ejpmr, 2018,5(8), 208-212

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

HISTORICAL PERVIEW OF TURMERIC IN INDIAN SOCIETY AND POTENTIAL OF THE NATURAL GUMS IN THE MODERN DAY FORMULATIONS

Nishant Thakur[1]*, Raman Bansal[3] and Manish Goswami[2]

[1]Asst.Professor, UIPS, Chandigarh University, Gharuan Mohali, Punjab (140413).
[2]UIPS, Chandigarh University, Gharuan, Mohali.
[3]Akal College of Pharmacy and Technical Education, Mastuana Sahib, Sangrur.

***Corresponding Author: Nishant Thakur**

Asst.Professor, UIPS, Chandigarh University, Gharuan Mohali, Punjab (140413).

Article Received on 26/05/2018 **Article Revised on 17/06/2018** **Article Accepted on 08/07/2018**

ABSTRACT

Curcuma is one of the most used condiments in the Asian countries especially India. It has been described well in the Ayurveda and has wonderful healing properties. Its use and medicinal value has remarkably drawn the attention of all researchers across the globe. A lot of work has been done on its cultivation, collection and purification. In addition to this extraction of gum has also been practiced on curcuma species. A number of natural gums are identified and extracted from different sources and have been investigated for their suitability in different formulations. These natural gums offer a advantages over synthetic polymers especially when a significant number of population is allergic to the synthetic compounds.

KEYWORDS: Cucuma, Gums, Natural, Turmeric, Rhizome, Antiallergic.

INTRODUCTION

Turmeric[1] is also credited with religious and magical rites in India and certain South-East Asian countries. Different species of Curcuma are also recognized for their ornamental. Traditionally, turmeric has been used in India for treatment of a variety of human and veterinary ailments, as a natural dye, as well as in preparation of delicious dishes. A number of curcuma varities are cultivated in India ranging from 20 improved varities of curcuma longa one improved varity of C.Amada.

Curcuma species[1] exhibit inter and intra-specific variation for the biologically active principles coupled with morphological variation with respect to the above-ground vegetative and floral characters. Curcuma is gaining importance world over as a potential source of new drug(s) to combat a variety of ailments as the species contain molecules credited with anti-inflammatory, hypocholestraemic, choleratic, antirheumatic, insect repellent, antimicrobial, antifibrotic, antivenom, antidiabetic, antihepatotoxic as well as it can be used against cancer. Curcuma species such as C. longa, C. aromatica, C. amada C. caesia, C. zedoaria (India, China, Thailand, Vietnam,etc.). A paste of turmeric is smeared topically on the head in vertigo, on body sprains, swellings, cuts, wounds, injuries, skin infection, poisonous insect/ snake/scorpion bites, pimples and foul ulcers; common cold, bronchitis and internal fevers (oral); flatulence, indigestion and diarrhoea (oral); bilary and hepatic disorders, anorexia, diabetic wounds (external or internal) in the Indian countryside. Inhaling fumes of dried turmeric rhizome is also a common practice in India for sinusitis, catarrh, coryza, fits etc.

From many studies[1] it showed that rhizome has also anatomical characters of four Curcuma spp., namely C. longa, C. aromatica, C. amada and C. zedoaria. Variations in the stereoscopic features of leaf epidemis (density, size and shape of epidermal cells, average perimeter of epidermal cells, average sectional area of the lower epidermis, stomatal density and trichome distribution of upper and lower epidermis) of some Curcuma spp. are reported from China.

Uses of Curcuma spices

- Antioxidant activity
- Antibacterial activity
- Antifungal activity
- Anti-inflammatory activity
- Platelet aggregation inhibitory activity
- Cytotoxicity
- Antiallergic activity
- Enterokinase inhibitory activity and anti tubercular Activity
- CNS depressant and analgesic activity
- Brine-shrimp lethal activity
- Hypotriglyceridemic activity

Potential of natural gums in the modern day formulations.

