



EXTRACTION OF NATURAL SUPERDISINTEGRANTS FROM POTATOS, MAIZE AND TARO (ARABI) FOR FORMULATION OF TABLETS

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Article Received on 28/06/2024

Article Revised on 18/07/2024

Article Accepted on 07/08/2024

ABSTRACT

The aim of the present exploration is to formulate Conventional Ketoprofen tablets. Ketoprofen is a non-steroidal anti-inflammatory (NSAID) medicine with analgesic, anti-inflammatory, and antipyretic goods. It's extensively used in the treatment of inflammation and pain associated with rheumatic diseases similar as rheumatoid arthritis, osteoarthritis, and in soft towel injury. Conventional Ketoprofen tablets were prepared by using wet granulation system using natural super disintegrants like Potato bounce, sludge bounce and Taro (Arabi) bounce. The set tablets were characterized for their hardness, frangibility, weight variation, decomposition time and in vitro dissolution studies. The capability of the tablet to release the medicine briskly depends on the attention and type of super disintegrants. In this study the conventional tablets containing Potato bounce, sludge bounce and Taro (Arabi) bounce used as the super disintegrants in the rate of 111. Where the F₃ shows better released of medicine. About 75.81% of the medicine was released from the tablets in 3 hours. Thus, grounded on the evaluation parameters, in vitro medicine release profile of F₃ expression containing Taro (Arabi) bounce is optimized as the stylish expression with high decomposition rate.

KEYWORDS: Conventional Tablets, Rheumatoid arthritis, Osteoarthritis, Super disintegrants, Ketoprofen, Corn starch, Taro starch, in vitro dissolution test.

INTRODUCTION

The oral route of administration has wide acceptance up to 50-60% of total dosage forms and also considered as the most widely employed route of administration due to its wide range of advantages like stability, ease of administration, accurate dosage, self-medication and patient compliance. Hence oral solid dosage forms are mostly preferred. Among all the dosage forms, the tablet dosage form is the most popular, because of ease of transportability and lower manufacturing cost. The disadvantage of oral dosage forms such as Dysphasia or difficulty in swallowing can be overcome by developing rapidly disintegrating and dissolving tablet dosage forms which dissolve in saliva and does not require water for swallowing. The faster the drug into solution, quicker the absorption and onset of clinical effects. Some drugs are absorbed from the mouth, pharynx, oesophagus, as the saliva passes down into the stomach.

Solid medicaments may be administered orally as powders, pills, cachets, capsules or tablets. These dosage forms contain a quantity of drug which is given as a single unit and they are known collectively as solid unit dosage forms, even in the case of sustained action

preparations which, technically, contain the equivalent of several normal doses of drug. The stringent formulation requirements of modern medications, the many advantages of tablet and capsule medication, coupled with expanding health services and the commitment needed for large-scale economic manufacture, have led to a steady decline in the prescribing of powders and pills. Tablets and capsules, on the other hand, currently account for well over two third of the total number and cost of medicines produced all over the world.

SUPERDISINTEGRANTS

Disintegrating agents are substances routinely included in the tablet formulations to aid in the break-up of the compacted mass into the primary particles to facilitate the dissolution or release of the active ingredients when it is put into a fluid environment. They endorse moisture penetration and dispersion of the tablet matrix. The major function of disintegrants is to oppose the efficiency of the tablet binder and physical forces that act under compression to structure the tablet. Recently new materials termed as "super disintegrants" have been developed to improve the disintegration processes. Super disintegrants are another version of super absorbing

materials with tailor-made swelling properties. These materials are not planned to absorb significant amounts of water or aqueous fluids, but planned to swell very fast. They are physically dispersed within the matrix of the dosage form and will expand when the dosage form is exposed to the wet environment. These newer substances are more effective at lower concentrations with greater disintegrating efficiency and mechanical strength.

