

ISOLATION AND IDENTIFICATION OF GUAR SEED
(CYAMPOSIS TETRAGONOLOBA) GUM

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ABSTRACT

Guar polysaccharide was extracted from its grounded seeds by using hot water, alkali and acetic acid treatments. The highest yield of this polymer (11.55%) was obtained with hot water and its $(\alpha)_D^{25}$ in water was $(+74^\circ)$ while cupperammonium complex reached (-224°) .

Silyl derivatives on G.L.C. technique showed that the monomer residues were identified as D (+) galactopyranose and D (+) mannopyranose with molar ratio 1:2, respectively.

I.R., spectrum of the polysaccharide indicated that the linkages between the units were of B-type.

The average molecular weight of guar gum was determined physically and chemically the first value was 22×10^3 , while the second was 166×10^3 .

Periodate oxidation technique indicated that the guar polysaccharide has (1 ---> 4) glycosidic linkages and a branched structure with Ca 16.7% of the units in terminal positions.

The proposed structure of guar polysaccharide might consist of 171 repeating segments, each segment composed of a main chain of four manno-opyranose units jointed by (1 ---> 4) glycosidic linkages. Each segment is also jointed with two units of galactopyranose through B (1 ---> 6) glycosidic bonds.

The technological and jelling examination of guar gum proved that it has high jelling quality and a good capacity (stability) for preservation.

INTRODUCTION

Guar belongs to leguminosae family (Gyamopsis tetragonoloba L. tab.), known as (Cyamopsis psaralioides Dc.). It was originally grown in India and recently in other many countries (Khater, 1977). Sandford and Baird (1983), reported that the total world production of guar gum reached to 90,000 tonnes (1980) since the gum has a wide range of functional characteristics exhibited by its polysaccharide. Khater (1977), stated that the guar polysaccharide has 5-8 times the thickening power of starch and it is used as a filter aid in the mining industry, textile industry, pharmaceuticals as a thickener in cosmetics and as a strengthening agent in paper industry. Also, Ibrahim et al. (1983), found that guar gum can be used as a pectin substitute in jam making and preservation.

In Egypt, nowadays several attempts for planting guar were sucessfully carried out, its yield amounted to 1.2 tonne per feddan (Khater, 1977)

Rees (1972), reported that galactomannans occur as reserve polysaccharide in seeds of many leguminous plants and guar powdered seeds contain large amounts of these galactomannans.

Smith and Montgomery (1959), McCleary et al. (1976), and Dey (1978), have confirmed that galactomannans are composed of mannopyranose residues. These residues are joined through B- (1 ---> 4) glycosidic linkages. On the other hand, the galactopyranose units were present as branches and linked through (1 ---> 6) glycosidic bonds.

McCleary (1979, 1983) concluded that D-gal-p-groups in locust bean, guar and other galactomannans of similar galactose content could be randomly distributed.

Tewari et al. (1984), have extracted a galactomannan polysaccharide from Cassia carymbosa (Leguminosae) seeds with cold, acidulated water and purified it to give a water soluble product having $(\alpha)_D^{25} + 72$, ash content 0.2% and containing D-galactose and mannose in molar ratio 4: 7. Acid catalyzed fragmentation, periodate oxidation and methylation showed that the seed gum has a branched structure consisting of a linear chain of B- (1 ---> 4) linked manno-pyranosyl units, some of which are substituted at 0-6 by two -D-(1 ---> 6) galactopyranosyl units mutually linked glycosidically.

