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CHEMICAL STUDIES ON SOME EGYPTIAN DESERT PLANTS (ASPHODELUS SPECIES)

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Chemical Studies on Some Egyptian
Desert Plants (*Asphodelus* species)

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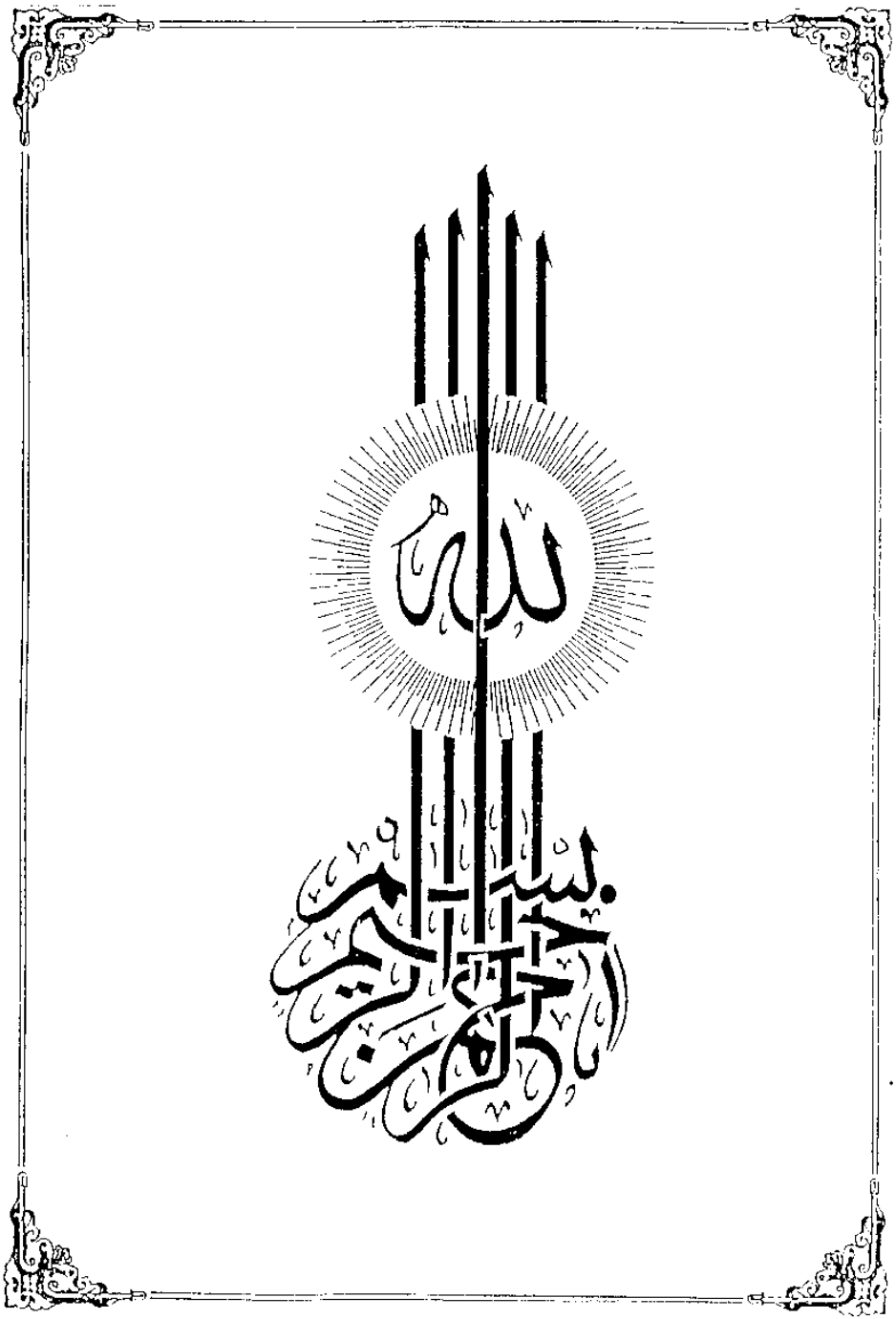

