



ORIGINAL RESEARCH ARTICLES

Nutraceutical Analysis of *Marticaria recutita* (Chamomile) Dried Leaves and Flower Powder and Comparison between Them

Ekta Singh Chauhan¹ and Jaya Aishwarya^{2*}**Abstract**

Chamomile is known as German Chamomile (*Marticaria recutita*) and Roman Chamomile (*Chamaemelum nobile*) a very famous daisy plant. The work mainly focuses on the nutraceuticals potential of Chamomile leaf and flower of this plant. The nutrient contains of the leaf and flower power was determined by various methods. The phytochemicals screening of the leaf and flower aqueous extract was perform by different procedure. Leaf of this plant is rich in carbohydrate, protein, fat and also rich in vitamin C, iron, zinc and calcium. Whereas flower are rich in moisture and fiber as compared to leaf. The aqueous extract of leaf of Chamomile showed presence of steroids, terpenoids, flavonoids, tannins and saponins and flower were lacked in alkaloids, saponins, gale tin and phenolic compounds. The results record that leaf and flowers powder contains different types of nutrients and phytochemicals in it. Chamomile is rich in different bio active compounds, antioxidant and phytochemicals; carries many pharmacological and traditional properties. Leaves, flowers and stems of Chamomile are used as anti-oxidant, analgesic, anti-viral, anti-inflammatory, anti-septic, anti-diabetic, anti-proliferative, anti-bacterial activities and many more diseases. This paper put a light on nutrient contain and phytochemical properties of Chamomile leaf and flower.

Keywords: Chamomile; anti-oxidant; nutraceuticals; traditional properties

Introduction

Chamomile (*Matricaria chamomilla L.*) is a medicinal herb native to southern and eastern Europe; belongs to the Asteraceae family. Germany, Hungary, France, Russia, Yugoslavia and Brazil are the countries which cultivate Chamomile on large scale. The hollow, bright gold cones of the flowers are packed with disc or tubular florets and are ringed with about fifteen white ray or ligulate florets, widely as Chamomile. The two most common species of Chamomile are German Chamomile (*Marticaria recutita*) and Roman Chamomile (*Chamaemelum nobile*).

The terpenoids and flavonoids are thought to be responsible for Chamomile's medicinal properties [1].

Bioactive phenolic composition coumarins: herniarin, umbelliferone; phenylpropanoids: chlorogenic acid, caffeic acid; flavones: apigenin, apigenin-7-O-glucoside. Luteolin, luteolin-7-O-glucoside; flavonols: quercetin, rutin and flavanone: naringenin are also present in Chamomile extract [2, 3]. Chamomile oil includes chamazulene, (1-15 %) chamazulene carboxylic acid and proazulenes [4, 5]. The essential oil from Chamomile showed specific inhibition toward aflatoxin G (1) (AFG (1)) production, and (E) — and (Z)-spiroethers were isolated as the active compounds from the oil [6]. Chamomile conventional used for hay fever, inflammation, muscle spasms, menstrual disorders, ulcers, rheumatic pain and hemorrhoids [7]. Its extract has been used for mild sedative to calm nerves and reduce anxiety,

*Correspondence: aishwarya.jaya16@gmail.com

²Food Science and Nutrition Department Banasthali University, Research scholar, Rajasthan, India

Full list of author information is available at the end of the article.

to treat hysteria, nightmares, insomnia and other sleep problems [8]. Leaves, flowers and stems of Chamomile are used as anti-oxidant, analgesic, anti-viral, anti-inflammatory, anti-septic, anti-diabetic, anti-proliferative, anti-bacterial, anti-leech effect [9–11]. Menstrual disorders, sedative and hepatoprotective activities [12] and anticarcinogenic properties. Anti-oral mucositis [13], anti-ulcer activity are also present in them. Dried flowers of Chamomile are also used in herbal tea, baby massage oil, for promoting the gastric flow of secretion and for the treatment of cough and cold [14].

Material and Methods

Collection of plant materials

Chamomile leaf and flower were brought from Natural Herbs, 52/01 Moti Bhawan, Collector Ganj, Kanpur, U.P., India.

Preparation of leaves powder

Chamomile dried leaf and flower were powdered in electronic grinder and stored in air tight container for further use.

