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Research Article

Use of of Aspirin and Bromelain Enzyme with the Aim of Using it as a Skin Medicine

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Abstract

In recent years, skin medicines have had side effects. Every day, with the spread of disease, drugs need to be synthesized with new formulations. In recent years, it has been proven that the small size of a drug is directly related to penetration into the branchial layer of the skin. On the other hand, the anti-inflammatory properties of aspirin and bromelain enzymes led to the development of new skin drugs with anti-inflammatory properties. For this purpose, for synthesis, we added 10 mg of aspirin to 50 ml of distilled water at room temperature on a stirrer for 30 minutes. Then, we added 1 mg of bromelain to the previous solution and put it on the stirrer again. We put the sample in an autoclave for 16 hours at a temperature of 180 degrees Celsius, passed it through a strainer and washed it. The above method is one of the methods of doping. After that, the desired material was subjected to SEM analysis to determine its size with a fine ball mill. Then, the roughness, smoothness and average particle size were evaluated with ImageJ software. The purpose of preparing these micromedicines is for skin treatment purposes.

Keywords: Aspirin, Bromelain Enzyme, Sem and Doping

1. Introduction

Previously, the use of oral and injectable drugs was common. However, over time, skin medicines have also been developed. One of the problems associated with injectable and oral drugs is the involvement of the digestive system, which is considered one of the most sensitive organs in the body [1]. However, unlike the other two drugs, skin drugs do not cause this problem and only affect the area used. Lipophilicity (hydrophobicity) is among the important features of skin medicines. Through many studies, it has been proven that the permeability of skin drugs with lower molecular weights is greater. In addition, the smallness of these particles also contributes to this factor [2-5]. New skin drugs must have the following three characteristics: positive charge, lipophilic nature and small size. The most common microparticles include liposomes, lipid-solid particles, polymer particles, and mineral particles [6]. Skin medicines are divided into three categories: topical, cosmetic and health, and the research of this project is related to topical medicines. Silica nanoparticles were introduced for the first time in recent years. A size of these nanoparticles less than 20 nm was toxic, whereas a size above 20 nm was usable. To increase the effectiveness of these nanoparticles, they used their combination with the active ingredient turmeric [7, 8]. In the following years, gold nanoparticles of very small sizes were used for these drugs, which have high penetration [9, 10].

Considering the history of topical skin drugs, the use of silver microparticles was welcomed due to their antimicrobial and antifungal properties. Other microparticles used in skin medicine include zinc oxide particles that absorb ultraviolet light and are used in the production of sunscreens[11, 12]. In addition, titanium dioxide nanoparticles with the same features have been used. For many years, medicinal plants and their active ingredients have been used. For example, we can refer to capsaicin to engage the nerves and divert a person's mind from pain (burning sensation) and menthol for a cooling sensation [13, 14]. Methyl silicate is another compound that is used in wintergreen plants as an effective ingredient in pain reliever ointments. It is common to use some fruits to extract active substances and enzymes. Like bromelain, which is extracted from pineapple stems and is used for inflammation and joint pain treatment. In this article, we use bromelain (an enzyme extracted from pineapple) and aspirin as raw materials for local painkiller topical skin medicine.

2. Methodology

Materials: For this article, we prepared aspirin 500 and bromelain enzyme 500.

First, we turned aspirin into a solid powder. Then, we delivered the solution to Isfahan University of Technology's microlab for micronization. The sample was milled for one hour with a ceramic ball capo at a speed of 250 and a ball weight of 25 grams. To check the microsize, we delivered the embryos to the central laboratory of Isfahan University of Technology, SEM Department. We also investigated the crys-

tallization of microparticles in the same center. The purpose of this approach is to prepare the sample for therapeutic purposes.

Figure 1: Aspirin

For synthesis of the desired drug, first, we put 10 mg of aspirin in 50 ml of distilled water at room temperature for 30 minutes on a stirrer; then, we added 1 mg of bromelain to the previous solution and put it on a stirrer again for 16 hours. We placed the samples in an autoclave at 180 degrees Celsius, passed them through a strainer and washed them. This substance is ready for therapeutic purposes.

3. Results and Discussion

SEM Analysis

To check the size of the SEM sample, we delivered the desired sample to the laboratory of Isfahan University of Technology. This scanning electron microscope was equipped with a gold coating. device model was a Leo 435vp (Figure 2).

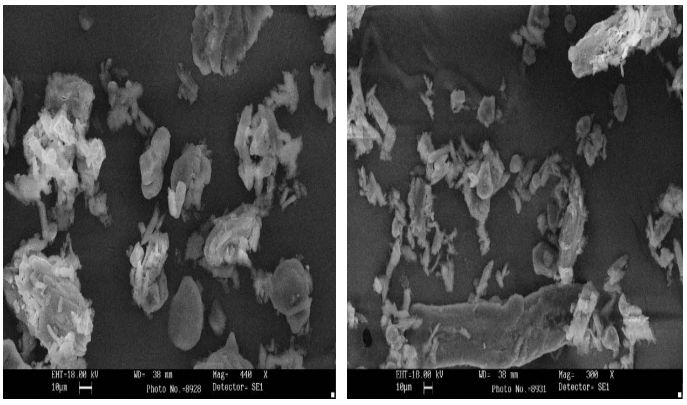

Figure 2: Sem Images of Aspirin.

