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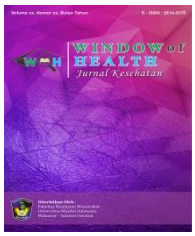

ARTICLE RESEARCH

URL artikel: http://jurnal.fkmumi.ac.id/index.php/woh/article/view/woh8211

Utilization of Corn Starch Amylopectin (*Zea mays* L.) For Coating Acetylsalicylic Acid Tablets

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ABSTRACT

Aspirin or acetylsalicylic acid is a class of NSAIDs stable in dry air, in humid air, aspirin will over time hydrolyze or decompose into salicylic acid and acetic acid, with the decomposition of aspirin levels that are contained in the preparation will experience degradation. Acetylsalicylic acid needs to be made in the form of thin-coated or film-coated tablets. In this research, the sample used was corn cobs, and the method used was coating aspirin tablets, followed by evaluation tests of core and film-coated tablets. This study developed film-coated tablets using corn starch amylopectin as the primary coating material. The results of this study indicate that corn starch amylopectin can be used as a thin layer and enteric coating. The coated tablet formulation from corn starch amylopectin has evaluation test results, namely the formula one tablet hardness test is 4,32 kg, formula 2 is 4,95 kg, formula 3 is 4,64 kg, size uniformity test is the diameter and thickness of formula one is 10,94 and 3,78 mm, formula 2 is 11,43 and 4 mm, formula 3 was 11 and 3,81 mm, average weight uniformity test for formula 1 was 389,5 mg, formula 2 was 399,5 mg, formula 3 was 393 mg, disintegration time test for formula 1 in stomach medium was 13, 31 minutes, formula 2 in the stomach medium 20,25 minutes, formula 3 in the intestinal medium 2,44 minutes, dissolution test for formula 1 in 120 minutes the solubility of the active substance reached 84%, formula 2 was 82%, formula 3 was 3% and intestinal dimedium within 210 minutes. The best formula, namely formula 3, meets the requirements for coated film.

Keyword : Acetyl salicylic acid; Amylopectin; Corn starch; Tablet; Thin layer salute

Article history
Received 27 June 2024
Received in revised form 20 April 2025
Accepted 24 April 2025
Available online 25 April 2025

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PUBLISHED BY :
Public Health Faculty
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Jl. Urip Sumoharjo Km. 5 (Kampus II UMI)
Makassar, Sulawesi Selatan.
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INTRODUCTION

Aspirin, or acetylsalicylic acid, is a widely used non-steroidal anti-inflammatory drug (NSAID) with antiplatelet, antipyretic, analgesic, and anti-inflammatory properties.[1] However, desprin has a significant limitation: it is, despite its therapeutic advantages, unstable under humid conditions. Over time, exposure to moisture causes aspirin to hydrolyze into salicylic acid and acetic acid, resulting in degradation of the active ingredient.[2] This degradation can compromise the drug's efficacy and stability, posing a significant challenge in pharmaceutical formulation.[3] Moreover, aspirin is known to cause gastric irritation because it non-selectively inhibits cyclooxygenase (COX) enzymes, reducing the synthesis of protective prostaglandins in the gastric mucosa.[4] Inhibition of prostaglandin production decreases mucus and bicarbonate secretion, thereby reducing the gastric defense system and leading to potential mucosal damage.[5] Aspirin must be formulated into thin-film or enteric-coated tablets to address both stability issues and gastric side effects, which protect the drug from premature release in the stomach and allow controlled release in the intestine.[6] One of the widely used materials for tablet coating is starch, a natural, abundant, and cost-effective polymer.[7] Corn starch, in particular, contains a high proportion of amylopectin, a highly branched polysaccharide that exhibits excellent film-forming ability.[8] Compared to amylose, amylopectin is more hydrophilic, absorbs water more gradually, and retains its structure longer, making it highly suitable for pharmaceutical film coating.[9]

Aspirin or acetylsalicylic acid is a class of NSAIDs or non-steroidal anti-inflammatory drugs with antiplatelet, antipyretic, analgesic, and anti-inflammatory properties.[1] Aspirin is the oldest analgesic marketed by Bayer; now, aspirin can be purchased under various names, such as Naspro, Remasal, and others.[10] A frequent side effect of aspirin is stomach irritation. Aspirin works by non-selectively inhibiting the cyclooxygenase (COX) 1 and 2 enzymes. Even though the COX-1 enzyme functions to convert arachidonic acid into prostaglandins (PGI2 and PGE2).[4] The secretion of mucus and bicarbonate in the stomach decreases by inhibiting prostaglandin synthesis.[5] This causes the protection of the stomach to decrease, which can cause damage to the gastric mucosa. These medications should be taken with food, a meal, or a glass of fluid to help reduce this problem.[6]

