

Anacidity of a Newly Developed Polyherbal Formulation

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Abstract

For treatment, the current system of popular medicine uses a lot of essential oils and their components. Cardamom, Ajowan, Fennel, Caraway, Coriander, and Peppermint have been utilized in Indian medicine for centuries. These are also said to help with gastrointestinal problems, making them a good option for the current study. Steam distillation is a popular method for extracting essential oils from dried seeds or leaves. This study aims to create a microemulsion utilizing a combination of essential oils, water, and the non-toxic, non-ionic surfactant, as well as ethanol as a cosurfactant. The antacid action of the manufactured product was then tested. All the studies were carried out with water collected from a Millipore gradient Water System (Millipore Ltd., Bangalore, India). Analytical grade reagents were employed for the study, including methanol, hydrochloric acid, sodium hydroxide, sodium carbonate, and others. All marker standards were purified to a minimum of 98 per cent purity. Antacid medicine should have a long enough duration of action to keep the pH of the stomach above 3. The product's 10 mL and 20 mL doses showed in vitro similar antacid characteristics and considerable acid reactivity. As a result, several plants with a penchant for neutralizing stomach acid are chosen, and a formulation is created. Oil microemulsions with 110-410nm droplet sizes showed more excellent stability. After that, the compound was tested in vitro for antacid characteristics, which revealed a substantial positive response.

Key Words: Mass Spectroscopy, Co- Surfactant, Cardamom Seed, Coriander Seed

Introduction:

For treatment, the current system of popular medicine uses a lot of essential oils and their components. Cardamom, Ajowan, Fennel, Caraway, Coriander, and Peppermint have been utilized in Indian medicine for centuries. These are also said to help with gastrointestinal problems, making them a good option for the current study. Steam distillation is a popular method for extracting essential oils from dried seeds or leaves. The methods used to extract oil from dried seeds of cardamom, fennel, coriander, caraway, ajowan, and peppermint utilizing the Clevenger device steam distillation apparatus. Each essential oil's physiochemical qualities were confirmed. A validated Headspace gas chromatographic method was used to characterize each

oil using a marker compound such as linalool for coriander oil, cineol for cardamom oil, and anethol for fennel carvone for caraway oil, thymol for ajowan oil, and menthol for peppermint oil. Mass spectroscopy was used to validate the marker compound. This is the second study to ensure that the results are accurate.

Aim and Objective:

This study aims to create a microemulsion utilizing a combination of essential oils, water, and the non-toxic, non-ionic surfactant, as well as ethanol as a cosurfactant. The antacid action of the manufactured product was then tested.

Material and Methods:

Cardamom, coriander, fennel, caraway, ajowan, and peppermint oil were obtained from the trade market. Ultra-International Limited, Uttar Pradesh, India, provided linalool, cineol, anethol, carvone, thymol, and menthol as markers. Sigma Aldrich in India provided the Tween 20 (Polyethylene glycol Sorbian monolaurate). All the studies were carried out with water collected from a Millipore gradient Water System (Millipore Ltd., Bangalore, India). Analytical grade reagents were employed for the study, including methanol, hydrochloric acid, sodium hydroxide, sodium carbonate, and others. All marker standards were purified to a minimum of 98 per cent purity. Oil extraction the market provided cardamom, coriander, fennel, caraway, and ajowan, and peppermint oil. 250 g of each seed was cooked in a Clevenger apparatus for 6 hours with 500 ml of distilled water. A calibrated trap was used to measure the volume of essential oils. The essential oils in the distillate were dried and stored in the freezer using anhydrous Na₂SO₄. To acquire the desired volume, the same procedure was repeated. 1g of each of the six oils was added to 20ml volumetric flasks. Peppermint oil (500mg) was added to offer a soothing effect. Sunflower oil was used as a basis. After that, the sample was placed in an amber-coloured bottle for storage.

