



## Construction of Spreadability Testing Apparatus

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### Description

The present invention relates to an apparatus for measuring the spreadability of semisolid formulations. Semisolid preparations such as ointments, pastes, cream emulsions, gels and rigid foams are considered as important topical pharmaceutical formulation. Their common property is their ability to adhere to the applied surface for a reasonable period before they are washed off or worn off. Semisolid preparations usually serve as vehicle for topical drug delivery, as emollients, or as protective or occlusive dressings, or they may be applied to the skin and membranes [1]. These preparations are widely used as a means to alter the hydration state of applied topical area and deliver the incorporated drugs in it [2].

The delivery of the correct dose of the drug depends highly on the spreadability of the semisolid topical formulations. As spreading the formulation in an even layer on the applied area to deliver a standard dose and optimum consistency of formulation ensure the suitable dose of the drug. A reduced dose would not deliver the desired effect and an excessive dose may lead to undesirable side effects. Hence, spreadability is an important parameter evaluated in the characterization of semisolid formulations [3].

Researchers always encounter a problem in the establishment of reliable technique for spreadability characterization of semisolid topical-mucosal preparations [2]. The parallel-plate method is the most widely used method for determining and quantifying the spreadability of semisolid preparations. This method is less precise and sensitive, and the data it generates must be manually interpreted and presented. Some techniques or instruments originally designed for other purposes also used for the measurement of spreadability of semisolids [2]. These include viscometers like cone-and-plate viscometers in which slippage between the rotating portion of the viscometer and the sample during measurement is a major disadvantage. Penetrometers, texture analyzers, spread meters are other instruments used for the assessment of spreadability of semisolids. These instruments are not economic and some require a mathematical manipulation to assess the spreadability [2,3]. Based on

these facts, the present study was planned to construct a simple, economical and reliable apparatus for the evaluation of spreadability character of various pharmaceutical semisolid preparations. The patent for apparatus is filed to Indian patent office (application No 201921010606, dated 2019/03/2019).

Spreadability measurement apparatus is constructed using a circular plate (16 cm in diameter) made of acrylic material, electric motor (12 V) and power battery (12 V) as shown in Fig. 1. A circular plate is fixed on the shaft of an electrically driven motor connected to a power battery. The speed of motor rotation can be adjusted (up 1000 rpm) using the speed regulator knob. From center to periphery the plate is marked with circles of different diameter with 5 mm increment. The apparatus is equipped with a camera to capture the semisolid spreading diameter from the center of the plate. The apparatus works on the principle of centrifugation forces. The fixed amount of semisolid formulation (0.5-1 g) under evaluation is poured in the center of disc and rotated at 500-800 rpm for 30 seconds. The centrifugal force generated during disc rotation circularly spreads the semi solid preparation. The spreadability is evaluated based on the diameter of semisolid formulation spread on the circular plate. We evaluated 15 marketed pharmaceutical semisolid preparations (0.5 g) at 800 rpm for 30 seconds showed spreading with a diameter of 2-4 cm [4,5].

The present investigation is a reliable technique to evaluate spreadability characterization of semisolid preparations. The evaluation method is quick, easy and economic for the researchers working in the field of pharmaceutical semisolid preparations.

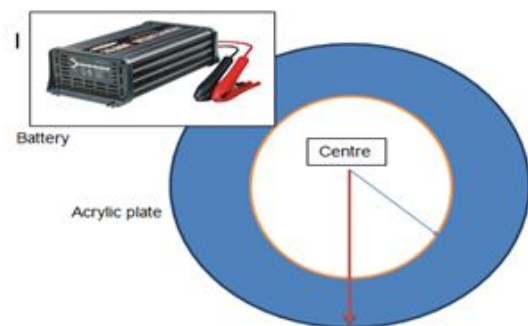


FIGURE 1: Apparatus for evaluating the spreadability.

Figure1: Apparatus for evaluating spreadability.

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