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Review Article

Formulation And Comparative Evaluation of Marketed Paracetamol Tablets

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ABSTRACT

Many suppliers sell paracetamol tablets as an over-the-counter (OTC) product, commonly used to reduce fever and relieve pain. The main goal of this research was to compare and assess different brands of paracetamol tablets available in the Sangli district. Five different brands of paracetamol tablets were randomly collected from various pharmacies in the area. The research followed official guidelines from books like the United States Pharmacopeia (USP) and British Pharmacopoeia (BP) to conduct various quality tests and analyses.Several parameters were evaluated for these brands, including weight variation, friability (how easily the tablet breaks), hardness, drug content, identification tests, disintegration time (how quickly the tablet breaks down), and dissolution profile (how the drug is released in the body). The weight variation and friability tests showed that all brands were within acceptable limits. However, when tested for drug content using UV analysis, none of the brands had less than 95% of the active drug. Overall, each brand showed different results, but all were within the standards set by official guidelines.

INTRODUCTION

Paracetamol is a medicine used to treat mild to moderate pain. Paracetamol can also be used to treat fever (high temperature). It's dangerous to take more than the recommended dose of paracetamol. Paracetamol overdose can damage your liver and cause death. Always follow the directions on the packet when using paracetamol. Paracetamol is a medicine used for mild to moderate pain. It can be bought over the counter in pharmacies, supermarkets and other shops.

▪**Paracetamol can be used for: -**

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▫Backache. ▫Headache
▫Migraine. ▫Muscle strains
▫Period pain. ▫Toothache
▫Aches and pains due to colds and flu.

▪Types of paracetamol: -

▫Tablets. ▫Capsules
▫Suppositories. ▫Soluble powders
▫Liquids

Paracetamol is made by lots of different companies and sold using different names. It's also often combined with other medicines and found in:

▫Cold and flu medicines. ▫Headache tablets

▪Pacimol :-

Pacimol 500 Tablet helps relieve pain and fever by blocking the release of certain chemical messengers responsible for fever and pain. It is used to treat headaches, migraine, toothaches, sore throats, period (menstrual) pains, arthritis, muscle aches, and the common cold.

Uses of Pacimol Tablet :-

▫Pain relief. ▫Treatment of Fever

▪Benefits of Pacimol Tablet :-

1) Pain relief :-

Pacimol 500 Tablet is a common painkiller for treating aches and pains. It is widely used and rarely causes any side effects if taken properly. To get the most benefits, take it as prescribed. Do not take more or for longer than needed as that can be dangerous.

2) Treatment of Fever :-

Pacimol 500 Tablet is also used to reduce a high temperature (fever). It works by blocking the release of certain chemical messengers that cause fever. It may be prescribed alone or in combination with other medicines. Take it as prescribed by the doctor.

▪Macfast :-

Macfast 500 Tablet helps relieve pain and fever by blocking the release of certain chemical messengers responsible for fever and pain. It is used to treat headaches, migraine, toothaches, sore throats, period (menstrual) pains, arthritis, muscle aches, and the common cold.

Uses of Macfast Tablet: -

▫Pain relief. ▫Treatment of Fever

▪Benefits of Macfast Tablet :-

1) Pain relief :-

Macfast 500 Tablet is a common painkiller for treating aches and pains. It is widely used and rarely causes any side effects if taken properly. To get the most benefits, take it as prescribed. Do not take more or for longer than needed as that can be dangerous.

2) Treatment of Fever :-

Macfast 500 Tablet is also used to reduce a high temperature (fever). It works by blocking the release of certain chemical messengers that cause fever. It may be prescribed alone or in combination with other medicines. Take it as prescribed by the doctor.

Side effects of Macfast Tablet :-

Most side effects do not require any medical attention and disappear as your body adjusts to the medicine. Consult your doctor if they persist or if you're worried about them

Common side effects of Macfast :-

▫Stomach pain
▫Nausea
▫Vomiting

How to use Macfast Tablet :-

Take this medicine in the dose and duration as advised by your doctor. Swallow it as a whole. Do not chew, crush or break it. Macfast 500 Tablet is to be taken with food.

How Macfast Tablet works :-

Macfast 500 Tablet is an analgesic (pain reliever) and anti-pyretic (fever reducer). It works by blocking the release of certain chemical messengers that cause pain and fever.

▪T-98 :-

T-98 Tablet helps relieve pain and fever by blocking the release of certain chemical messengers responsible for fever and pain. It is used to treat headaches, migraine, toothaches, sore throats, period (menstrual) pains, arthritis, muscle aches, and the common cold.