The nature of aspirin is that it is stable in dry air, in humid air, Acetyl salicylic acid will over time be hydrolyzed or decomposed into salicylic acid and acetic acid, with the release of acetyl salicylic acid, the levels contained in the preparation will experience degradation.[11] Many of the acetyl-salicylic acids on the market are in tablet form. For storage in tablet dosage form, it will be easily affected by changes in temperature, so that it can be hydrolyzed..[3] Therefore, acetylsalicylic acid needs to be made in the form of thin coated or film-coated tablets to maintain the stability of the active substance during storage where the therapeutic effect will not be obtained if there is a change in the stability of the active substance caused by a change in the form of the active substance and to prevent release. The drug is in the stomach and can be released quickly when it enters the intestine, or enteric.

Starch is one of the basic ingredients for making coating films, and corn is one source of starch that can be obtained.[7] Several studies have been conducted where corn starch generally contains 75%

amylopectin and 25% amylose.[8] The amylose content easily absorbs water and releases its bonds, while the amylose-pectin content absorbs water more slowly and takes longer to release its bonds.[9] Based on the background above, a coating film formulation will be carried out using corn starch amyl pectin to coat acetylsalicylic acid tablets.

METHODS

Sample Collection

Sampling was carried out purposively, without comparing samples taken from different places with the same sample. The samples used in this research were corn kernels.

Corn Starch Separation

Separation of corn starch using the method of Yudiyanti and Matsjeh. The modification is by separating the corn kernels from the cobs and washing them until they are clean. Then add water in a ratio of 1:3 and grind using a blender until a porridge-like mass is obtained. Then it is squeezed, the filtrate is left for approximately 24 hours, and the top liquid is discarded for corn starch. The starch obtained is then dried in the sun and in an oven at 60ºC for 13 hours. After drying, the starch is ground with a blender and sieved, so that fine grains of corn starch are obtained, and then the yield is calculated.[12]

Isolation of Amylopectin from Corn Starch with Modification

Amylopectin is isolated by mixing the starch with distilled water, stirring, and heating at 50°C for 120 minutes. The resulting precipitate is amylopectin and amylose, which dissolve with water as a solution above the precipitate. The precipitate is discarded, and the precipitate is allowed to stand and then dried in an oven at 500°C for 24 hours to produce amylopectin powder.[13]

Characteristics of Amylopectin Powder

Characteristics of amylopectin powder include organoleptic test, water content test, ash content test, solubility test, functional group analysis of amylopectin powder with FTIR, and iodine test.[14]

Corn Starch Amylopectin Coating Medium Preparation Process

Put the amyl pectin little by little into a beaker containing some water while stirring using a homogenizer at speed for 15 minutes. In a separate place, a suspension was made from other substances, namely talc, titanium dioxide, polyethylene glycol 6000, dye, and water, using a homogenizer for 20 minutes. Add suspension (2) to mixture (1) and stir again for 5 minutes at low speed.[15]

Comparative Coating Medium Preparation Process

PVA was gradually added to a beaker containing some water while stirring using a homogenizer at low speed for 15 minutes. In a separate place, a suspension was made from other substances, namely talc, titanium dioxide, polyethylene glycol 6000, dye, and water, using a homogenizer for 20 minutes. Add suspension (2) to mixture (1) and stir again for 5 minutes at low speed.[16]

Tablet Coating Process

The tablet coating method is the Santoso method with modifications due to inadequate equipment. Specifically, 30 tablets are prepared, then one by one, the tablets are dipped into the coating

medium for a duration of 10 seconds so that the tablets can be coated completely and evenly. The coated tablets are dried in a cupboard for 12 hours until the coating sticks perfectly to the surface of the tablet.[15]

Evaluation of Acetyl Salicylic Acid Core Tablets

Evaluation of acetylsalicylic acid core tablets includes tablet hardness, tablet friability, size uniformity, weight uniformity, disintegration time test, and dissolution test. [17]

Evaluation of Acetyl Salicylic Acid Coated Tablets

Evaluation of acetyl salicylic acid coated tablets includes organoleptic, weight gain test, disintegration time test, tablet hardness, tablet firmness, size uniformity, weight uniformity, dissolution test, and coated tablet water content test.[18]

RESULTS

Sample Processing and Isolation of Amylopectin from Corn Starch

The wet weight of corn kernels obtained was 1650 g, then after being converted into corn starch, the dry weight of corn kernel starch was 139,4 g. The yield obtained was 8,4%. The amylopectin yield obtained was 77,8%.