Using ImageJ software, we analysed the SEM images. In the first step, we calibrated the images with this software and obtained the mean number of particles (Figure 3).

Results

File Edit Font Results

	Area	Mean	Min	Max	Angle	Length
1	9.086	57.109	39	75	0	20

Figure 3: Average Size of Aspirin Particles.

We evaluated the roughness and softness of the aspirin particles using this software (Figure 4). According to this figure, the presence of many sharp and narrow peaks indicates the roughness of the sample.

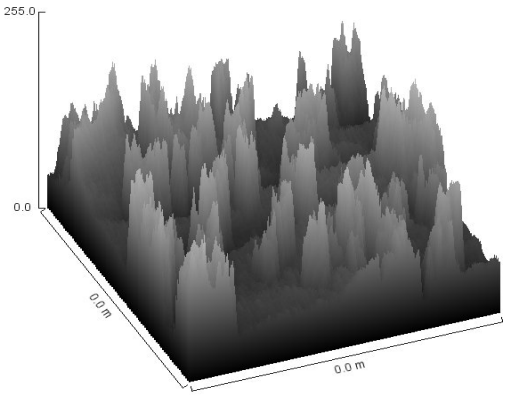

Figure 4: Roughness and Softness of Aspirin Particles.

With the same software, the average particle size was calculated (Figure 5). Figure 5 shows the distribution of microparticles of different sizes. As shown in the figure, there are 35 particles in the range of 1 to 35 micrometres and 34 particles in the range of 35 to 69 micrometres. As a result, a number of particles ranging from 1 to 205 in the sample is distributed.

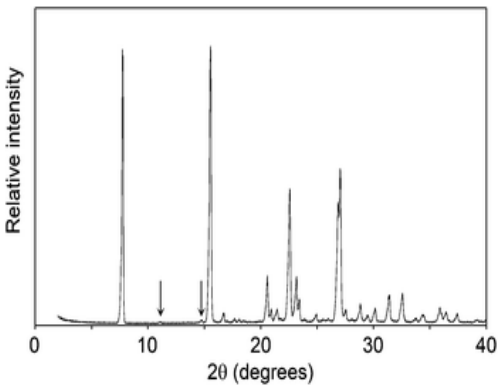

Figure 5: Particle Size Average.

XRD Analysis

The synthesized sample was subjected to X-ray diffraction to measure the degree of crystallization of the material. X-ray diffraction was performed with a copper lamp wavelength of 1.5406 angstroms. Figure 6 shows the XRD pattern of the bromelain-doped aspirin sample. All the peaks appear in this pattern, and these peaks are long and narrow, which indicates a high degree of crystallization of the material. . However, there are several peaks at values of 16, 23, and 27.

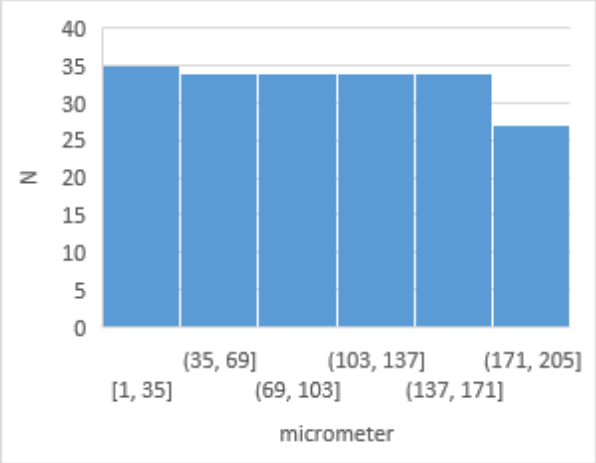

Figure 6: XRD Pattern of Aspirin-Doped Bromelain.

4. Conclusion

need to synthesize drugs with new formulations is felt. On the other hand, the anti-inflammatory properties of aspirin and bromelain enzymes led us to think about the synthesis of new skin drugs with anti-inflammatory properties. For this purpose, we put 10 mg of aspirin in 50 ml of distilled water at room temperature on a stirrer for 30 minutes. Then, we added 1 mg of bromelain to the previous solution and put it on the stirrer again. We put the autoclave in place for 16 hours at 180°C. After that, the desired material was subjected to SEM. Then, the roughness, smoothness and average particle size were evaluated with ImageJ software. A distribution diagram of microparticles of different sizes was constructed, and 35 particles were in the range of 1 to 35 micrometres, 34 particles were in the range of 35 to 69 micrometres, etc. As a result, the number of particles in the sample ranging from 1 to 205 was distributed in the same amount. All the diffraction peaks that appeared in the diffraction pattern were long and narrow. This indicates a high degree of crystallization. . However, a few peaks were observed at 16, 23, and 27 cm-1.

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