STUDIES ON AYURVEDIC TABLETS – PART I DISINTEGRATION TIME AS A PRELIMINARY TOOL FOR STANDARDISATION

BHUSHAN PATWARDHAN, V. V. WALIMBE, VIJAYA PALKAR*, and P.H. KULKARNI*

Interdisciplinary School of Ayurvedic Medicine, University of Poona, Pune, India.
* Ayurved Rasashala, Karve Road, Pune – 411 004, India.

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ABSTRACT: The ayurvedic pharmacy needs to be established on the basis of modern quality standards. A study on ayurvedic Gutī-Vati (tablets) was undertaken with this view, revealed that most of the tablets conform to the I P standards for hardness and DT. A few of the tablets showed curious responses similar to that of enteric coated and slow release tablets commonly used in modern medicine.

A systematic supporting study is essential so as to establish relationship of such responses to the nature of ingredients and their relevance with the indications and therapeutic utility described in Ayurvedic texts.

Background

In the modern medicine many improvements in the treatment of human and animal disease have taken place in last few years. The advancement in pharmaceutics has aided these agents to be used in a safe and effective manner. These advances reflect collective progress in various disciplines of Science and Technology including Physical and Organic Chemistry, Biochemistry, Pharmacology, Toxicology, Physiology, Pathology, Chemical Technology, Biotechnology etc. This multidisciplinary approach has established a firm foundation for the drastic and dramatic changes occurring in experimental and clinical therapeutics. Proper utilization of these advances into clinical therapy will occur only when a parallel progress is made in devising new strategies to achieve specific delivery of such agents at desired sites.

In modern medicine, administration of drug has been extensively studied. Various methods of drug delivery have been established so as to achieve better results. The drug delivery systems include administration of drug into formulations of various forms viz. syrups suspensions, tablets, capsules, enteric coated tablets, sustained release tablets, drops, injections, ointments. Special drug delivery system by using liposomes, specific antibodies, enzymes etc. have also been developed in order to achieve the accurate target site. Combination of two drugs for better action and low toxicity e.g. Benoryl paracetamol. Aspirin linked drug have also been in routine practice. Metal chelated compounds e.g. copper, gold chelated compounds etc. are becoming more and more popular in various disorders.
Oral route of administration is the most preferred and commonly used for drug delivery in the gastrointestinal tract. GI tract is not well characterized anatomically, in terms of biological responses and barriers responsible for interaction with and exclusion of drug intended either for local or systemic effects.

Due to this inadequate, knowledge and understanding of physiological events under normal and pathological conditions and lack of detailed description at the cellular or molecular level, the oral delivery systems are still designed on empirical basis (1).

Tablet is considered to be the commonest form of oral administrations. These are designed to give exact amount of drug per dose. Most of the tablets release their active ingredients in the stomach by disintegration. The time required for disintegration is called as DT which is defined and described by most of the pharmacopeas including Indian Pharmacopea. The DT test is obligatory in the analytical testing of allopathic tablets.

Besides the tablet disintegration test, now the dissolution test is gaining more importance, because it has more direct correlation with absorption of the drug or bioavailability.

**Introduction**

With this background we have studied ayurvedic tablets i.e. Guti and Vati considering its activity with respect to ingredients, binders, procedures of preparation etc. used during formulation.

In the modern days, allopathic system of medicine has been backed by a developed science of pharmacy and is enriched in standards and quality control measures. Various types of allopathic tablets will have different DT depending on their function and nature of ingredients.

There is a scope to presume that ayurvedic system of medicine has also considered various aspects of drug delivery systems. Ayurvedic preparations like Kwath, Churna, Asava, Arishta, Guti, Vati, Ghrita etc. have been well described in ancient books. If we consider Guti and Vati from ayurveda pharmacy, we can see a number of methods of their preparation by using various substances like guggul, mercury-sulphur (kajjali) etc. (2). In order to control the disintegration of tablet and also it could affect the penetration of active ingredients across the membrane.

It would be interesting to study the ayurvedic Guti and Vati from the ayurvedic pharmacy angle, with modern methods and concepts. The Disintegration Time (DT) which is more important in case of tablet was considered with special reference to 1. Nature of tablet 2. Ingredients 3. Indications 4. Site of action. 5. Nature of binders 6. Procedure.

**Materials and Methods**

Tablets manufactured by a local Ayurvedic pharmacy, (Table 1) were taken for studying disintegration time. The DT was obtained by a method described in Indian pharmacopea (3) on a disintegration apparatus.

The emersion liquids consisted

- A. Deionised water of pH $\geq 7$
- B. 0.1 N. HCL = pH $= 1.5 – 2$
- C. 0. N. Na2 Co3 pH $\geq 8.5$

Each tablets was tested for hardness on Hardness testing apparatus and reading were
recorded. For the determination of DT five tablets of the same batch were used at a time and the same experiment was carried out with the emersion liquids A, B and C. The average of the DT was taken for experimental purpose.