Isolation of Amylopectin from Corn Starch

The results of the amylopectin isolation carried out in previous research were obtained by heating, where the amylose dissolves with water while the amylopectin precipitates. Then, the amylopectin is separated from the amylose and dried. After weighing, the amylopectin result was 107,4 g. After calculating the percent yield by comparing the weight of amylopectin powder with the weight of starch, the yield was 77,8%.

Physicochemical Properties of Amylopectin

Physicochemical properties of Amylopectin can be seen in Table 1.

Table 1. Physicochemical Properties of Amylopectin

Component	Condition	Results	Information
Organoleptic	(SNI 3451:2011)		
Form	Powder	Powder	Qualify
Smell	No smell	No smell	Qualify
Color	White	White	Qualify
Foreign object	There isn't any	There isn't any	Qualify
Water content (%)	< 10%	2,6%	Qualify
Total Ash Content (%)	< 5%	0,98%	Qualify

Based on Table I above, the organoleptic test of amylopectin powder has met the SNI requirements, and the ash content has met the requirements according to MMI Edition VI.[19]

Functional Group Analysis Using FTIR

The results of the FTIR analysis can be seen in Figure 1.

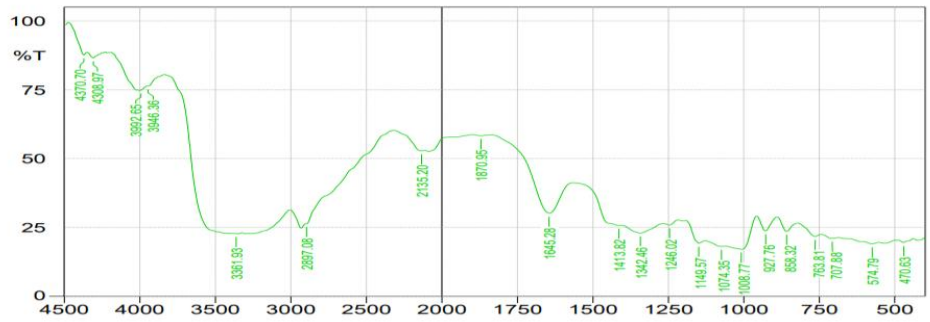

Figure 1. Corn Starch Amylopectin Spectrum Results

Based on the Fourier Transform Infrared Spectroscopy (FTIR) analysis results, the spectrum of amylopectin powder isolated from corn starch exhibited several characteristic absorption peaks corresponding to the main functional groups typically found in polysaccharides. A broad absorption band observed around 3361 cm-¹ indicates O–H stretching vibrations, characteristic of the abundant hydroxyl groups in polysaccharide structures such as amylopectin. The absorption band at 2897 cm¹ corresponds to C–H stretching vibrations from CH_2 and CH_3 groups, which are also typical of carbohydrate chains. A minor absorption peak appeared at 2135 cm¹, which may be attributed to noise or minor impurities, as triple bonds (C≡C or C≡N) are not commonly found in native starch structures. The absorption band at 1645 cm¹ is associated with C=O stretching, which in polysaccharides is generally attributed to the vibrational mode of bound water within the polymer matrix. In the region between 1334 and 1000 cm¹, particularly at 1149 cm¹, 1079 cm¹, and 1027 cm¹, prominent peaks correspond to C–O–C and C–O stretching vibrations, which are characteristic of the glycosidic linkages connecting glucose units in the amylopectin structure. At lower wavenumbers, around 930–500 cm¹, additional peaks represent skeletal vibrations of the glucose pyranose rings, further supporting the identification of the sample as amylopectin. Overall, the FTIR spectrum confirms that the isolated powder retains the typical structural features of amylopectin, without significant degradation or contamination. This finding is consistent with the iodine test results, where the violet-red coloration also indicated the presence of amylopectin. The horizontal line at 2000 cm-¹ serves as a visual reference line for the wavelength scale in the FTIR spectrum. It acts as a boundary separating the region above 2000 cm^{-1}, which shows strong absorption bands from functional groups such as O–H, N–H, and C–H, from the region below 2000 cm^{-1}, known as the fingerprint region, which contains unique and complex absorption patterns specific to individual compounds but is more challenging to analyze.

Iodine Test

This iodine test was carried out to prove that the powder was amylopectin and not a mixture with amylose. Amylopectin is added with 2 –3 drops of iodine and will form a violet-red color. [20] The amylopectin powder iodine test results can be seen in Table 2.

Table 2. Test data for the antioxidant activity of ascorbic acid, durian seed, and peel extract

Information	Results
Amylopectin powder + 2 drops of iodine	(+) red violet

Based on Table 2 above, it can be seen that the corn amylopectin iodine test results are positive, violet-red in color, which is a characteristic of amylopectin. [20]

Organoleptic Test

Organoleptic tests are carried out by examining shape, smell, and color. .[21] The organoleptic test results can be seen in Table 3.