Super disintegrants are generally used at a low level in the solid dosage form, typically 1-10 % by weight relative to the total weight of the dosage unit. Their particles are generally small and porous, which allow for rapid tablet disintegration in the mouth without an objectionable mouth-feel from either large particles or gelling. The particles are also compressible which improves tablet hardness and its friability. Effective super disintegrants provide improved compressibility, compatibility and have no negative impact on the mechanical strength of formulations containing high-dose drugs.^[1] Added to a tablet formulation to facilitate its breaking or disintegration when it contacts water in the GIT. Example: Starch - 5-20% of tablet weight. Starch derivative - Primogel and Explotab.

STARCH

Starch is a carbohydrate consisting of a large number of glucose units joined together by glycosidic bonds. This polysaccharide is produced by all green plants as an energy store. It is the most common carbohydrate in the human diet and is contained in large amounts in such staple foods as potatoes, wheat, maize (corn), rice, and cassava. It is either used as extracted from the plant and is called "native starch", or it undergoes one or more modifications to reach specific properties and is called "modified starch". Pure starch is a white, tasteless and odourless powder that is insoluble in cold water or alcohol. It consists of two types of molecules: the linear and helical amylose and the branched amylopectin. Depending on the plant, starch generally contains 20 to 25% amylose and 75 to 80% amylopectin.

It is obvious that starch has moved from its traditional role as food to being an indispensable medicine. The wide use of starch in the medicine is based on its adhesive, thickening, gelling, swelling and film-forming properties as well as its ready availability, low cost and controlled quality. From the foregoing, to think that starch is still ordinary inert excipients is to be oblivious of the influence this important biopolymer plays in therapeutic outcome of bioactive moieties. Starch has proven to be the formulator's "friend" in that, it can be utilized in the preparation of various drug delivery systems with the potential to achieve the formulator's desire for target or protected delivery of bioactive agents. Maize starch, extra white maize starch, wheat starch and potato starch are long-known and reliable excipients used as insoluble diluents that act as fillers in the formulation of tablets and capsules, and as powders for sachets, all while retaining a disintegration function. Generally,

starch is isolated from potatoes, wheat, maize (corn), rice, and cassava etc. But Starch extraction from Taro (*Colocasia esculenta*) tuber has not been reported extensively so, the purpose of this study is to extract the starch from Taro (*Colocasia esculenta*) and evaluating it, and further using taro starch as disintegrating agent in tablet formulation with overall evaluation. In short from this research activity, it can be said that taro starch can be introduced to the modern era of research, and hence it can be proved better and efficient than other natural starches mainly as disintegrants and can be further modified with various researches made over it.

GENERAL PROPERTIES OF TABLET DOSAGE FORMS

- 1) A tablet should have elegant product identity while free of defects like chips, cracks, discoloration, and contamination. Should have sufficient strength to withstand mechanical shock during its production packaging, shipping and dispensing.
- 2) Should have the chemical and physical stability to maintain its physical attributes over time.
- 3) The tablet must be able to release the medicinal agents in a predictable and reproducible manner.

IDEAL CHARACTERISTICS OF CONVENTIONAL TABLETS ARE

- 1) Mask or overcome the unacceptable taste of a drug.
- 2) Have pleasant mouth feel.
- 3) Convenience of administration and accurate dosing as compared to liquids.
- 4) They should easily disintegrate and dissolve.
- 5) Rapid dissolution and absorption of the drug, which may produce rapid onset of action.
- 6) Exhibit low sensitivity to an environmental condition such as humidity and temperature.
- 7) Allow the manufacture of tablets using conventional processing and packaging equipment at low cost.
- 8) They should have low sensitivity to environmental conditions like moisture, temperature etc.
- 9) They should have high drug loading.
- 10) Ease of administration to patients who refuse to swallow a tablet, such as pediatric and geriatric patients and psychiatric patients.

ADVANTAGES OF THE TABLET DOSAGE FORM ARE

- 1) They are unit dosage forms and offer the greatest capabilities of all oral dosage forms for the greatest dose precision and the least content variability.
- 2) Cost is the lowest of all oral dosage forms.
- 3) Lighter and compact.
- 4) Easiest and cheapest to package and strip.
- 5) Easy to swallow with least tendency for hang-ups.
- 6) Sustained release product is possible by enteric coating.

