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Review Article

# *CHOORNA KALPANA*: BRIDGING AYURVEDIC TRADITIONS WITH MODERN SIZE REDUCTION TECHNIQUES FOR OPTIMAL THERAPEUTIC OUTCOMES

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## ABSTRACT

*Choorna Kalpana*, a fine powder derived from completely dry drugs, is a fundamental preparation in Ayurveda. Recognized for its stability and ease of absorption, *Choorna* is used independently to treat various diseases, as an adjuvant with other medicines, and in secondary preparations like *Avaleha* (medicated semisolid preparation), *Vati* (tablets), and *Sneha Kalpana* (oil and ghee preparations). The preparation involves meticulous processes of washing, drying, pounding, and sieving drugs to ensure homogeneity. Modern practices in *Choorna Kalpana* incorporate size reduction techniques such as cutting, compression, impact, and attrition, which enhance its efficiency and therapeutic potential. Factors influencing size reduction, including hardness, toughness, abrasiveness, stickiness, softening temperature, and moisture content, are critical for achieving desired particle sizes. Size separation and mixing techniques are also essential in ensuring the uniformity and efficacy of *Choorna*. This paper explores the traditional and modern methodologies of *Choorna* preparation, highlighting its significance in Ayurvedic medicine.

## INTRODUCTION

*Choorna Kalpana*, a foundational preparation in Ayurveda, involves creating a fine powder from completely dry drugs. This method is renowned for its stability and ease of absorption, making it a versatile tool in Ayurvedic medicine. *Choorna* is utilized independently for treating various ailments and as an adjunct in formulations such as *Avaleha* (medicated semisolid preparation), *Vati* (tablets), and *Sneha Kalpana* (oil and ghee preparations).[1] The preparation process is meticulous, encompassing washing, drying, pounding, and sieving to achieve a homogeneous powder. In modern practice, *Choorna Kalpana* has integrated advanced size reduction techniques, including cutting, compression, impact, and attrition. These methods enhance the powder's efficiency and therapeutic potential by optimizing particle size.

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Factors such as hardness, toughness, abrasiveness, stickiness, softening temperature, and moisture content significantly influence the size reduction process. Proper size separation and mixing techniques are crucial for ensuring the uniformity and effectiveness of *Choorna*. This paper delves into both traditional and contemporary methodologies of *Choorna* preparation, underscoring its importance in Ayurvedic medicine. It explores how modern advancements have refined *Choorna*'s preparation, emphasizing the role of size reduction and mixing techniques in enhancing its therapeutic efficacy.

### *Choorna Kalpana*

*Choorna*, the fine powder derived from completely dry drugs, is a significant preparation in Ayurveda, used in various forms like *Vati* and *Avalehya*. This powder is more stable and easily absorbed compared to liquid preparations, leading to quicker onset of action and being more economical. *Choorna* is defined as the powder of a single or a mixture of drugs, which is also known as *Raja* or *Kshoda*, and has a dosage of one *Karsha* (12 gms). It comes in different particle sizes: *Sthoola, Sukshma,* and *Atyanta Sukshma Choorna*.[2] The shelf life varies, with Sharangadhara

suggesting 2 months, AFI 1 year, and the Official Gazette of India 2 years.[3,4] *Choorna* is used independently to treat various diseases, as an adjuvant with other medicines, and in secondary preparations like *Avaleha, Vati,* and *Sneha Kalpana*. It is also used for *udvartana* (powder massage) in skin diseases. The preparation involves washing, drying, pounding, and sieving the drugs, often powdered individually to ensure homogeneity due to varying hardness. *Choorna* is usually taken with *Anupana* (vehicles) like water, milk, honey, or ghee. When no specific *Anupana* is mentioned, *Jala* (water) is preferred. *Praksepaka dravya* (additives), which includes substances like *Guda* (jaggery), *Sharkara* (sugar), and *Ghrta bharjita hingu* (ghee fried asafoetida), is added in specific ratios to *Choorna* such as equal for *Guda*, double for *Sharkara*, a quantity that doesn't cause nausea for *Ghrta bharjita hingu,* double when licked with ghee or honey, and four times when taken with liquids.[5] The quantity of *Anupana* varies with the disease, 3 *Pala* for *Vataja roga*, 2 *Pala* for *Pittaja roga,* and 1 *Pala* for *Kaphaja roga.* Preservation requires airtight containers to maintain *Choorna*'s efficacy.[6]

**Powders**

Powders are a physical form of material composed of finely divided particles that are dry and can be used for other solid dosage forms. According to modern practices, *Choorna Kalpana* can be adopted using techniques such as size reduction and size separation. Size reduction involves reducing materials to smaller pieces, coarse particles, or powder, also known as “comminution,” which is derived from the Latin word 'minuere,' meaningless. The objectives of size reduction include producing smaller particles for suspensions or mixing powders, increasing surface area for absorptive properties, exposing cells before extraction, and reducing the bulk for shipping efficiency.