Table 3. Organoleptic Test Results

Information	Form	Smell	Color
Core tablet	Spherical	Typical sour smell	White
Formula 1 (amylopectin)	Spherical	Typical sour smell	Light blue
Formula 2 (amylopectin)	Spherical	Typical sour smell	Light blue
Formula 3 (amylopectin)	Spherical	Typical sour smell	Light blue
Formula 4 (PVA)	Spherical	Typical sour smell	Dark blue
Formula 5 (PVA)	Spherical	Typical sour smell	Dark blue
Formula 6 (PVA)	Spherical	Typical sour smell	Dark blue

Tablet Hardness Test

Tablet hardness testing uses a tool, a hardness tester. The measurement principle is to apply pressure to the tablet until it cracks or breaks. [22] The tablet hardness test was carried out five times; the results can be seen in Figure 2.

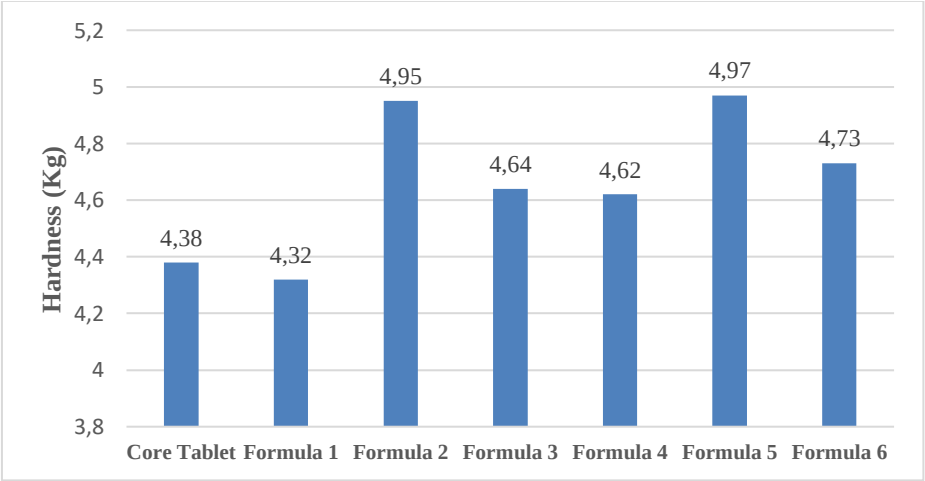

Figure 2. Tablet Hardness Test Results Diagram

From Figure 2, it can be explained that all tablets meet the tablet hardness requirements of 4 - 8 kg. Core tablets and also formulas one to six coated tablets meet the test requirements, as follows: core tablets have a hardness of 4,38 kg, formula 1 (amylopectin) (4,32 kg), formula 2 (amylopectin) (4,95 kg), formula 3 (amylopectin) (4,64 kg), formula 4 (PVA) (4,62 kg), formula 5 (PVA) (4,97 kg), and formula 6 (PVA) has a hardness of 4,73 kg.

Tablet Firmness Test

The firmness test, also known as brittleness, is called the crispness test. Crispiness or friability is another way to measure a tablet's strength. The measurement principle is to determine the percentage of tablet weight lost from 20 tablets during rotation in 4 minutes (100 rotations). [22] The tablet firmness test can be seen in Figure 3.

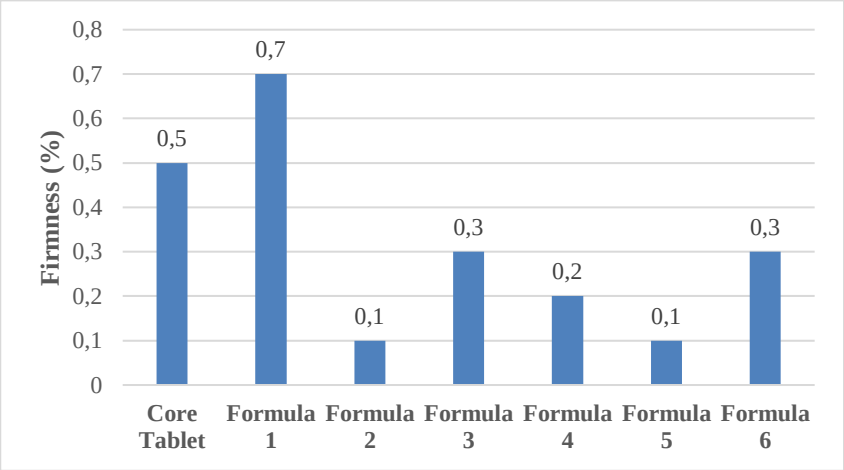

Figure 3. Tablet Firmness Test Results Diagram

From Figure 3, it can be seen that all friability test results meet the requirements for tablet friability test, namely ≤ 0,8%, as follows: core tablet (0,5%), formula 1 (amylopectin) (0,7%), formula 2 (amylopectin) (0,1%), formula 3 (amylopectin) (0,3%), formula 4 (PVA) (0,2%), formula 5 (PVA) (0,1%), and formula 6 (PVA) (0,3%).