Kumar R et al.[2] studied the increasing in concentration of Abelmoschus esculents mucilage of (1% to 4% w/v)

as suspending agent in paracetamol suspension and compared with sodium CMC and tragacanth gum concluded that the mucilage of Abelmoschus esculentus may be used as a pharmaceutical adjuvant and as a suspending agent at 4%w/v, depending on its suspending ability and the stability of the resulting suspension. Ibezim EC et al[3] investigated Ginger starch as a binder in acetaminophen tablets. The rhizomes of ginger, Zingiber officinale had been reported to contain up to 56.0% starch. The starch was extracted from the fresh rhizomes, evaluated for relevant properties and used as a binder to acetaminophen tablets at concentrations of 2.0 - 8.0% w/w. The binding properties were found to be as good as that with the gelatin for the acataaminophen.

Kalu VD et al[4], studied the matrix properties of a new plant gum in controlled drug delivery. Gum okara has been evaluated for its controlled release matrices against the sodium carboxymethyl cellulose and hydroxyl propyl methyl cellulose on the model drug paracetamol. The results indicated that Okra gum matrices could be useful in the formulation of sustained-release tablets for up to 6 h. Anroop B et al[5] The mucilage obtained from Ocimum gratissimum was studied for its of binding properties by preparing granules with calcium carbonate using different concentrations of Ocimum and compared with acacia (5% w/w) as standard. The study showed that this could be used as the alternate to the gum acacia for its binding properties.

Sathyanarayana MU et al[6] studied on Chitosan as a tablet binder and comparison with other cellulose binder such as Sod. CMC, HPMC, and MC. He showed that granules prepared with MC had lower percentage of friability. The rank order correlation for binder efficiency was: HPMC > Chitosan > MC > Sod. CMC. Gangurde AB et al[7], studied on preliminary evaluation of Neem gum as tablet binder for pharmaceutical dosage forms. The binder concentrations used in the formulation were 2, 4, 6 & 8% w/w. It was concluded that the Neem gum to be useful for the preparation of uncoated tablet dosage form.

Emeje M et al[8], studied the isolation, characterization and compaction properties of Afzelia Africana gum exudates in hydrochlorothiazide tablet formulation. Formulation containing Afzelia gum as a binder show slower onset and lower extent of plastic deformation than those containing the two standard binders, tragacanth and gelatin and concluded that the Afzelia gum has good physiochemical properties that would made it a useful binder in hydrochlorothiazide tablet formulation. Mann AS et al[9] studied the suspending properties of Cassia tora (family Leguminosae) comparatively with those of compound tragacanth, acacia and gelatin at concentration range of 0.5-4.0% w/v in sulphadimidine suspension. Cassia tora mucilage (2.5%w/v) produced a comparable suspending ability as 4%w/v compound tragacanth. The results suggest that, due to the high viscosity of cassia tora mucilage, its mucilage can be a stabilizer of choice when high viscosity is desired.

Alebiowu G et al[10], studied on the effects of Pregelatinization of native sorghum and plantain starches on the mechanical properties of a paracetamol tablet formulation in comparison with corn starch BP. He suggested that pregelatinized starch may be useful as binders when a particular degree of bond strength and brittleness is desired.

Eichie FE et al[11], evaluated the binding properties of the gum obtained from the Cissus populnea nsd acacia sennegal on the mechanical properties of the paracetamol.1-15% of mucilage concentration were used and relative viscosities were evaluated. Improvement in the tabletting capacities was found and capping capacity of the tablet was ameliorated.

