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# ALOEVERA MUCILAGE USE AS A BINDING AGENT FOR POORLY COMPRESSED DRUG

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## ABSTRACT

Now a days, an oversized range of pharmaceutical excipients are obtained from natural sources. Mucilages and their derivatives square measure a group of polymers extensively used in pharmaceutical dosagee forms. it acts as pharmaceutical adjuvants. A study was carried out to investigate the possibility of extracting aloe mucilage from the leaves of Aloe barbadensis and using it as a binding agent in metronidazole tablets. The binding properties of the gum extracted were investigated in lactose based metronidazole tablet formulations at completely different binder concentrations of 1%w/w, 2%w/w, 4%w/w. The present review discusses the expansive sources of mucilage, its versatile excipient property as tablet binders, disintegrating, emulsifying, suspending, gelling, stabilizing, thickening and sustained release agent obtained from aloe plants which adds an different pharmaceutical property to its uses.

**KEYWORDS:** Aloe barbadensis, binders, tablets, Mucilage, Excipients.

## INTRODUCTION

Binders are pharmaceutical excipients that are usually utilized in tablet formulations to impact cohesion on the powder mix and thus sometimes improve the flow properties of the granules.[1,2,3] They modify the cohesive properties of the granules by promoting the formation of potent cohesive bonds between particles.[4] They're used as solutions and in dry forms depending on different ingredients within the formulation and therefore the technnique of preparation.[5]

Gums are mostly long chain, straight or branched chain polysaccharides that contain hydroxyl groups that bond to water molecules.[6] Variety of plant gums/ hydrocolloids are used as binding agents, suspending or emulsifying agents in both solid and liquid dosage forms.[7,8]

These gums are usually non toxic and wide accessible hence the continuing interest.[9] Aloe gum is the yellow juice exudates made from most aloe varieties.[10] The majority of analysis done on aloe has been on its medicinal properties and it's several of such properties.

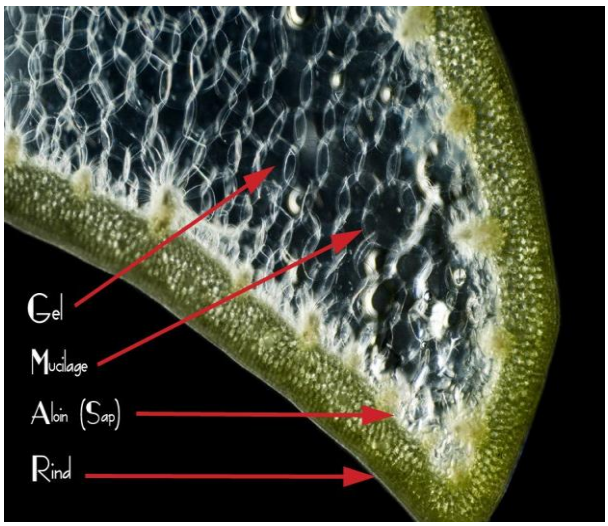


**Fig: The transversal section of Aloevera leaf.**

Its medicative properties embrace, wound healing, purgative, immunostimulation, anti-inflammatory and promotion of radiation injury repair.[11,12,13] The first elements of aloe are aloin, barbaloin, isobarbaloin, aloe emodin and resins. It additionally contains aloetic acid, galactouronic acid, glucosamine, monosaccharides and polysaccharides.[11] There's a prevailing have to be compelled to develop cheaper and simply accessible tablet excipients particularly in developing countries so as to cut back the value of production of tablets.

**Mucilage in Plant Parts**

By the term "mucilage in plants" is supposed those substances that are soluble, or a minimum of swell very perceptibly in water and that, upon the addition of alcohol, are precipitated in a very or less amorphous or granular mass. Mucilage originates within the plant either as a part of the contents of the cell or as a part of the wall thereof.[14]

**EXTRACTION AND ISOLATION OF MUCILAGE**

The fresh plant material containing mucilage is collected, cleaned with water to get rid of dirt, debris and then dried in shade. The drying of the plant material is applied in shade to prevent the degradation of any thermolabile and photosensitive constituent present if any. The dried material is grinded to make powder; the powdered material is then immersed in distilled water and kept for 06 hours, boiled for half an hour, and then allowed to stand for an hour to permit all the mucilage to release into the water. In case of thermosensitivity, the mucilage is extracted by soaking the dried part with ten times its weight of distilled water and kept for 24 Hrs without boiling. The material is then passed through an eight fold muslin cloth and squeezed to separate the marc from the solution. After this, three volume of acetone is added to the filtrate to allow precipitation of mucilage. The precipitated mucilage is separated and washed thrice with acetone to remove the traces of water. It's then dried in an oven at a temperature less than 50˚C or in vacuum. The drying of the final product should be applied with care. The dried powder is then passed through sieve no. 80 to get fine powder and stored in a desiccator so that any further moisture uptake and degradation of the product can be prevented.[15,16]

**PHARMACEUTICAL APPLICATIONS OF MUCILAGE**

Mucilages are most ordinarily used as adjuvant in pharmaceutical preparations, with wide selection of applications like binding, disintegrating, suspending, stabilizing and gelling agents. Mucilages could also be used as sustained and controlled release formulations.[17]