DISADVANTAGES OF THE TABLET DOSAGE FORM ARE

- 1) Difficult to swallow in case of children and unconscious patients.
- 2) Some drugs resist compression into dense compacts, owing to amorphous nature, low density character.^[2]

PLANT PROFILE

1. POTATO

Synonyms: Yam, Aaloo, Batate, Murphy, Spud, Tater

Biological Source: Tubers of Solanum

Family: Solanaceae

Chemical Constituents: It contains 25% dry matter, including 10-23% starch 1.4-3.0% high quality protein vitamins C, B₁, B₂, B₆, PP, K.

Therapeutic Uses: Treat health of eyes, protect liver from injury, prevent cancer, Promote digestion.

2. MAIZE

Synonyms: Chief cereal crop, Mealie, Sweet corn, Indian corn, Maqua.

REPARATION OF NATURAL SUPERDISINTEGRANTS: POTATO STARCH



Fig no:01.

- Take three medium size potatoes.
- Peel a raw potato and cut into small pieces and record the initial weight.
- Grind them in a motor and pestle with sufficient water.
- Here 1 % of NaCl solution used in the water to proper extraction of starch from the potatoes
- Allow the filtrate to settle. Starch rapidly settles at the bottom. Decant the starch free supernatant carefully.



Fig no: 02.

- Wash 3-4 times and decant the supernatant. Collect the compact mass of starch and allow it to dry.
- Record the final weight of isolated.^[6]

MAIZE STARCH

- Take a fresh 2-3 corn.
- Take out the corn kernels. And remove corn
- Add water and clean 1-2 times. Add water soak for 1-2 hours.

- If corn is too hard and dry soak for 6 to 12 hours until them soft.
- After 2-hour corn become soft.
- Remove it from water.
- Add soaked corn into a Grinding jar.
- Grind the corn in batches; by doing this more starch comes out.
- Add equal amount of water to grind the corn and grind until very smooth.
- Grind all the corn in same way.
- Sieve the corn mixture into a bowl.
- Add water little by little till all corn starch completely extracted.
- Keep adding water as required.
- After extracting starch, the residue can be used for compost making.
- Sieve it again using a fine strainer cotton cloth or cheese cloth.
- Cover and allow it to rest for 1 to 2 hours so that the starch separates from the water.
- After 2 hours, now the sediments are well settled.
- Pour out the water completely.
- Thick starch settles at the bottom of the bowl.
- Remove the yellow liquid, Spread sediment as a thin layer over a broad plate.
- Sun dry the wet starch for a whole day.
- After 4 hours in Sun drying, once dries it start to develop cracks.
- Collect the corn starch.



Fig No. 03.

TARO STARCH

Taro tubers was collected and cleaned properly washed. After washing outer covering layer was peeled. The tuber was than sliced and kept for drying at room temperature. After drying, the dried sliced tuber pieces were crushed in mixer grinder to form the powder. This powder is further used for extraction of starch.

EXTRACTION BY SIMPLE PROCESS

- Taro powder (50 gm) was taken and dispersed in 100 ml of water.
- The mixture was homogenized for about 30 mins, by using homogenizer.
- Resulting solution was kept overnight.

- On next day the solid and liquid layer gets separated, solid material gets deposited at the bottom of the glass beaker while the liquid floats at upper surface.
- The liquid layer is decanted and remaining sediment is washed with excess of water.
- After washing the water is decanted and the starch powder is obtained by filtration through Whatman's filter paper, powder is kept for drying.
- The obtained powder after drying is starch powder.^[8]

PRELIMINARY TESTING OF STARCH^[9] MICROSCOPIC VIEW

To see the starch granules under the compound microscope.



Fig no. 04.

IDENTIFICATION TEST^[9]**Table 01: Identification test for prepared Starch.**

Sr. No.	Test	Observation	Potato Starch	Corn Starch	Taro Starch
1.	Iodine test	Colour change to blue or black	+	+	+
2.	Mix Water + starch powder and give heat.	Formation of jelly	+	+	+

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