Size Uniformity Test

Size uniformity is carried out to ensure that the tablets have a uniform thickness and diameter. [23] A caliper tool can be used to test the uniformity of tablet size. The following results of the size uniformity test can be seen in Figure 4.

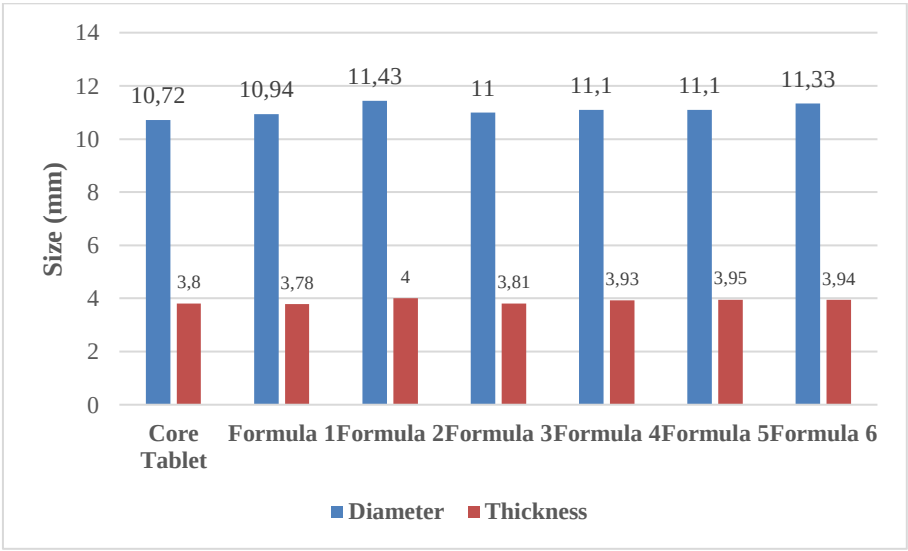

Figure 4. Tablet Size Uniformity Test Results Diagram

From Figure 4, the results of the uniformity test of tablet size and thickness can be seen where all meet the requirements of the tablet diameter test of no more than 3 times and no less than 1 1/3 times

the tablet thickness, namely as follows, core tablets of 10,72 and 3,8 mm, formula 1 (amylopectin) 10,94 and 3,78 mm, formula 2 (amylopectin) 11,43 and 4 mm, formula 3 (amylopectin) 11 and 3,81 mm, formula 4 (PVA) 11,1 and 3,93 mm, formula 5 (PVA) 11,1 and 3,95 mm, and formula 6 (PVA) 11,33 and 3,94 mm.

Weight Uniformity Test

The weight uniformity test aims to ensure that the tablet contains the right amount of drug. For tablets weighing more than 300 mg, the average weight should not be more than two tablets with a deviation of 5%, and there should not be one tablet with a deviation of 10%. [23] The results of the weight uniformity test can be seen in Table 4.

Table 4. Weight Uniformity Test

Core tablet	Weight (mg) F1	F2	F3	F4	F5	F6
374	390	390	400	400	400	400
374	390	390	390	400	400	400
373	400	410	400	400	390	390
373	400	410	390	390	390	390
380	390	410	390	380	390	390
380	380	410	390	390	390	390
374	380	400	390	390	390	390
380	390	390	390	390	390	390
380	390	400	390	380	390	390
380	380	390	390	390	390	400
380	390	390	390	390	390	400
373	400	410	390	390	390	400
373	400	410	390	390	400	400
380	400	410	390	390	400	390
380	380	390	390	390	400	390
380	380	390	390	390	400	380
374	380	390	400	390	390	380
374	390	390	400	390	400	390
374	390	410	400	390	400	390
374	390	400	400	380	400	390
average	average	average	average	average	average	average
376,5	389,5	399,5	393	390	394,5	392
Column A (5%) (357,7–395,3)	Column A (5%) (370–409)	Column A (5%) (379,5–419,5)	Column A (5%) (373,3–412,7)	Column A (5%) (370,5–409,5)	Column A (5%) (374,8–414,2)	Column A (5%) (372,4–411,6)
Column B (10%) (338,9–414,1)	Column B (10%) (350,6–428,4)	Column B (10%) (359,5–439,5)	Column B (10%) (353,7–432,3)	Column B (10%) (351–429)	Column B (10%) (355,1–433,9)	Column B (10%) (352,8–431,2)
			Deviation (%)			
373= 0,9 374= 0,6 380= 0,9	380= 2,4 390= 0,2 400= 2,7	390= 2,4 400= 0,1 410= 2,6	390 = 0,7 400= 1,8	380= 2,6 390= 0 400= 2,6	390= 1,1 400= 1,4	390= 0,5 400= 2

Disintegration Time Test Results

The disintegration time test determines how quickly the tablet disintegrates into aggregates and/or finer particles.[24] The results are shown in Figure 5.

