Biosciences, Biotechnology Research Asia Vol. **4**(2), 797-798 (2007)

Microwave assisted preparation of mucilage powder and gum from the wasteland *Prosopis juliflora*

N. BHOJAK* and BALVINDER SINGH

Green Chemistry Research Centre**,** P.G. Department of Chemistry, Government Dungar College, University of Bikaner, Bikaner - 334 001 (India).

(Received: October 18, 2007; Accepted: December 10, 2007)

ABSTRACT

In the present study, we report microwave assisted biochemical technique for the preparation of useful mucilage powder and gum. Utilization of microwave technique has not only reduced processing time but also increases the obtainable amount of gum contents from 65 % to 81 %. Thus, seeds of *Prosopis juliflora* have been used to produce mucilage powder with gum contents higher than guar. The properties of powder and gum prepared by present technique have been found better than existing method.

Key words: Microwave, Mucilage powder, *Prosopis juliflora.*

INTRODUCTION

Prosopis juliflora commonly known as Vilayti Babul or Vilayti Keekar is an exotic species of arid and semi-arid regions[1]. It is very variable, evergreen spiny or sometimes unarmed tree or shrub, with dropping branches, found in a mild or cultivated state. Its bark is grayish brown, leaves are bipinnate with 2-4 pairs of pinnae. Pinnules are 10-46 pairs and 5-20 mm long, flowers are small[2]. Pods of this plant are yellow 10-25 cm × 8-15 mm, straight or falicate, flat or cylindrical, often with transverse depressions between the seeds, in a pod 10-30 seeds are found which are ovoid, flattened hard and yellowish brown in color. It grows wild and produces large quantities of sugary pods every year. These pods are available to the tune of two million tones annually in India. These pods are good source of animal feed and may be incorporated in concentrate mixtures of animal feeds without any harmful effect from 15-30% level[3,4]. The utilization and production of materials from bio sources is the primary object of biotechnology[5]. The present work is in continuation of our earlier work[6], here we report a novel method for the preparation of gum like material from the seeds of *Prosopis juliflora* and exploration of its uses in many fields viz to produce protein hydroxylate, animal feed formulations, protein rich poultry products, sugary syrups, mucilage powder etc. In this paper, we report development of a Green technique for the preparation of mucilage powder by the use of microwave. The properties of powder prepared by this technique have been determined and compared with the existing powder.

EXPERIMENTAL

Preparation of mucilage powder

Step I: 50 g of sugary pods of *Prosopis juliflora* were dried under microwave for 2 h with interval of 10 minutes at medium power level turning the sides regularly. Than pod fragments were heated in 0.1% Triton X-100 micellar solution at 60°C for 10 minutes. Fragments were prepared by light manual hammering. The whole mass was paddled intermittently and by virtue of vessel tilting, solution containing sugars and spongy tissues was drained

off. Thus obtained pod mass was placed again in microwave in solvent free conditions for 1-2 min. Dry pod fragments were pulverized to coarse powder with small pulveriser and sieving was performed in order to get particle size in between 8-16 mesh. 25 g of thus obtained seed fragments were subjected to a sequence of microwave rolling for 30 sec five times and than for rolling-sieving-rolling by means of light medium roller and germplasm were separated.

Step II: In the second step, 50 g of endoplasm was treated successively under microwave for 1 min in dry conditions, than for 2 min under wet conditions made by distilled water and finally grounded under moist conditions. Thus obtained endoplasm was placed with 0.5% Triton X-100 solution for 2 min, than with acetic acid for 2 min and finally washed few times with distilled water. Finally, it was dried in solvent less condition for 10 min at 50 °C. Dried mass was pulverized to fine powder.

RESULTS AND DISCUSSION

It is the first report and experimentation to obtain the mucilage powder with gum contents from any plant by the use of microwave technique. The mucilage powder with gum contents of 60% and 84% have been obtained from seeds of *Prosopis juliflora*. Effects of various parameters like solvent, pH, time and rate of heating have been investigated. Results have been reported in Table 1. In general, it has been observed that microwave technique developed by us is much better than conventional technique. Further, we have also reported effect of surfactant systems for the separation and solubilization. Seeds are heavier than rest of the empty pod parts of *Prosopis juliflora*, so these can be separated from each other with the help of gravity separation devices either as whole or fragmented seeds. Separation will be easier if similar sized particles are run-down on inclined plane. Sequences of rolling-sieving-rolling may be used where due to differential rolling soft germplasm is powdered to smaller particles. Although these are primary results but these indicates clearly that gum produced by this powder is at par with guar gum and in future it may be used independently or in place of guar gum in paper, textile, food, feed and medicine industries as an adhesive, sizing and edible gums, thickener and laxative.

Table 1: Characteristic of Mucilage powder obtained from the seeds of *Prosopis juliflora*

Parameter	Mucilage powder normal method	Mucilage powder by present method
pH	5.4	5.4
Moisture	21.5 %	11.5 %
Albuminoids	5.4 %	3.4 %
Fiber	3.12 %	1.12 %
Ash	3.42 %	2.42 %
Oil	0.61 %	0.65 %
Viscosity at 25 °C	820 cps	840 cps
Gum	64.2 %	81.2 %
Na/K	0.033	0.031

REFERENCES

1. Burkart A, *J. Arn. Arb.*, **57**, 219 (1976).
2. The Wealth of India, *CSIR New Delhi*, 11 (1976)
3. Jiang X Y, Omarov R T, Zhazira S Y and Sagi M, *Plant Sciences*, **167**(2), 297 (2004).
4. Meyer D, Becker R, Gubbmann M R, Vohra P, Neukom H and Saunders R M, *J of Agri. and Food Chem.*, **34**, 914 (1986).
5. Indrayan A K, Sharnma S, Durgapal D, Kumar N and Kumar M, *Curr Sci.*, **89**, 1252 (2005).
6. Bhojak N, Kumar L and Arora A, *BioSci, Biotech Res.*, **3**(2), 197 (2005).