For microemulsion preparation, Tween 20 was utilized as a surfactant. To improve the stability and dispersion of the organic phase in the continuous phase, ethanol was used as a co-surfactant. Tween 20 was combined in a 3:1 ratio with the cosurfactant ethanol (S). Different formulations were made by combining a 2:1 (OS1), 2:2 (OS2), 2:3 (OS3), and 2:4 (OS4) ratio of essential oil (O) with surfactant-cosurfactant mixer (S) (OS4). Using a magnetic stir at 300 rpm, water was added drop by drop externally while the mixture was continuously stirred. To assess the thermodynamic stability of each formulation, it was centrifuged for 30 minutes at 12,000 rpm at room temperature. The observation was carried out every day for the first week, then every week for the next three months. For each sample, the test was conducted three times. pH is calculated. The pH values of the chosen formulation samples were measured at 25°C using the Mettler Toledo 320 pH meter. The tests were done in three different ways. The zeta potential is measured by the zeta potential, the electrostatic or charge repulsion/attraction between particles. The solution was infused with 0.1N HCl at a 4 ml/min rate, simulating the rate of natural acid secretion. The Rosette-Rice time was calculated, and the pH was observed. The test was repeated twice more with 10mL and 20mL of medication product each time.

Results and Discussion:

Steam distillation was used to determine the amount of each essential oil. To acquire the requisite volume of essential oil, the extraction was repeated. Physical characterizations of the

oils, including odour, colour, refractive index, optical rotation, and purity, were completed and compared to their specifications in the data bank. The purity of a combination of essential oils was determined using the marker chemical of each oil as a reference. After centrifuging each formulation, the phase stability of several microemulsion formulations (OS1, OS2, OS3, and OS4) was examined. The OS1 and OS2 formulations experienced quick phase separation after centrifugation. However, the OS3 and OS4 formulations remained stable and extended at ambient temperature.

Table 1: Rosette rise test results

Sample number	Quantity of blend	Essential oil blend	Maintenance time of pH(min)
1	5 ml	12.52 mg	4.12±0.11
2	10 ml	21 mg	11.2±0.10
3	25 ml	51 mg	10±0.16

After two weeks of storage, phase separation was seen in OS3, whereas OS4 demonstrated more excellent stability during the three-month stability period. As a result, OS4 was used to characterize better and apply investigations. After obtaining the stable formulation OS4, the technique was optimized by evaluating the same formula's sameness characterization properties of four distinct batch formulations to evaluate the formulation's repeatability, the pH, refractive index, zeta potential, droplet size, and assay for five batches of formulation were tested and tabulated, which reveals the droplet size dispersion of OS4 formulation. It is discovered that the results of all five batches are consistent and stable. For 5mL, 10mL, and 20mL of a medicinal product containing 12.5 mg, 25 mg, and 50 mg of each essential oil, an in vitro test known as the Rosette-rise test was used to evaluate the antacid profile. Compared to conventional 2.5 mg NaHCO₃, which kept the pH above 3 for 10.08.010 minutes, a 5mL dose kept the pH above 3 for 4.110.10 minutes, a 10mL dose kept the pH at 10.100.10 minutes, and a 20mL dose kept the pH at 25.100.15 minutes.

Antacid medicine should have a long enough duration of action to keep the pH of the stomach above 3. The product's 10 mL and 20 mL doses showed in vitro similar antacid characteristics and considerable acid reactivity. As a result, the drug product can be called an effective antacid. It is plausible to conclude from the current work that employing the optimal combination of cosurfactant ethanol and Tween 20, a stable microemulsion of a blend of essential oils may be generated, which can be a viable medication delivery system. The findings of this study suggest that a product with significant acid neutralizing capacity and resistance to pH changes be used. As a result, this substance can be used as an antacid to prevent gastric secretion.

Conclusion:

As a result, several plants with a penchant for neutralizing stomach acid are chosen, and a formulation is created. Oil microemulsions with 110-410nm droplet sizes showed more excellent stability. After that, the compound was tested in vitro for antacid characteristics, which revealed a substantial positive response.

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