**Results**

Table I enlists the tablets which disintegrate within fifteen minutes in the emersion liquid A. These tablets conform to the specifications of Indian Pharmacopea as regards to the DT and hardness. Some of the tablets in this category have shown prolonged DT in the emersion liquid B & C.

| S. No. | Name of Guti                     | D.T. in A | D.T. in B | D.T. in C | Hardness kg/sq.cm. | Binder %          |
|--------|---------------------------------|-----------|-----------|-----------|--------------------|-------------------|
| 1      | Amex                            | 10        | 10        | 7         | 1                  | 10 Sugar          |
| 2      | Calcipral                       | 10        | 2         | 1         | 1.5                | 5 Gum             |
| 3      | Kurchico                        | 5 to 10   | 10        | 7         | 1                  | 25 Gum + Sugar    |
| 4      | Garbhapalarasa                  | 1         | 3         | 1         | 1.2                | 25 Gum + Sugar    |
| 5      | Karpuradivati                   | 10        | 18        | 15        | 0.5                | 30 gum            |
| 6      | Praval Pishtivati               | 5         | 1         | ½         | 0.5                | 5                 |
| 7      | Makardhwajvati                  | 10        | 8         | 8         | 2                  | 10 Gum sugar      |
| 8      | Vasant Kusumaker                | 5         | 7         | 7         | 1                  | 17.5 gum starch   |
| 9      | Sootshekhar Sadha               | 10        | 3         | 4         | 0.5                | 15 gum sugar      |
| 10     | Suvarna Sootashekhar            | 8 to 10   | 5         | 7         | 0.5                | 15 sugar          |
| 11     | Shwaskuthar                     | 10        | 10        | 10        | 0.5                | 30 gum + sugar    |
| 12     | Shankhavati                     | 7         | 7         | 8         | 0.5                | -                 |
| 13     | Kumbhajatu                      | 8         | 2         | 2         | 0.5                | 15 gum + sugar    |
| 14     | Tribhuvan Kirti                 | 15        | 10        | 10        | 0.5                | 25 gum + sugar    |
| 15     | Lashunadivati                   | 15        | 5         | 5         | NIL                | 26 gum sugar + starch |
| 16     | Calciprite (praval Panchamrut)  | 3         | 7         | 2         | 1                  | 5 gum             |
| 17     | Brihatvatatchintamani           | 10        | 5         | 10        | 1.5                | 93 gum starch     |
| 18     | Bhoota Bhairavarasa             | 15        | 70        | 60        | 1                  | 10 gum starch     |
| 19     | Vata Vindwansa                  | 15        | 20        | 15        | 0.5                | 25                |
| 20     | Gokshuradigugula                | 15        | 15        | 10        | 0.5                | 25 gum + sugar    |
Table II enlists the tablets which showed DT more than fifteen minutes in all the three emersion liquids A, B, & C. Some of these tablets showed comparatively less DT in either of the emersion liquids. A few tablets like Gandhak Rasayana, Suksma Triphala have considerably long DT suggesting properties like slow release tablets.

**Discussion**

This preliminary study was undertaken with an intention to study the responses of Ayurvedic tablets considering two main parameters described in the pharmacopeia viz. hardness & disintegration time. Actually the responses of these tablets on Tablet dissolution time are required to be studied.

These tests are not yet obligatory to be performed in case of ayurvedic preparations yet, they remain to be important considering the necessity of applying quality standard to ayurvedic medicines.

In conclusion it could be mentioned that this preliminary study could be considered as one of the tools for incorporating quality standards to Ayurvedic tablets. (Note)

A comparative study considering the influence of ingredients on the disintegration time would be necessary as as to establish these preparations on sound scientific background. The relation of such responses with the therapeutic activity and indications is also important issue which needs further systematic investigations.

These investigations were carried out only with academic interest. The authors have no intention to apply this to the present FDA rules and regulations applicable for Ayurvedic manufacturing in India.

| S. No. | Name of Guti                           | D.T. in A | D.T. in B | D.T. in C | Hardness kg/sq.cm. | Binder %       |
|--------|---------------------------------------|-----------|-----------|-----------|---------------------|----------------|
| 1      | Asanadi                               | 30        | 40        | 30        | 2                   | 10 gum         |
| 2      | Kutajaparpati                         | 25 to 30  | 20        | 25        | 1.5                 | 40 gum + sugar |
| 3      | Amritadi Guggulu                      | 35        | 45        | 17        | 1                   | -              |
| 4      | Kamadudha Mauktikyukta                | -         | 25        | -         | 1.2                 | -              |
| 5      | Tapyadi Loh Vati                      | 25        | 7         | 5         | 2                   | -              |
| 6      | Bal Goli                              | 20        | 5         | 7         | 1.5-2               | 15 gum sugar   |
| 7      | Kamudha                               | -         | 50        | 50        | 1                   | -              |
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