International Journal of Pharmaceutical Science Invention
ISSN (Online): 2319 – 6718, ISSN (Print): 2319 – 670X
www.ijpsi.org Volume 2 Issue 9‖ September2013 ‖ PP.46-48

Quantitative Evaluation of Some Physical and Chemical Properties of the Gum-Mucilage of *Anacardium Occidentale* L (Anacardiaceae)

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ABSTRACT : *Anacardium occidentale L (Anacardiaceae) is a tree that grows up to a height of 12m and strives well in most soils. This study is mainly concerned with the quantitative evaluative parameters of the stem bark exudates (gum) of the plant. The result of tested gum showed that the Moisture content was 11.68±0.11%w/w for cashew gum and 9.0±0.58%w/w for gum Arabic (used as standard); Total ash value (0.75±0.03% w/w); Acid insoluble ash value (0.10±00% w/w); Water soluble ash value (0.76±0.03% w/w); Swelling index (3.19±0.19%w/w and 5.68±0.048 for test gum and gum Arabic respectively); Alcohol extractive value (0.09±00% w/w for test sample and 0.60±0.12%w/w for gum Arabic) and Water extractive value (15.92±0.24% w/w for cashew gum and 6.20±0.23%w/w for gum acacia). The acid value was found to be 4.49 and 3.93 for A. occidentale and gum Arabic respectively; Saponification value was 11.22 for A. occidentale and 22.44 for the gum Arabic; Refractive index for test gum was 1.36 while the gum arabic has refractive index of 1.33. The results of the study could be useful in setting some diagnostic indices for the identification and preparation of a monograph of the plant.*

KEY WORDS: *Anacardium occidentale; Arabic; gum; parameters*

I. INTRODUCTION

Gums and mucilages are typically heterogeneous polyuronides with similar composition which upon hydrolysis, they yield sugars such as arabinose, galactose, glucose, mannose, xylose and various uronic acids [1] Gums as useful hydrocolloids are also contained in some seed embryos or other plant parts (in the case of pectin). They are extracted from various marine algae, and are produced by selected micro organisms. A number of semi-synthetic cellulose derivatives are used for their hydrophilic properties, and can be considered as specialized hydrocolloid gums [2]. Gums consisting of linear polymers are less soluble than those with branched constituents, and linear hydrocolloids yield solutions with greater viscosity. Marine gums are widely used as utility gums at the present time, and their competitive positions appear stable [2]. Previous workers, [3] determined that *A. occidentale* gum has the ability reduce inflammatory reactions. The anti-inflammatory effects of the stem bark extract of *A. occidentale* was reported to be potentiated or enhanced by Grape fruit juice [4].
Anacardium occidentale L tree is known to exude a gummy substance that is similar to that of gum Arabic and which may be used as a substitute in the pharmaceutical, cosmetic and in the food industry [5]. Cashew gum has been reported to be a low viscosity polysaccharide [6]. The cashew gum mucilage was found to be acidic in nature with a pH range of 4.2 – 4.7 by [7].The need to explore more natural sources of gums in addition to those already known is becoming more demanding because of its wider application in pharmacy, food supplements, printing and binding industries.

II. MATERIALS AND METHODS

About 500g of the gum powder was dissolved in about 1 litre of hot water and the resultant solution was strained to free it from insoluble matter (organic matter) by filtering, through a clean piece of linen cloth. The gum from the filterate was then extracted or precipitated using the method of [8] for gum purification and extraction. The gum was extracted severally with 95% alcohol and finally washed and dried in the oven at a temperature of 40°C for at least 3 hours and kept in an air tight container for further use.The crude gum was used to determine the ash values, moisture content, swelling index, extractive values, by the methods prescribed in the monograph unless otherwise [9, 10]. The acid value, saponification and the refractive index values were similarly determined by the official methods prescribed unless otherwise as above.

III. RESULTS

Table 1: Showing the Evaluative Chemical properties of the gums

Quantitative Parameter	*A. occidentale* gum		Gum arabic
	Crude	Purified	
Acid value	3.366	4.488	3.927
Saponification value	8.415	11.220	22.440
Refractive index	1.335	1.364	1.334

Table 2. Showing the values for some physical parameters of the gums.

Test	% w/v	
	A. occidentale	Gum Arabic
Moisture content	11.68 ±0.11	9.00±0.58
Swelling Index	3.19 ±0.19	5.68±0.05
Total ash value	0.75 ±0.03	N.D
Acid insoluble ash value	0.09 ±00	N.D
Water soluble ash value	0.76 ±0.03	N.D
Alcohol extractive value	0.09±00	0.60±0.12
Water soluble extractive value	15.9±0.24	6.20±0.23

Key note: - N.D. →Not Determined

IV. DISCUSSION

The gum of *A. occidentale* was found to have a moisture content of 11.68±0.11% w/w, swelling index of 3.19±0.19%w/w while the total ash obtained after subjecting the gum to furnace treatment was 0.75±0.03%w/w, the acid insoluble ash value and water soluble ash value were respectively 0.10±00%w/w and 0.76±0.03%w/w. The extractive values were found to be 15.92±0.24%w/w and 0.10±00%w/w for both the water and alcohol respectively. From the given results, it shows that the gum was completely extracted by the water more than the alcohol. In other words, the gum's constituents is more water soluble than alcohol.The method is designed to determine the amount of constituents that are extractable by a selective solvent under given conditions. It is good for some vegetable drugs in which there is no precise method of chemical or biological assay for their bio actives [11].

The ash value showed that the extraneous matter or organic matter was completely removed. It is also a useful parameter in the evaluation of crude drugs. It can also be inferred that the gum is non-toxic. From the results, the moisture content of 11.68±0.05%w/w obtained for the *A.occidentale* gum when compared to the 9.0±0.11%w/w for gum Arabic (gum Acacia) implies that the former has higher tendency of microbial attack than the later. It also means that the gum cannot be kept for a long time. The high moisture content is also reflected in the high water soluble extractive value of 15.92±0.24%w/w as against 6.20±0.23%w/w obtained for gum Arabic. The moisture content of the standard is lower than that of cashew gum suggestive of its high degree of purity than the cashew gum. The high water soluble extractive value, moisture content, and swelling index may suggest its usefulness in the preparation of food hydrocolloids. These parameters may also suggest the gum's instability.The refractive index which is a fundamental physical property can be used to identify the substance, confirm its purity and to measure its concentration. From the results of refractive index, the test gum 1.335 was observed to be pure as compared to the standard (gum acacia) with refractive index, 1.334.

V. CONCLUSION

As gum and mucilage, it can have wider applications in pharmacy as tablet binders, suspending agents, filling agents and also in the food industry, cosmetics and in paper and textile industries. It is therefore recommended that the pharmaceutical use of this gum as a close substitute for an official gum like *Acacia Senegal* (gum arabic) be exploited in drug formulation since it grows well in most Nigerian soils.

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