Dhumal RS et al[12], studied on evaluation of a drug with wax-like properties as a melt binder. Binding efficiency was compared with granules prepared by wet granulation using polyvinylpyrolidone (PVP K30) as a binder. The present study underlines the fact that ibuprofen may be adopted as a binder in ibuprofen formulations using the melt granulation technique. Gbadegesine E.et al[13], worked with the binder obtained from the Delonix regia seed gum and evaluated the binder and disintergrant peoperties on the drug paracetamol. The results revealed that Delonix regia seed gum may be useful as a binder and in low concentration will improve the balance between the binding and disintegration properties of tablet, while in high concentration serve the desire for a modified or sustained release tablet formulation. Patil BS et al[14], Moringa oleifera gum was used as the binder in Chloroquine phosphate tablets at different concentrations in comparison with potato starch.results were found to be comparable with the potato starch.

Deshmukh VN et al[15], Prepared the metoprolozl succinate matrix tablets using karaya gum and Guar gum; and their combination as matrix forming materials. Increase in swelling index as the gum absorbs water but after 6-8 h, there was decrease in swelling index due to erosion surface layer of tablet. The in vitro drug release studies showed that combination of karaya gum and guar gum exhibited more sustained effect than individual gum.

Jani GK et al[16] studied on mucilage from aloe barbadensis miller as pharmaceutical excipients for sustained-release matrix tablets and concluded that natural gum and mucilage have been widely explored as pharmaceutical excipients. Gum and mucilage are biocompatilble and cheap. The goal of this study were to extract mucilages from the leaves of aloe barbadensis and to study its functionality as an excipient in pharmaceutical sustain release tablet matrix tablets. Jaleh V et al[17] studied on use of natural gums and cellulose derivatives in production of sustained release metoprolol

tablets that were prepared using xanthan/guar gums and also hydroxyl prop methyl cellulose (HPMC), Carboxymethylcellulose (CMC) polymer. Increasing the xanthan gum concentration decreased the release rate of Metoprolol. Results showed that natural gums are suitable for production of sustained-release tablets of metoprolol. Rai PR et al[18], developed fast dissolving tablet (FDT) of metoclopramide HCl with5% Ca or Na salt of carbamoyethylated with direct compression, showed superior disintegrating property due to decreased water sorption time, increased particle packaging index. FDTs prepared with these polymers showed high mechanical strength and low DT.

Deveswaran R et al[19], formulated dispersible tablet of famotidine by using powder of Plantago ovata mucilage as a super disintegrating agent. The tablets showed 96.1-99.3% of the labelled amount of drug, indicating uniformity in drug content. The in-vitro dissolution profile indicated a faster and maximum of 99.4% drug release from formulation F4 proving the disintegrant property of isolated mucilage of Plantago ovata.

Khinchi MP et al[20] developed orally disintegrating tablet (ODT) of Fexofenadine HCl to show the disintegrating property of mucilage, Husk powder and seed powder of Isapghula. In-vitro dissolution studies on the optimize formulations revealed that more than 90% drug released within 10 min. Patil BS et al[21], prepared fast dissolving tablets of granisetron hydrochloride using, plantago ovata mucilage and sodium starch glycolate as super disintegrants (2.5 to 10 % w/w). Compare to sodium starch glycolate formulations, Plantago ovata formulations shows faster release of drug; this is due to more swelling property of Plantago ovata mucilage. In Formulation GPO4, the 50% and 90% of drug release was found to release within 0.43 and 2.51min. Malik K et al[22], was aimed to develop taste masked microspheres of ofloxacin using Eudragit and to prepare orodispersible tablets of the formulated microspheres using Locust bean gum as a natural superdisintegrant. locust bean gum as a natural superdisintegrant was used to formulate Drug loaded microspheres. The in-vitro release of the ofloxacin was about 97.25% within 2h.

Mehta KK. et al[23], Developed fast dissolving tablets of Nimesulide containing natural lepidium sativum known as pharmaceutical excipient as disintegrating agent. From the study, it was concluded that 10% mucilage concentration gave the higher dissolution of tablet and also the mannitol concentration was 10%. The disintegration and mean dissolution time for batch M5 was 17 sec and 5.27 sec respectively. Results were better than other tablet prepared from other synthetic disintegrating agent.