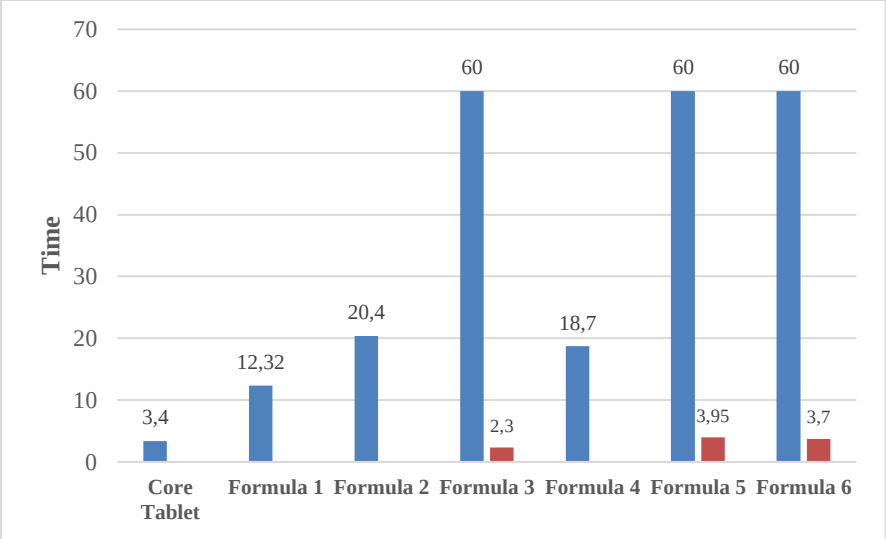

Figure 5. Tablet disintegration time test results diagram

From Figure 5, it can be seen that the results of the disintegration time test of the acetylsalicylic acid core tablet meet the disintegration time requirements, namely disintegrating within 3 minutes 11 seconds, where for uncoated tablets the requirement is no more than 15 minutes, while for formula one, formula two and formula four do not meet the disintegration time requirements for enteric coating where formula one in acidic media completely disintegrates within 13 minutes 31 seconds, formula two disintegrates within 20 minutes 25 seconds. Formula four disintegrates within 18 minutes and 20 seconds. Still, in formula three, formula five, and formula six, the tablets do not completely disintegrate until the 60th minute in acidic media and completely disintegrate in alkaline media, namely formula three at 2 minutes 44 seconds, formula five at 4 minutes 7 seconds, and formula six at 4 minutes 6 seconds.

Weight Gain Test Results

The weight increase test was conducted to see if the core tablet's weight increased after coating. The results are shown in Figure 6.

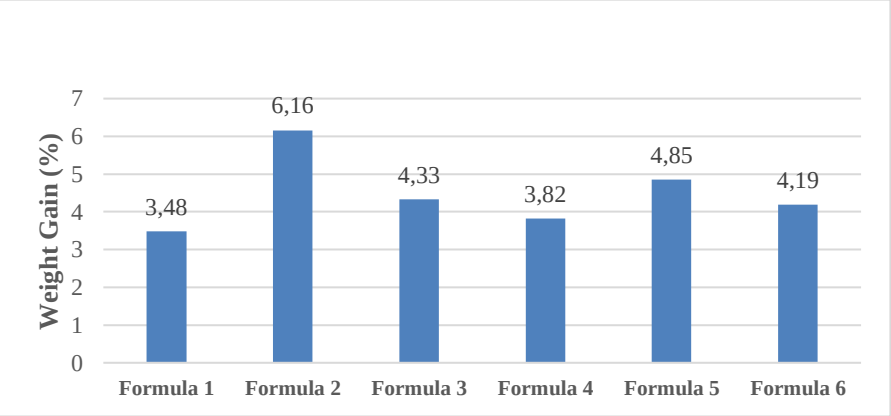

Figure 6. Diagram of Weight Increase Test Results for Coated Tablets

From Figure 6, it can be seen that the results of the weight increase test for formulas one, three, four, five, and six have met the requirements, namely 2-5%; however, for amylopectin coating, formula two experienced the highest increase, namely 6,16%. For formula two, amylopectin coating did not meet the requirements because, during the coating process, the coating solution was attached more, making the core tablet's surface thicker than the other formulas. The data can be considered follows: formula 1 (amylopectin) is 3,48%, formula 2 (amylopectin) is 6,16%, formula 3 (amylopectin) is 4,33%, formula 4 (PVA) is 3,82%, formula 5 (PVA) is 4,85%, and formula 6 (PVA) is 4,19%.

