Plant Archives Volume 20 No. 1, 2020 pp. 2707-2710 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

FLAVONOID CONTENTS OF SOME SPECIES FROM CYNAREA AND CICHOREA TRIBES (ASTERACEAE) IN IRAQ

[1] *Shaima H.A. AL-Abbasi, [2] Talib O.H. Al-Khesraji and [3]Sirwan H.S. Meran

[1]Department of Biology, College of Education, University of Samarra, Iraq.
[2]Department of Biology, College of Education for Pure Sciences, Tikrit University, Iraq.
[3]Department of Biology, College of Education, University of Garmian, Iraq.

Abstract

In this study *A. flava*, *C. solstitialis*, *C. crupinastrum C. benedictus C. foetida*, *L. hispidulum*, *P. babylonica* and *T. nevskii* showed the presence of catechin, apigenin, kaempferol, gallic acid, Rutin, quercetin and caffeic acid. Other Asteraceae species studied lack some of these compounds. Results showed the presence of kaempferol in all plant species studied. Rutin (0.04-17.3 mg/gm) and gallic (0.02-0.65 mg / g) showed the highest and lowest concentrations in the species studied respectively. *A. flava*, *C. solstiticis*, *C. crupinastrum* and *O. acanthium* from Cynarea (14.04 - 26.85 mg / g) and *C. foetida* and *L.hispidulum* from Cichorea (13.01 - 55.95 mg / g). In conclusion the highest total flavonoid concent compared with other species studied. Total flavonoid content was found affected by environmental changes in the study area. Aerial plant parts showed higher flavonoid content than that of the flowers.

Key words : Flavonoid, Cynarea, Cichorea, Asteraceae.

Introduction

The Asteraceae family (compositae or Sun flower family) is the second largest plant family, including 24700-25000 species (Christenhusz and James, 2016 and Mabberley, 2017). The Asteraceae family is one of the most widespread plant family on earth. This family has a great medical and pharmaceutical importance, due to its active contents, like flavonoids, volatile oils and terpenes (Mabry and Bohlmann, 1977). Due to this active content, the family is also important as a source in human nutrition, leather and cosmatic industries and as insecticide (Adjanahoun *et al.*, 1991; Kasim *et al.*, 2014; AL-Snafi, 2015; Al-Jubory *et al.*, 2017). Asteraceae family is not included in flora of Iraq and information on its phytochemical constituent from this country is very limited. Therefore, the present study deals with the flavonoid content of some Asteraceae species from Iraq.

Materials and Methods

Plant materials

Plant materials of some species from cynarea and cichorea (Asteraceae) were collected from North and middle of Iraq, during March, 2017- March, 2018. The aerial parts of the species studied (at flowering stage) were cleaned, washed, air dried and crushed with electrical blender. The powdered samples were stored in freezer at 4°C for further analysis.

Chemical composition of the methanolic extract were determined by HPLC technique (Table 1 and Fig. 1-7).

Preparation of plant extract

0.5 gram of powder samples were added to 10 ml of 40% HPLC methanol in a glass bottles. the bottles containing the methanol mixture were placed in the ultrasonic bath for 10 minutes then filtered using the filter paper whatmann No. 1.

The supernatant was concentrated by evaporating methanol by exposing it to a stream of liquid N2 until the solution reaches 1ml.

20µl of the alcohol extract was taken per sample and injected into columns (FLC), Fast liquid chromatographic columns (Shimadzu Co.) with size (4.6 × 50 mm) and the mobile phase consists of the following compound (0.1% Acetic Acid in acetonitrile: Dionized water) and volume V / V (20:80). Measurement of

***Author for correspondence :** E-mail: Shaimaa.h.ali1986@gmail.com

samples at wavelength 264 nm and flow rate = 0.7 ml / min. The concentration of each of the flavonoid compounds was measured by comparing the standard curve of the Standard solution with the standard curves of the alcohol extract samples using the following equation. (Harborne, 1973).

Concentration of sample µg/ ml = area of sample/ area of standard × conc. of standard × dilution factor.