Narkhede SB et al[24], Mucilage of A. Heterophyllus at each three different concentration (4.0, 6.0, 8.0%w/v); starch gum mucilage (6.0 %w/v) was used as standard binder for comparison. An increase in binder concentration led to decrease in friability and increase in disintegration time of the tablets. Mucilage obtained from Artocarpus heterophyllus fruit possesses comparable binding properties as that of the starch gum mucilage. Emeje MO et al[25]., evaluation of okra gum as a dry binder in paracetamol tablets. Dried powdered okar gum to 0, 0.5, 1.0, 2.0 3.0, 4.0 and 5.0% w/w was mixed with paracetamol. The results indicate that compact hardness increased with increased binder concentration except. Between 0.5 and 2.0 % w/w okar gum concentration. Compacts containing gelatin as binder were less friable than those with Okar gum. Sudarshan KS et al[26], Pharmaceutical excipient of Prosopis juliflora seed Mucilage as binder. The mucilage was evaluated for its granulating and binding properties in compressed tablet, using diltiazem HCl as a model drug. Mucilage was used in four different concentrations i.e. 0.25, 0.5, 0.75 and 1.0 % w/v. Increase in concentration of mucilage increases the hardness and decrease the disintegration time. Binding property of 1% w/v Prosopis juliflora mucilage is almost equivalent to 1.0% w/v Xanthan gum.

Shivalingam MR et al[27], Cassia Roxburghii Seed Galactomannan use binder in pharmaceutical excipient formulation of Paracetamol tabletcontaining 8%, 10% and 12% binding concentration. Cassia roxburghii gum from 8% to 12%; decrease the percentage of fine, increase the hardness, increase the disintegration time, decrease the percentage of friability and decrease % cumulative release. Sivakumar T et al[28]., evaluate the gum of mangifera indica as a tablet binder employing paracetamol as a model drug. The tablet hardness and disintegration time increased with increase in binder concentration. The friability values decreased with increase in binder concentration prepared using MIG is comparable with the tablets prepared using 5%w/w gum acacia as a standard binder.

Jackson C et al[29]., Sesamum indicum gum as a binder employing paracetamol as a model drug. Seasamum indicum, Acaia and Gelatin gums were incorporated in the formulations in different proportions as binder. An increase in binder concentration increased the hardness of the tablets. Disintegration time increasesed with increase concenteration of binder and decrease the relase of drug in dissolution media.

Kumar VJ et al[30], Isolated from the bark of mucilage obtained from Grewia optiva as tablet excipient as binder. Increase in the binder concentration has also increased the hardness of tablet and decrease the friability as the binder concentration increases. Compared with starch binders and it was found that almost all the results shows similar pattern as shown by the mucilage obtained from Grewia optiva.Deshmukh TA et al[31], the Boswellia Serrata gum as binder concentrations in the present tablet were 2, 4, 6, 8, 10 and 12% w/v using aceclofenac as model drug. Starch (10% w/v) was used as binder for comparison. The

percentage friability values were reduced as the concentration of gum was increased. The tablets (12%) of Boswellia serrata showed more hardness when compared to tablets (10%) starch.

Shelke SP et al[32], Remusatia vivipara as a binder for pharmaceutical dosage forms. The tablet binder concentrations used in formulations were 2, 4, & 6% (w/w) by Wet granulation technique. The hardness of tablet was increased with increase in percentage binding agent and increase the disintegration time. Friability of the tablet decreased with the increase in the polymer concentration and 6% was found to be the optimum concentration for the tablet formulation.Kharat AR et al[33], used mucilage from Cassia absus as tablet binder in formulations were 2, 4, &6% w/w concentration by Wet granulation technique. Cassia absus gum ranged between 0.3-0.7 percent which is almost equal to that of Guar gum. Cassia absus mucilage 4%-5% use for the uncoated tablet result found were compared with the guar gum as showed improved binding and hardness.