A C K N O W L E D G E M E N T

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C O N T E N T S

E X P E R I M E N T A L

Chapter I

ANTHRAQUINONES

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I N T R O D U C T I O N

Most of the Egyptian flora, which comprises about 2000 species, are desert or semi-desert plants. The majority of these plants are still not yet investigated. Our attention in the Pharmaceutical Sciences Laboratory, N.R.C. is especially drawn to the flora of the desert, and in particular drug plants as well as plants of economic potentialities. Meanwhile, the study of plants liable to cause toxicity to grazing animals is always emphasized.

The plants studied, in this work, viz. Asphodelus fistulosus and A. microcarpus are widely distributed in the Egyptian desert; the former is widely distributed in the New Valley while the later grows all over the Mediterranean Costal region.

The genus Asphodelus belongs to a family rich in medecinal plants. It includes several genera which were reported (1) as remedies in folk medicine;their value in this respect has been attributed to various constituents. These constituents may be either alkaloids as colchicine in Colchicum spp. (2), anthraquinones as in Aloe spp. (3), volatile substances as in Allium spp. (4) and glycosides as in Urginea spp. (5,6), or any other constituents.

AIM OF WORK

The recent investigation, carried out in this laboratory, on tubers of Asphodelus microcarpus, showed that it contained a fair quantity of anthraquinones. The fact that the other common species i.e. A. fistulosus was not investigated, in addition to the incomplete study of A. microcarpus, lead the author to carry the present work. This work deals with the following:

1- The study of the anthraquinone constituents of A. fistulosus.

2- The identification of the anthraquinone constituents (other than those reported) of A. microcarpus.

3- A qualitative and quantitative comparison of the anthraquinones in the different parts of the two species (leaf, seed, tuber).

4- A study of the seasonal variation of the anthraquinones of A. microcarpus (tubers) in order to select the best time of the year to collect the tubers.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Klein and Pollauf (7) recroded evidence for the presence of colchicine in Asphodelus albus Willd, but this was later refuted by Sǎntavy (8).

Levie and Marini (9) in their search for national resources of cellulose for paper pulp stated that A. ramosus, on dry basis, gave cellulose 55 %. Rovesti (10) reported on the composition of A. ramosus and discussed the possibilities of producing alcohol from it.

Arrazola (11) found that hydrolysis of asphodel-inulin, the non-cellulosic polysaccharides of the tuberous root stocks of A. albus and A. microcarpus, gives fructose which supports the growth of the yeast Torula utilis.

Arrazola et al. (12) stated that the roots of Willd A. albus and A. microcarpus were saccharified, yielding a juice containing 17.18 % sugars, mostly levulose with some dextrose.

A process for alcohol production from Asphodelus tubers was reported by Guzzi and Prunotto (13).

Tappi (14) isolated, from the anthers of A. albus xanthophyll, xanthophyll epoxide, flavoxanthin and β-carotene III in addition to other carotenoids.

Leyte (15) reported on the composition (total protein, digestible protein, fat, crude fibre, N-free extract and ash) of A. microcarpus and its possible utilization as animal food.

Khan et al. (16) studied the composition of the oil of A. fistulosus seeds. The oil contains myristic, palmitic, stearic, oleic and linoleic; the unsaponifiable matter contains fucosterol and an unidentified yellow substance.

Van Rheede van Oudtshoorn (17) detected anthraquinones (aloe-emodin, nataloe-emodin and chrysophanol) in several genera of the Liliaceae, including A. albus which contains chrysophanol and aloe-emodin as free anthraquinones; citric and malic acids were also detected.

Saeed et al. (18) reported on the amino acids composition of the proteins of A. fistulosus and suggested this protein as a possible human food source.

Colin and Neyro (19) found laevulosan, sucrose, a reducing sugar and an amorphous glycoside in tubers of