The dilution factor of the flowers 4 and for the aerial parts 3 and concentration of standard solution = 25 µg/ml and the area of the standard curves was as following:

Table 1: Represents the area of standard curves.

S.No.	Basic ingredients	Area
1	caffeic acid	3366
2	quercetin	8025
3	rutin	8977
4	gallic acid	68594
5	kaempferol	52670
6	apigenin	3087
7	catechin	32675

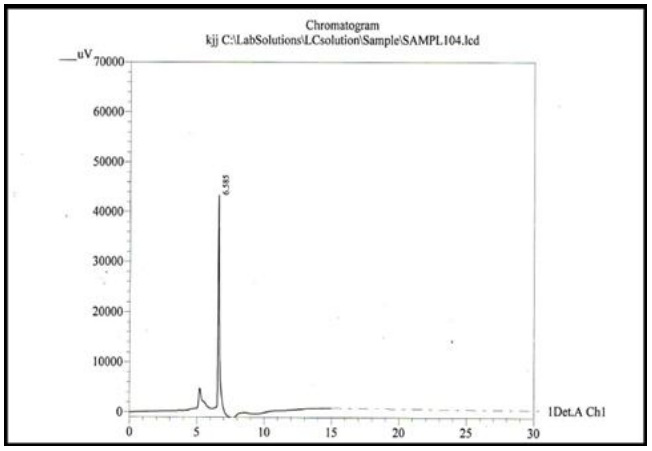

Fig. 1: Caffeic acid compound Standard curve with HPLC technology used with studied plant species.

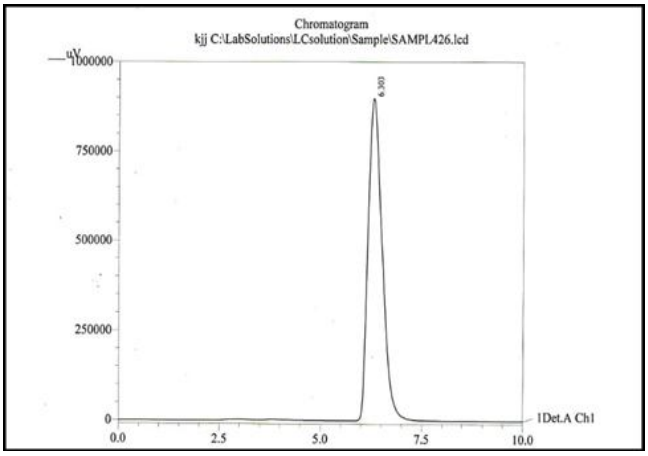

Fig. 2: Quercetin compound Standard curve with HPLC technology used with studied plant species.

Results & Discussion

Results showed the presence of catechin, apigenin, kaempferol, gallic acid, rutin, quercetin and caffanic acid in *A. flava*, *C. solstitialis*, *C. crupinastrum* and *C. benedictus* and *C. foetida*, *L. hispidulum*, *P.*

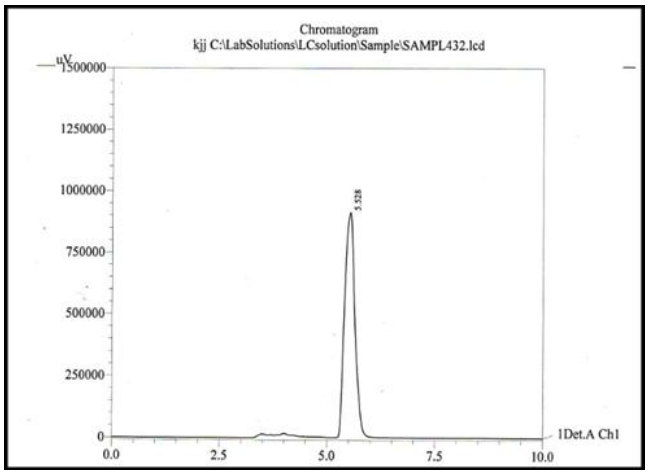

Fig. 3: Rutin compound Standard curve with HPLC technology used with studied plant species.