Stability Test

This stability test was carried out to determine the effect of the amylopectin coating on its ability to protect active substances that are unstable to moisture. The results are shown in Figure 7.

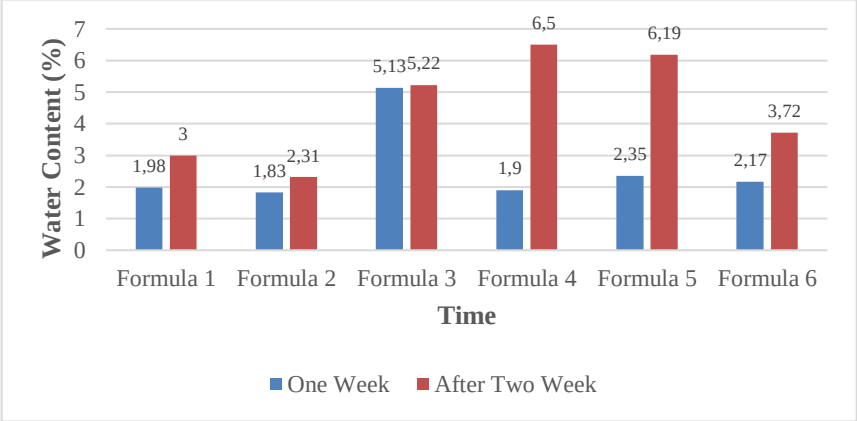

Figure 7. Diagram of Stability Test Results for Coated Tablets

From Figure 7, the results of the water content test on coated tablets can be seen: the increase in the water content of the tablets after 2 weeks occurred in all formulas, but the lowest increase was in formula 3 with amylopectin coating and in formula 6 with PVA comparison coating. This shows that the amylopectin coating with an amylopectin formula of 27,2 grams has the best stability results. The data can be seen as follows: formula 1 (amylopectin) is 1,02%, formula 2 (amylopectin) is 0,48%, formula 3 (amylopectin) is 0,09%, formula 4 (PVA) is 4,6%, formula 5 (PVA) is 3,84%, and formula 6 (PVA) is 1,55%.

DISCUSSION

The results of the FTIR examination show the IR spectrum of corn starch amilo pectin, which shows the presence of an absorption band at a wavelength of 2850-2970 cm^{-1} (CH range), namely 2897,08 cm^{-1}, an absorption band 3200-3600 cm^{-1} (OH range), namely 3361,93, and band absorption 1640-1680 cm^{-1} (C=O range), namely 1645,28 cm^{-1}. These three functional groups are the main functional groups characteristic of amylopectin.[25]

Evaluation results of core tablets and acetyl salicylic acid-coated tablets. In making acetylsalicylic acid-coated tablets, core tablets that are already on the market are used, namely tablets containing 300 mg of acetylsalicylic acid. Then it is coated with a coating medium from amylopectin, corn kernel starch, and PVA as a comparison coating with the addition of several other ingredients, namely titanium dioxide as an opaque agent which aims to produce a more opaque color and increase the coverage of the thin layer combined with an additional coloring agent, talc which functions as Pelican so that the surface of the coated tablet does not adhere strongly to the container when drying, PEG (Polyethylene glycol) 6000 which functions as a plasticizer which can improve the flexibility of the coating, reduce the risk of the coating cracking, water as a solvent and coloring agent which aims to provide value—aesthetics on the physical appearance of coated tablets. After the core tablet is coated, an evaluation test is carried out on the core tablet and the coated tablet formula to compare the evaluation results between the tablets that have not been coated and the coated tablets.

Based on the table 3 above, it can be seen that the organoleptic test results for the core tablet form up to formula 6 have the same shape, namely round spherical, have a distinctive sour smell where the smell comes from the acetic acid content of acetose/acetyl salicylic acid, which has a characteristic sour (vinegar) odor, caused by acetic acid.