▪Uses of T-98 Tablet :-

- Pain relief.
- Treatment of Fever

▪Benefits of T-98 Tablet :-

1) Pain relief :-

T-98 Tablet is a common painkiller for treating aches and pains. It is widely used and rarely causes any side effects if taken properly. To get the most benefits, take it as prescribed. Do not take more or for longer than needed as that can be dangerous.

1) Treatment of Fever :-

T-98 Tablet is also used to reduce a high temperature (fever). It works by blocking the release of certain chemical messengers that cause fever. It may be prescribed alone or in combination with other medicines. Take it as prescribed by the doctor.

Side effects of T-98 Tablet :-

Most side effects do not require any medical attention and disappear as your body adjusts to the medicine. Consult your doctor if they persist or if you're worried about them

Common side effects of T-98 :-

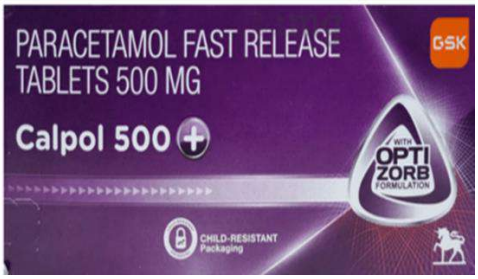
▫Stomach pain
▫Nausea
▫Vomiting

How to use T-98 Tablet :-

Take this medicine in the dose and duration as advised by your doctor. Swallow it as a whole. Do not chew, crush or break it. T-98 Tablet is to be taken with food.

How T-98 Tablet works :-

T-98 Tablet is an analgesic (pain reliever) and anti-pyretic (fever reducer). It works by blocking the release of certain chemical messengers that cause pain and fever.



▪Calpol :-

Calpol 500 + Tablet helps relieve pain and fever by blocking the release of certain chemical messengers responsible for fever and pain. It is used to treat headaches, migraine, toothaches, sore throats, period (menstrual) pains, arthritis, muscle aches, and the common cold.

Uses of Calpol Tablet :-

▫Pain relief
▫Treatment of Fever

▪Benefits of Calpol Tablet :-

1) Pain relief :-

Calpol 500 + Tablet is a common painkiller for treating aches and pains. It is widely used and rarely causes any side effects if taken properly. To get the most benefits, take it as prescribed. Do not

take more or for longer than needed as that can be dangerous.

2) Treatment of Fever :-

Calpol 500 + Tablet is also used to reduce a high temperature (fever). It works by blocking the release of certain chemical messengers that cause fever. It may be prescribed alone or in combination with other medicines. Take it as prescribed by the doctor.

Side effects of Calpol Tablet :-

Most side effects do not require any medical attention and disappear as your body adjusts to the medicine. Consult your doctor if they persist or if you're worried about them

Common side effects of Calpol :-

▫Stomach pain
▫Nausea
▫Vomiting

How to use Calpol Tablet: -

Take this medicine in the dose and duration as advised by your doctor. Swallow it as a whole. Do not chew, crush or break it. Calpol 500 + Tablet is to be taken with food

How Calpol Tablet works: -

Calpol 500 + Tablet is an analgesic (pain reliever) and anti-pyretic (fever reducer). It works by blocking the release of certain chemical messengers that cause pain and fever.

▪Xykaa :-

Xykaa Rapid 650 Tablet helps relieve pain and fever by blocking the release of certain chemical messengers responsible for fever and pain. It is used to treat headaches, migraine, toothaches, sore throats, period (menstrual) pains, arthritis, muscle aches, and the common cold.

Uses of Xykaa Tablet :-

▫Pain relief. ▫Treatment of Fever

Benefits of Xykaa Tablet :-

1) Pain relief :-

Xykaa Rapid 650 Tablet is a common painkiller for treating aches and pains. It is widely used and rarely causes any side effects if taken properly. To get the most benefits, take it as prescribed. Do not take more or for longer than needed as that can be dangerous.

2) Treatment of Fever :-

Xykaa Rapid 650 Tablet is also used to reduce a high temperature (fever). It works by blocking the release of certain chemical messengers that cause fever. It may be prescribed alone or in combination with other medicines. Take it as prescribed by the doctor.

Side effects of Xykaa Tablet :-

Most side effects do not require any medical attention and disappear as your body adjusts to the medicine. Consult your doctor if they persist or if you're worried about them

Common side effects of Xykaa :-

▫Stomach pain
▫Nausea
▫Vomiting

How to use Xykaa Tablet :-

Take this medicine in the dose and duration as advised by your doctor. Swallow it as a whole. Do not chew, crush or break it. Xykaa Rapid 650 Tablet is to be taken with food.