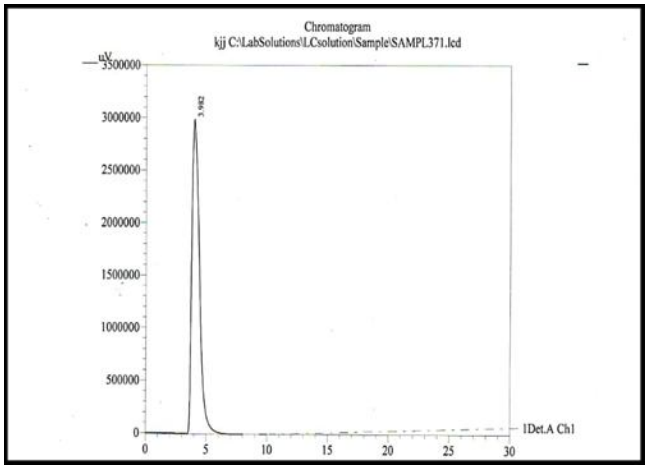

Fig. 4: Gallic acid compound Standard curve with HPLC technology used with studied plant species.

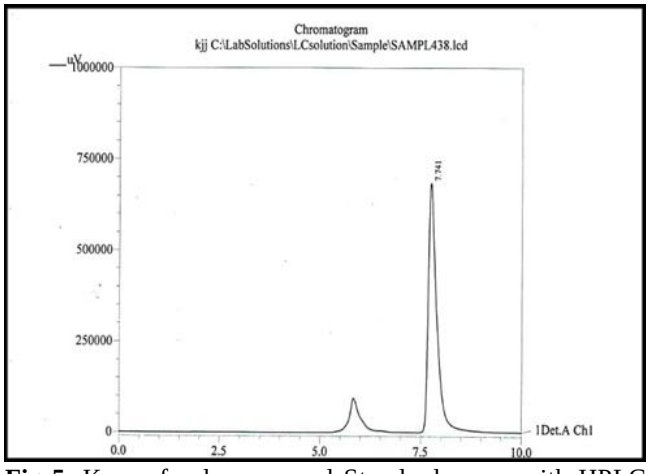

Fig. 5: Kaempferol compound Standard curve with HPLC technology used with studied plant species.

Table 2: Flavonoid content for the aerobic parts of the two species Cynarea and Cichorea.

Tribe	species	catechin	apigenin	kaempferol	Gallic acid	Rutin	quercetin	caffeic acid	Total
Cynarea	*A.flava*	0.85	7.89	1.18	0.38	4.99	1.63	0.81	17.73
	C.solstitialis	0.17	0.31	1.94	0.13	0.73	0.34	6.65	10.27
	C.bruguieriana	0.09	0.57	0.02	0.18	1.18	-	0.47	2.25
	C.crupinastrum	1.24	8.75	0.73	0.08	9.91	3.47	2.67	26.85
	C. benedictus	0.37	2.61	1.02	0.45	3.16	0.47	0.39	8.47
	C.alguridina	0.08	0.58	0.01	0.19	1.89	-	0.49	3.25
	O. acanthiu	0.40	2.84	0.20	-	7.51	1.75	1.34	14.04
middle	*S.marianum*	-	-	0.17	0.07	-	0.65	0.5	1.39
North	*S. marianum*	-	-	0.05	0.04	-	0.13	0.10	0.32
Total	*C. iberica*	-	0.51	0.17	0.43	-	-	-	1.11
Flowering	*C. iberica*	-	0.26	0.21	0.2	-	-	-	0.67
cichorea	*C. alpina*	0.04	0.29	0.04	-	0.06	0.12	0.14	0.69
	C. foetida	2.90	17.98	0.45	0.10	17.3	8.35	8.87	55.95
	H.rhagadioloides	0.04	0.32	0.02	0.14	1.09	-	1.24	2.85
	L.hispidulum	0.35	2.53	0.14	0.65	7.61	0.98	0.75	13.01
	P.babylonica	0.49	3.46	0.52	0.25	2.22	0.47	0.42	7.83
	S. semicanab	0.10	0.73	0.07	0.18	1.45	-	0.12	2.65
	T. vaginatus	0.11	-	0.40	0.25	1.23	1.13	0.78	3.9
	T. nevskii	0.03	0.31	0.14	0.06	0.51	0.36	0.28	1.69
middle	*G.tornefortii*	-	2.01	0.46	0.06	0.48	-	-	3.01
North	*G.tornefortii*	-	0.14	0.18	0.02	0.04	-	-	0.38
Total	*T.major*	0.08	0.58	0.41	0.41	-	-	-	1.48