Based on the Figure 2 hardness test results in the data above, it can be seen that the core tablets and formula one to six coated tablets meet the tablet hardness test requirements, namely 4-8 kg. After the tablet was coated, the hardness of the tablet for formulas 2 to 6 increased compared to the core tablet before being coated. The most excellent hardness is in formula 2 for the amylopectin coating and formula 5 for the comparison PVA coating. The smallest hardness is formula 1 in amylopectin and formula 4 in the comparator PVA. The hardness of tablets that have been coated increases due to a layer covering the core tablet's surface, so the tablet's thickness also increases. In formula one, it decreases because when drying, the surface of the tablet experiences cracks, and coating cracks can occur. After all, the core tablet expands during the coating process, which is caused by moisture absorption by the tablet core. [26]

Based on the results of the tablet firmness test above, it can be seen that the core tablets and formula one to formula six coated tablets meet the tablet firmness test requirements, namely ≤ 1%. Where there was a decrease in the percentage of tablet friability in the coated tablet formula from the uncoated core tablet, namely the most minor reduction in the amylopectin coating formula, namely in formula two and in the comparative PVA, namely formula five, this is because it has the most significant tablet hardness so that the drug is not easily brittle. Based on the results of the size uniformity test in the data above, it can be seen that the core tablets and also formula one to formula six coated tablets meet the requirements of the tablet size uniformity test, namely the diameter of the tablet is not more than 3 times and not less than 1 1/3 times the thickness of the tablet. The weight of core tablets and aspirin-coated tablets is no more than two tablets whose weight is more than 5% and not a single tablet whose weight is more than 10%; it can be concluded that the core tablets and aspirin-coated tablets meet the requirements of the weight uniformity test. [27] Disintegration time test that has been carried out, it shows

that the amylopectin coating formula based on disintegration time meets the requirements as an enteric coating, namely in formula three with the amylopectin content used as much as 27,2 g and in the comparison coating the PVA content which is effective as an enteric coating is in formula five. as much as 19,8 grams of PVA and formula six as much as 27,2 g of PVA. Based on the results of the weight increase test in the data above, it can be seen that formulas one, three, four, five, and six have met the requirements, namely 2 - 5%, for the amylopectin coating formula two experienced the highest increase, namely 6,16% and for the PVA coating Formula 5 experienced the highest increase, 3,78. The amount of coating material influences the increase in weight in the coating suspension. Also, not all coating material sticks to the core tablet during the coating process, which can reduce the coated tablet's weight. The two amylopectin coating formulas do not meet the requirements because, in the coating process, the coating solution sticks to more of the core tablet's surface, making the core tablet's surface thicker than other formulas. Based on the stability test results in the data above, it can be seen that an increase in tablet water content after 2 weeks occurred in all formulas. This shows that the amylopectin coating with the amylopectin formula 27,2 g can attract water absorption well.

Amylopectin, the significant component of corn starch (75–80%), has a branched molecular structure that provides excellent film-forming ability. This structure creates coatings with higher mechanical strength than linear amylose, as evidenced by the hardness test results that meet pharmacopeial standards (4–8 kg). Additionally, amylopectin exhibits pH-dependent solubility, remaining intact in the acidic stomach (pH 1–2) but dissolving rapidly in the intestinal environment (pH ≥ 6), making it ideal for enteric coatings (7,28). Acetylsalicylic acid (aspirin) is prone to hydrolysis in humid conditions, forming salicylic acid, which can irritate the gastric mucosa. This study showed that amylopectin coatings effectively reduce moisture penetration, with only a 2,6% increase in tablet water content after two weeks of storage. This is attributed to amylopectin's semi-hydrophobic nature, which limits water diffusion.[11] Furthermore, the controlled drug release profile minimizes the risk of gastric irritation caused by sudden drug release (burst effect).[6] As a natural polymer, amylopectin is non-toxic and biocompatible, unlike synthetic coatings such as PVA, which may irritate. Its safety profile is particularly advantageous for patients with gastrointestinal sensitivities. Moreover, amylopectin requires minimal additives (e.g., PEG 6000 as a plasticizer), reducing the risk of chemical interactions with the drug.[16] Corn starch amylopectin is a renewable, biodegradable, and locally sourced material, aligning with green pharmacy principles. This research achieved a high amylopectin isolation yield, indicating efficient production.[25] Economically, amylopectin is more affordable than synthetic polymers, making it a viable option for large-scale production in resource-limited settings.[7]

CONCLUSIONS AND RECOMMENDATIONS

Corn starch amylopectin can be formulated as a coating film, namely as a thin layer coating of acetylsalicylic acid tablets, where, with the addition of other ingredients, namely talc, titanium dioxide,

PEG 6000, dye, and water, it becomes the coating medium for the amylopectin coating film. And the coating film from corn starch amylopectin can be used as a thin layer coating to protect the active substance of acetylsalicylic acid tablets where the higher the amylopectin content, the stronger the potential to protect the active substance of acetylsalicylic acid tablets, so that corn starch amylopectin can be used as a thin layer enteric coating for delayed release in acetylsalicylic acid tablets, namely in formula three with an amyl pectin content of 27,2 g in 160 ml of water solvent.

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