**a) Binding agent:** One in every of the foremost important adjuvant to be added in tablet dosage form is binder. It's used for binding powders and converting it into granules by a process called Granulation. Different mucilages from natural sources are used nearly pretty much as good binders as compared to many synthetic compounds. The tablets prepared with the plant mucilage of E. campestris showed greater hardness than the tablets prepared with starch mucilage of same concentration.[18] The mucilage obtained from the roots of Asparagus racemosus and seeds of Cassia sophera exhibits higher binding properties than the tablets prepard taking 10% starch mucilage.[19] A study was performed to hunt out the potentials of mucilage extracted from Indian hemp as tablet binder. Different batches of tablet with varying concentration of mucilage was studied.[20] The granules prepared with Fenugreek seed husk has advantage over starch as binder because it may be used without heating whereas starch should to be heated.[21] In a study, water soluble mucilage was extracted from flamboyant tree seeds. The study showed that the tablets prepared with 8-10% concentration of isolated C. pulcherrima seeds mucilage exhibited disintegration time and hardness within the standard limit compared with 10% starch binder formulation.[22]

**b) Disintegrating agent:** Disintegrants are another important pharmaceutical adjuvants added in tablet formulation. They're substances that help within the breakdown of tablets into smaller particles as soon because it comes in contact with GI fluid. They assist the tablet to disintegrate faster than tablets prepared without disintegrants. For faster release of drug from tablet, disintegration is taken inti account because the rate limiting step. In formulating a tablet, disintegrating agent help the tablet to disintegrate earlier in aqueous system.[23, 24] Mucilages swell in water to a greater extent so that they are often used as disintegrating agents. Mucilages extracted from several plants have already been evaluated for its disintegrant properties and also the process is progressing.

**c) Suspending agent:** Mucilages are used as suspending agent and help to suspend insoluble solid substances in liquid formulations. They prevent immediate sedimentation and caking because of their colloidal character and high viscosity. Their high viscous nature makes mucilage a stabilizer of choice in suspension. The suspending property of mucilages is found to be kind of like different gums, which have already been utilized in formulating pharmaceutical suspension. The extraction of mucilage from fenugreek seeds explored as suspending agent at 8% w/w concentration. The sedimentation volume of suspension formulated using fenugreek mucilage as suspending agent shows highest sedimentation volume than suspension prepared using tragacanth, acacia. Thus, it are often used as a stabilizer of choice in suspension and because of its high viscosity; it's desired especially in pharmaceutical, food and cosmetic industries.[25]

**d) Gelling agent:** Gels are pharmaceutical formulation, which are generally applied externally They're used either topically on the external skin for the control of pain But after they are applied to body cavity, have specific purpose like improvement of bioavailability, control of side effects and drug targeting. The nasal route of administration, has received a wonderful deal of attention in recent years as a convenient and reliable method not only for local but also for systemic administration of medicine. The nasal cavity offers number of individual advantages like easy accessibility, good permeability especially for lipophilic, low molecular weight drugs and avoidance of harsh environmental conditions and hepatic first pass metabolism. It's a capacity for direct delivery to

the brain and it provides direct contact of vaccines with lymphoid tissue and act as inducer yet as effectors of the mucosal system. Highly swellable mucoadhesive gels betray mucoadhesive behavior may be extremely useful in nasal delivery applications. Mucoadhesive agents in their molecular form make contact with mucin of mucosa and then make adhesion with the nasal membrane and eventually the mucoadhesive carriers allow the release of drug direct nasal membrane in a very continuous fashion.[26] Many plants contain mucilages, which give high concentration of complex sugars. When solutions of polysaccharides (hydrophilic polymer) are combined, they interact with each other; this may lead to an increase in viscosity, which becomes greater than the viscosity of every solution individually. Under certain conditions, they will even form a gel such a phenomenon is usually called as rheology synergism.[27] When these mucilage are mixed with water, protective and soothing preparation results, which may be applied externally. Mucilage of different plants has been used as gelling agent because of its non-toxicity, low cost, free availability, emollient and non-irritating nature.[28]

**e) Sustained release formulation:** A prolonged therapeutic effect are often achieved by designing sustained drug delivery system which continuously release medication over an extended period of time after its administration. This can be achieved by formulating drug loaded matrix tablets using drug of choice, retardant material and suitable additives. Drug release are often modulated by incorporating polymeric materials within the matrix system. Various mucilages are used as polymer to sustain the discharge of drug in formulations, out of which, hydrophilic polymers are the best candidate for retarding the discharge of drug. Thus there's growing interest in incorporating these natural polymers in sustained drug delivery system.[29,30,31] Mucilage extracted from the leaves of Aloe barbadensis Miller are used as a pharmaceutical adjuvant in preparing sustained release matrix tablets. A identical study showed that mucilage obtained from the dried fruit of Abelmoschus esculentus possess the property to be used as a matrix forming material for preparing sustained release matrix tablets.[32] Since the natural mucilage acts as release retardant so it are often employed to sustain the discharge of drug from matrix tablet. Thus mucilages from natural sources proved to possess good suspending properties.

## CONCLUSION

It's concluded that mucilage obtained from natural sources are often used as a tablet binder and produce tablets with good hardness, low friability, disintegration time within limit and better dissolution rate. Therefore it's versatile excipient property for typical dosage forms. So, it's become essential to explore out the new sources of plant mucilage for pharmaceutical demand.

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