babylonica and *T. nevskii* compared with other species studied which fluctuate in their active compounds. Regardless of environmental factors and plant part, all the studied taxa showed the presence of kaempferol (0.01 - 1.94 mg / g).In most species, the highest concentrations were exhibited by rutin (0.04 - 17.3 mg/gm) while gallic acid showed the lowest concentrations (0.02-0.65 mg/g) compared to other active compounds studied *A. flava, C. solstiticis, C. crupinastrum* and *O. acanthium* of Cynarea (14.04 - 26.85 mg / g) and *C. foetida* and *L. hispidulum* of Cichorea (13.01 - 55.95 mg / g) showed the highest total flavonoids content compared with other species studied. Results showed also that flavonoids content of the total aerial part was higher than that of the flowers.

According to the literature review this is the first report on the flavonoid content of some Asteraceae species from Iraq, among them some new taxa for the flora of this country. Concerning the flavonoids, this study was in agreement with previous reports on the flavonoid content of other Asteraceae species from Iraq not included in this study. (Mohamad, 2011) Several studies revealed the presence of caffeic acid acid (Chakavarty, 1976), catechin, epigen, kaempferol and rutin (Taskova *et al.*, 2003; Lajter, 2015) in a number of Asteraceae

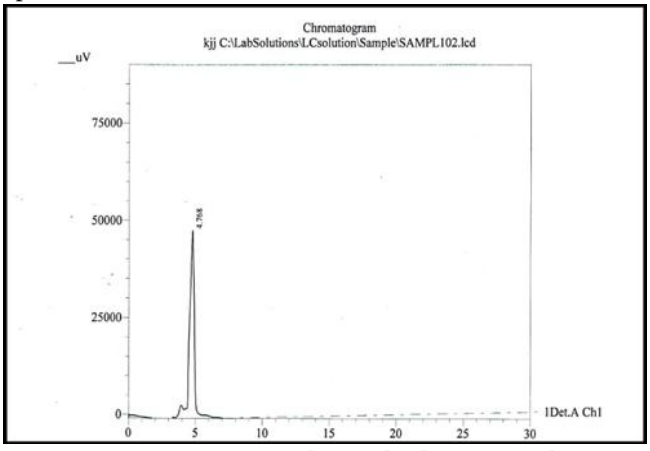

Fig. 6: Apigenin compound Standard curve with HPLC technology used with studied plant species.

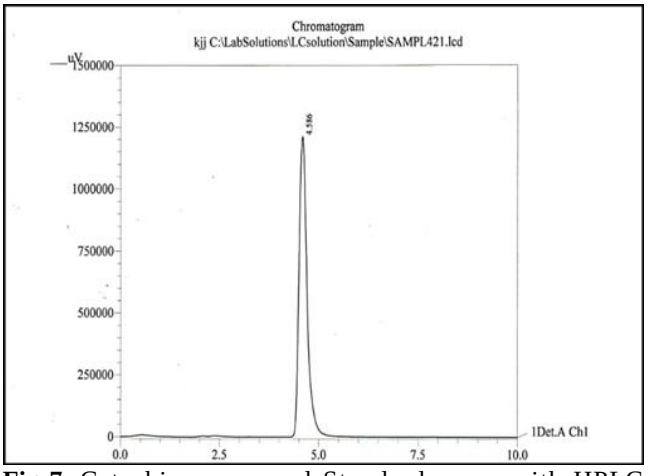

Fig. 7: Catechin compound Standard curve with HPLC technology used with studied plant species.

species from other part of the world. Plant flavonoids (like those reported here) play an important role in medical and pharmaceutical industries (Taskova *et al.*, 2003; Huyiligeqi *et al.*, 2018). Therefore, further studies on the active contents of Asteraceae are essential, especially from the medical point of view.