How Xykaa Tablet works :-

Xykaa Rapid 650 Tablet is an analgesic (pain reliever) and anti-pyretic (fever reducer). It works by blocking the release of certain chemical messengers that cause pain and fever.

Clinical implications:-

paracetamol is mostly eliminated by hepatic metabolism, patients with severe hepatic failure have a considerably longer elimination half-life, and therefore, paracetamol must be used cautiously in such patients. Intoxication are not

infrequent because paracetamol is one of the most widely used over-the-counter drugs. Paracetamol intoxication has important clinical implications as it can induce life-threatening hepatic and renal failure. This failure is probably due to the accumulation of toxic metabolites, caused by an increase in their production and a decrease in their detoxification due to depletion of glutathione stores. The treatment of intoxication is

1) Gastric emptying and administration of active charcoal
2) Administration of N-acetylcysteine, which acts by replenishing the hepatic stores of glutathione (preferably by the oral route, otherwise intravenously)
3) Heamodialysis may be useful if started within 12 hours after ingestion of huge doses.

▪**Parameter :-**

Hardness Test:

The hardness test was conducted using a Monsanto Hardness Tester, with each tablet placed vertically in the device. A load was gradually applied, and the load at which the tablet broke was recorded. Approximately 10 tablets were tested in this manner.

Friability: The friability test was performed using a Roche Friabilator, requiring approximately 10 tablets. The apparatus was operated at a rotating speed of 25 rpm for a duration of 4 minutes. After the rotation process, the tablets were weighed and compared to their initial weight. The percentage friability (% F) was calculated using the formula:

$$\% F = [1 - (W/Wo)] \times 100$$

Where:

▪% F = Friability percentage

▪Wo = Initial weight of the tablets

▪W = Weight of the tablets after rotation.

Tablet Disintegration:

The disintegration test was conducted using a disintegration test apparatus, where six tablets were placed. The temperature of the medium, which was simulated gastric fluid (0.1 N HCl), was maintained at 37 ± 0.2°C. The time taken for the tablets to disintegrate was then recorded.

Dissolution Test:

To perform the dissolution test, a USP Type-1 (Basket) 8-Paddle Apparatus was used. The tablets were placed in 900 ml of simulated gastric fluid (0.1 N HCl). The experimental conditions were carefully maintained, including keeping the temperature of the medium at 37 ± 0.2°C and the basket's rotation speed at 150 rpm. Every 10 minutes, 2 ml of the dissolution medium was withdrawn, and the volume was replenished with fresh medium (0.1 N HCl) to maintain sink conditions. This process was repeated every 10 minutes for one hour.The samples withdrawn were diluted with fresh dissolution medium to a total volume of 10 ml, and the resulting solution was filtered. The absorbance of each sample was measured using UV spectroscopy at a wavelength of 222 nm, as specified by USP.

Assay:

To find the difference between the actual amount of active drug and the labeled amount, an assay was done. Ten tablets from each brand were taken, ground into a fine powder, and from this, a portion containing 150 mg of paracetamol was placed in a 200 ml flask. To this, 100 ml of distilled water and 50 ml of 0.1M sodium hydroxide (NaOH) were added. The mixture was sonicated (mixed using sound waves) for 15 minutes, then diluted to full volume and filtered.Next, 10 ml of the filtered solution was transferred to a 100 ml flask and diluted with purified water. In another 100 ml flask, 10 ml of 0.1M NaOH and 10 ml of the filtered solution were added and diluted with distilled. water. A UV spectrophotometer was prepared to measure absorbance (how much light the solution absorbs) using 0.1M NaOH as a blank (a reference). The absorbance of the sample was measured at a wavelength of 257 nm. The same procedure was repeated for 150 mg of pure

paracetamol to get Its absorbance. This absorbance was then used to calculate the percentage of the active drug in each brand of tablets. Beer-Lambert's law was applied to determine the concentration of the drug in each sample according to British Pharmacopoeia (BP) standards.

CONCLUSION: -

"Based on the evaluation of Pacimol, Macfast, T98, Calpol, and Xykaa, it can be concluded that while each tablet demonstrates variations in terms of performance (such as efficacy, dissolution rate, or patient response), all of them fall within the acceptable standards as defined by regulatory guidelines. Although there are minor differences in certain parameters, none of the products exceed the prescribed limits, indicating that all of these brands are safe and effective for consumer use within their respective formulations."

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