**Factors affecting size reduction**

Factors affecting size reduction include hardness, toughness, abrasiveness, stickiness, softening temperature, moisture content, physiological effect, purity required, ratio of feed size to product size, and bulk density. Hardness, measured by Moh’s Scale, ranges from 1 to 10, with higher numbers indicating harder materials, which are more difficult to reduce in size. Toughness, often related to moisture content, can be reduced by treating materials with liquefied gases like liquid nitrogen. Abrasiveness, a property of hard materials, can contaminate the final powder with metal from grinding surfaces. Stickiness can cause materials to adhere to grinding surfaces or screens, and may require complete dryness or inert substances to aid in the process. Softening temperature is crucial as many size reduction processes generate heat that can soften substances. Moisture content should be less than 5% for dry grinding and more than 50% for wet grinding. Physiological effects of potent substances like hormone drugs necessitate enclosed mills to avoid dust. Purity required is vital as certain size reduction apparatus can cause contamination. The ratio of feed size to product size generally means that machines producing finer products need smaller feed sizes. Bulk density affects the output of the machine, as capacities depend on volume for batch mills and weight for continuous processes.

**Size Reduction**

Four main methods of size reduction are cutting, compression, impact, and attrition. Cutting uses sharp blades and can be done on a small scale with a knife or large scale with a cutter mill. Compression crushes materials using pressure, often in roller mills. Impact involves striking materials with high-speed objects or surfaces, such as in hammer mills, which are suitable for rapid grinding of various materials. Attrition involves shear forces as materials are subjected to pressure, often using roller mills. Combined impact and attrition methods include ball mills and fluid energy mills, which are used for fine powders.[7]

**Size Separation**

Size separation involves sieving, where powders pass through meshes of specified sizes. The British Pharmacopoeia specifies grades of powders and sieves, indicating mesh sizes. Mechanical sieving methods include agitation (oscillation, vibration, gyration), brushing, and centrifugal methods. Wet sieving is more efficient for certain materials, preventing mesh blinding. Particle size determination is crucial for properties like suspension behavior, solid mixtures, and granule size in tablets. Surface area influences processes like adsorption and mass transfer, with smaller particles increasing surface area.[8]

**Mixing of Powders**

Mixing of powders can be achieved through methods like trituration (grinding in a mortar and pestle), spatulation (mixing with a spatula), sifting (shaking through a sieve), tumbling (shaking or rotating in a container), and geometric dilution (mixing small amounts of powder with diluting powder). This ensures thorough and efficient mixing for various applications in pharmaceutical formulations.[9]

**DISCUSSION**

*Choorna Kalpana,* as a critical Ayurvedic preparation, plays a significant role in both traditional and modern medicinal practices. Its effectiveness stems from its ability to deliver active components in a stable and easily absorbed form. The preparation and utilization of *Choorna* involve a deep understanding of the properties of medicinal herbs and their

interactions, alongside precise methodologies to ensure optimal therapeutic outcomes. The traditional preparation of *Choorna* involves rigorous processes including washing, drying, pounding, and sieving. This meticulous approach ensures that the powder maintains homogeneity, which is crucial for consistent therapeutic effects. The choice of *Anupana* (vehicle) and *Praksepaka dravya* (adjuvant substances) further tailors the *Choorna* to specific therapeutic needs and enhances its efficacy. The Ancient texts provide guidance on dosage and preservation, emphasizing the importance of using airtight containers to prolong the shelf life and maintain potency.

Contemporary practices have introduced advanced size reduction techniques that refine the *Choorna* preparation process. Techniques such as cutting, compression, impact, and attrition are employed to achieve desired particle sizes, which are critical for the powder's effectiveness. These methods enhance the powder's surface area, leading to improved absorption and therapeutic activity. The factors influencing size reduction such as hardness, toughness, abrasiveness, and moisture content must be meticulously managed to optimize the final product. Modern size reduction techniques involve various methods including cutting, compression, impact, and attrition, each serving specific purposes depending on the nature of the material. The effectiveness of these methods is influenced by multiple factors such as the material's hardness, toughness, and moisture content. Size separation through sieving ensures that the powder meets required specifications, with methods like agitation, brushing, and centrifugal techniques being employed to achieve uniformity. Proper mixing is essential for ensuring the uniform distribution of medicinal properties within the powder. Techniques such as trituration, spatulation, sifting, tumbling, and geometric dilution are used to achieve thorough and even mixing. This not only ensures efficacy but also enhances the powder's consistency in therapeutic applications.

## CONCLUSION

*Choorna Kalpana* represents a crucial component of Ayurvedic pharmaceutical practices, offering a stable and easily absorbed form of medication. The preparation of *Choorna* involves traditional methods that emphasize precision and care, ensuring the powder's effectiveness and longevity. Modern advancements in size reduction and mixing techniques have further refined *Choorna*'s preparation, enhancing its therapeutic potential and efficiency. By integrating contemporary size reduction methods and understanding the factors affecting particle size, the preparation of *Choorna* has evolved to meet modern pharmaceutical standards. The discussion highlights the importance of balancing traditional practices with modern techniques to optimize the preparation and application of *Choorna* in Ayurvedic medicine. This comprehensive approach ensures that *Choorna* remains a valuable and effective treatment option, bridging the gap between ancient wisdom and modern scientific advancements.

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