References

Adjanahoun, E., M.R.A. Ahyi, L. Ake-Assi, J.A. Elewude, Dramane and K. Fadoju (1991). Contribution to Ethnobotanical Floristic Studies in Western Nig. Pub. Organization of African Unity, Lagos, Nigeria: 420.

Al-Snafi, Ali Esmail (2015). The chemical constituents and pharmacological "Indian Journal of Pharmaceutical Science & Research." *Indian Journal of Pharmaceutical Science & Research.,* **5(2):** 72-82.

AL-Jubory, I., T. Mouhi and S.K. Baderen (2017). Agriculture active compound investigation of cola herb (*Artemisia abrotanum* L.) recently introduct in Iraq.

Chakravarty, H.L. (1976). Plant wealth of Iraq. Ministry of agriculture and agrarian reform. Iraq. Baghdad. 505.

Christenhuz, J.M.C. and W.B. James (2016). The number of known plants species in the world and its annual increase. *phytotaxa.,* 2.

Hegnaure, R. (1977). The Chemistry of Compositae. In : Heywood, V.H., J.B. Harborne, B.L. and Turner. (eds.). The Biology and Chemistry of Compositae, **1:** 359-381. Academic Press, London, New York.

Harborne, J.B. (1973). Phytochemical Methods. A Guide to Modern Techniques of Plant Analysis. London, New York, Champman and Hall, 278.

Huyiligeqi, Xiaoxv Dond, Jing Fu, Sali Cao and Chunjing Yang (2018). "Simultaneous Determination and Pharmacokinetic Study of Giraldoid a, Giraldoid B in Rat Plasma after Oral Administration of Daphne Giraldii Nitsche Extracts by LC–MS/MS." *Biomedical Chromatography.,* **32(3):** 1-8.

Kasim, S. Lateef, Kafayat O. Olaleye, A.B. Fagbohun, S.F. Ibitoye and O.E. adejumo (2014). "Chemical Composition and Antibacterial Activity of Essential Oils from & amp; Lt; I & amp; Gt; Struchium Sparganophora & amp; Lt; /I & amp; Gt; Linn. Ktze Asteraceae." *Advances in Biological Chemistry.,* **04(04):** 246-52. http://www.scirp.org/journal/doi.aspx?DOI=10.4236/abc.2014.44030.

Lajter, I. (2015). Biologically active secondary metabolites from Asteraceae and polygonnaceae species. Ph.D. Thesis. university of szeged, faculty of pharmacy.

Mabry, T.J. and F. Bohlmann (1977). Summary In "Biology and Chemistry of the Compositae".

Mohammad, Z.B. (2011). An anatomical and classification study of some terrestrial carbon species of the composite family (Asteraceae) Compositae In some region of Iraq. Msc Thesis. College of Education. Tikrit University.

Mabberley, D.J. (2017). Mabberleys plant-Book Aportable dictionary of plants, their classification and uses. Cambridge university press, Cambiridge, UK. 1102.

Lajter, I. (2015). Biologically active secondary metabolites from Asteraceae and polygonnaceae species. Ph.D. Thesis. university of szeged, faculty of pharmacy.

Taskova, R., M. Mitova, B. Mikhova and H. Duddek (2003). Bioactive Phenolics from *Carthamus lanatus* L. *Verlag der Zeitschrift für Naturforschung*., **58c:** 704-707.

Christenhuz, J.M.C. and W.B. James (2016). The number of known plants species in the world and its annual increase. *phytotaxa.,* 2.

Mabberley, D.J. (2017). Mabberleys plant –Book Aportable dictionary of plants,their classification and uses. Cambridge university press, Cambiridge, UK. 1102.