्वरूप hepatic transaminases, triglycerides व glycosylated hemoglobin (HbA1c) की मात्रा में कमी एवं HDL cholesterol की मात्रा में वृद्धि होने के तथ्य प्राप्त हुए।

अन्न के पुराण रूप में ही उपयोग करने के निर्देश की पुष्टि हेतु अनेक तथ्य सामने आए। अन्न के पुराण होने की प्रक्रिया में उसके जल अवशोषण करने की क्रिया में अत्याधिक परिवर्तन दृष्टिगोचर होते हैं। काल के परिणाम से जल व sucrose की solvent retention capacity में वृद्धि एवं carbonate व lactic acid की SRC में कमी तथा gluten performance की में कमी आने के तथ्य प्राप्त हुए। इन सब का अध्ययन करने के पश्चात यह निश्चित किया जा सकता है कि नवीन अन्न प्रमेह कारक है एवं उसका निषेध युक्तिसंगत है।

यवादि अन्न का अश्वदि पशुओं को भक्षण करवा कर उनकी विष्टा से अपचित अन्न एकत्रित कर प्रमेही को भक्षण करवाने का निर्देश पूर्णतः वैज्ञानिक प्रतीत होता है। यवादि अन्न पूर्णतः पाचित न होने के कारण विष्टा से प्राप्त किए जा सकते हैं। अश्व की आन्त्र से गुजर कर यव की कोशिकाओं की भिती में जो परिवर्तन होते हैं वह इसके glycaemic response के कम होने एवं insulin sensitivity के बढ़ने का कारण होते हैं।

प्रस्तुत अध्ययन से प्रमेह के प्रसंग में वर्णित मधु आदि विशिष्ट आहार योगों की कल्पना की तार्किकता प्रकाशित होती है। युग के परिवर्तन के पश्चात् भी आचार्यों द्वारा वर्णित विधानों की पुष्टि आधुनिक विज्ञान के मापदण्डों द्वारा पूर्णतः होना यह सिद्ध करता है कि आचार्य के द्वारा लिपिबद्ध तन्त्र में दोष देखने के बजाए उसपर दृढ़ विश्वास कर अग्रसर होने पर ही विकास की ऊँचाइयों को प्राप्त किया जा सकता है।