CONCLUSION

Mother nature has given us ample amount of resources which could be utilized for the best of mankind. Natural polymer are less allergic, more environment friendly and easily available. These gums and mucilages are some time the by products in different extraction procedures hence a research could be oriented to streamline the development and procurement of more polymers for pharmaceutical formulation development.

REFERENCE

1. Bhaskaran S. Genetic resources of Curcuma: diversity, characterization and utilization. Plant Genetic Resources 3(2): 230-251.
2. Kumar R, Patil MB, Patil SR, Paschapur MS. Evaluation of Abelmoschus esculentus mucilage as suspending agent in paracetamol suspension. Int J PharmTech Res., 2009; 1(3): 658-65.
3. Ibezim EC, Ofoefule SI, Omeje EO, Onyishi VI, Odoh UE. The role of ginger starch as a binder in acetaminophen tablets. Sci Res Essays, 2008; 3(2): 46-50.
4. Kalu VD, Odeniyi MA, Jaiyeoba KT. Matrix properties of a new plant gum in controlled drug delivery. Arch Pharm Res., 2007; 30(7): 884-89.
5. Anroop B, Ghosh B, Parcha V, Vasanti S. Studies on Ocimum gratissimum seed mucilage: evaluation of binding properties. Int J Pharm, 2006; 325: 191-93.
6. Sathyanarayana MU, Pruthvipathy RK, Nuessle NO. Chitosan as a tablet binder. Drug Dev Ind Pharm, 1992; 18(15): 1701-08.
7. Gangurde AB, Malode SS, Bhambar RS. Preliminary evaluation of neem gum as tablet binder. Indian J Pharm Educ Res., 2008; 42(4): 344-47.
8. Emeje M, Ihimekpen O, Isimi C, Sabinus O, Kunle O. Isolation, characterization and compaction properties of afzelia africana gum exudates in hydrochlorothiazide tablet formulation. Afr J Pharm Pharmacol, 2009; 3(5): 265-72.
9. Mann AS, Jain NK, Kharya MD. Evaluation of the suspending properties of cassia tora mucilage on sulphadimidine suspension. Asian J Exp Sci., 2007; 21(1): 63-67.
10. Alebiowu G, Itiola OA. The effects of starches on mechanical properties of paracetamol tablet formulations. Pregelatinization of starch binders. Acta Pharm, 2003; (53): 231-37.
11. Eichie FE, Amalime AE. Evaluation of the binder effects of the gum mucilages of cissus populnea and acassia senegal on the mechanical properties of paracetamol tablets. Afr J Biotechnol, 2007; 6(19): 2208-11.
12. Dhumal RS, Shimpi SL, Chauhan B, Mahadik KR, Paradkar A. Evaluation of a drug with wax-like properties as a melt binder. Acta Pharm, 2006; (56): 451-61.
13. Gbadegesine E. Adetogun. Properties of Delonix Regia seed gum as a Novel tablet Binder Acta Poloniae Pharmaceutical Drug research, 2009; 66(4): 433-438.
14. Patil BS, Soodam SR. Evaluation of moringa oleifera gum as a binder in tablet formulation, IJRAP, 2010; 1(2): 590-596.
15. Deshmukh VN, Singh SP, Sakarkar DM. Formulation and evaluation of sustaineda release metoprolol succinate tablet using hydrophilic gums as release modifiers. Int J Pharm Tech Res., 2009; 1: 9-163.
16. Jani GK, Shah DP, Jain VC, Patel MJ, Vithalani DA. Evaluating mucilage from aloe barbadensis miller as a pharmaceutical excipient for sustained-release matrix tablets. Pharma Tech, 2007.
17. Jalesh V, Nasser T, Ali ES. Use of naural gum nad celloulose derivative in production of sustained release of metoprolol tablets. Drug delivery, 2006; 13(2): 113-19.
18. Rai PR, Tiwary AK, Rana V. Superior disintegrating properties of calcium cross-linked Cassia fistula gum derivatives for fast dissolving tablets. Carbohydrate Polymers, 2012; 87: 1098-104.
19. Deveswaran R, Bharath S, Furtado S, Basavaraj BS, Abraham S, Madhavan V. Studies on the disintegrant properties of mucilage and seed powder of plantago ovata. International Journal of ChemTech Research, 2009; 3: 621-6.
20. Khinchi MP, Gupta MK, Bhandari A, Agarwal D, Sharma N. Studies on the disintegrant properties of seed powder, husk powder and mucilage of plantago ovata by formulation of orally disintegrating tablet. International Journal of Pharmaceutical Sciences and Research, 2011; 2(1): 145-52.
21. Patil BS, Rao NGR, Rao KD. Formulation and evaluation of fast dissolving tablets of granisetron hydrochloride. International Journal of Applied Biology and Pharmaceutical Technology, 2011; 2(2): 22-8.

22. Malik K, Arora G, Singh I. Taste Masked Microspheres of Ofloxacin: Formulation and evaluation of orodispersible tablets. Sci Pharm, 2011; 79: 653-72.
23. Mehta KK, Patel HH, Patel ND, Vora CN, Patel NJ. Comparative evaluation of natural and synthetic superdisintegrants for promoting nimesulide dissolution for fast dissolving technology. International Journal of Pharmacy and Pharmaceutical Sciences, 2010; 2(3): 102-8.
24. Narkhede SB, Sagar GA, Kumar BA, Bendale RA, Patel Nk. Isolation and evaluation of mucilage of Artocarpus heterophyllus as a Tablet binder. J. Chem. Pharm. Res., 2010; 2(6): 161-166.
25. Emeje MO, Isimi CY, Kunle OO. Evaluation of okra gum as a dry binder in paracetamol tablet formulations. Continental j. Pharmaceutical sciences, 2007; 1: 15-22.
26. Sudashan KS, Sheth NR, Singh S, Dodia R. Pharmaceutical characterization of Prosopis juliflora (sw) seedmucilage-excipient. Acta Pharmaceutica Sciencia, 2010; 52: 487-494.
27. Shivalingam MR, Kumaran KSGA, Jeslin D, Reddy YVK, Tejaswini M, Madhusudhana Rao C .Cassia Roxburghii Seed Galactomannan-A Potential Binding Agent in the Tablet Formulation. J Biomed Sci and Res., 2010; 2(1): 18-22.
28. Sivakumar T, Singh AK, Shingala VK, Selvam RP. Evaluation of mangifera indica gum as tablet binder International Journal of PharmTech Research, 2010; 2(3): 2098-2100.
29. Jackson C, Akpabio E, Umoh R, Adedokun M, Ubulom P, Ekpe G. Evaluation of Sesamum indicum gum as a binder in the formulation of paracetamol granules and tablets. Research in Pharmaceutical Biotechnology, 2012; 4(1): 1-5.
30. Kumar VJ, Sati OP, Singh R. A potential natural tablet binder from Grewia Optiva. Der Pharmacia Lettre, 2011; 3(3): 120-127.
31. Deshmukh TA,Chaudhari SP, Patil PR, Tekade BW, Patil VR. Evaluation of binding properties of Boswellia Serrata Roxb. Gum in tablet Formulation J Pharm Educ Res., 2011; 2(1): 61-65.
32. Shelke SP, Aragade D, Anupama S. Preliminary Evaluation of Remusatia vivipara Mucilage as Tablet Binder. International Journal of PharmTech Research, 2011; 3(3): 1649-1651.
33. Kharat AR, Kumar A. Evaluation of binding potential of mucilage obtained from seeds of Cassia absus Journal of Pharmacy Research, 2011; 4(2): 327-328.