Nutrient Analysis

Nutrients were analysis by various methods like estimation of carbohydrates by Difference method [15], estimation of fat by Soxhelt method [16] and estimation of protein by Microkjeldhal method [16]. Estimation of moisture content [17], crude fiber [17] and ash [15] were also determined. Preparation of aliquot from ash for the estimation of iron by Wong's method [15] and estimation of calcium by Titrimetric method [17]. Estimation of vitamin C by Titrimetric method [17], and estimation of zinc by AOAC method [18].

Phytochemicals

The aqueous extract of Chamomile dried leaf and flower powder were extracted for the phytochemical screening like alkaloids by Mayer's test [19], glycosides by Modified Borntrager's test [20] terpenoids by Salkowski test [19], Saponins by Foam test [20]. Tannins by Gelatin test [19], phytosterol by Libermann Burchard's test [20], flavonoids by Alkaline Reagent test [20], phenolic compound by Ferric Chloride test [20]. Steroids [21] and gale tin [22] were also determined.

Results & Discussion

In Table No. 1, showed that nutrient composition in Chamomile dried leaf and flower powder. If we compare nutrient contain of macro nutrient carbohydrate, protein, fat, ash are more in leaves

while moisture and fiber is more in flower. Micro nutrient are also present in Chamomile such as vitamin C, iron, zinc and calcium if we see in leaf and flower we can notice that these micro nutrient are rich in leave as compression to flower.

In Table No. 2 showed that Chamomile leaf is rich with tannins, phytosterol, terpenoids, steroids, phenolic compounds, flavonoids and gale tin and deficient in alkaloids, glycosides, saponins and anthraquinones. Whereas Chamomile flower is enclose with tannins, phytosterol, terpenoids, steroids and flavonoids. Whereas deficient in alkaloids, glycosides, saponins, phenolic compounds, anthraquinones and gale tin

Table 1 Nutrients Analysis of Chamomile Dried Leaf and Flower Powder

S.No.	Nutrients	Amount	
		Leaves	Flower
1.	Moisture	20.33gm	22.20gm
2.	Protein	1.25gm	0.87gm
3.	Fat	3.2gm	2.4gm
4.	Fiber	10.8gm	17.2gm
5.	Ash	12.00gm	9.8gm
6.	Carbohydrate	52.12gm	47.43gm
7.	Iron	8.4 mg	5.6 mg
8.	Vitamin C	17.64mg	16.47mg
9.	Calcium	20.04mg	14.02mg
10.	Zinc	33.31ppm	27.06ppm

Table 2 Phytochemical Analysis of Chamomile Dried Leaf and Flower Powder Extract

S.No.	Phytochemicals	Chamomile	
		Leaves	Flowers
1.	Alkaloids	-	-
2.	Glycosides	-	-
3.	Tannins	+	+
4.	Saponis	-	-
5.	Phytosterol	+	+
6.	Terpenoids	+	+
7.	Steroids	+	+
8.	Phenolic Compound	+	-
9.	Flavanodis	+	+
10.	Anthraquinones	-	-
11.	Galetin	+	-

Traditionally, Chamomile has been used for centuries as a mild astringent and healing medicine. As a traditional medicine, it is used to treat wounds, ulcers, eczema, gout, skin irritations, bruises, burns, canker sores, neuralgia, sciatica, rheumatic pain, hemorrhoids, migraine, headache, mastitis and other ailments [23, 24]. Externally, Chamomile has been used to treat diaper rash, cracked nipples, chicken pox, ear and eye infections, disorders of eyes including blocked tear ducts, conjunctivitis, nasal inflammation and poison ivy. Chamomile is widely used to treat inflammations of the skin and mucous membranes, and for various bacterial infections of the skin, oral cavity and

gums, and respiratory tract [25]. Chamomile in the form of an aqueous extract has been frequently used as a mild sedative to calm nerves and reduce anxiety, to treat hysteria, nightmares, insomnia and other sleep problems [26]. Chamomile has been valued as a digestive relaxant and has been used to treat various gastrointestinal disturbances including flatulence, indigestion, diarrhea, anorexia, motion sickness, nausea and vomiting. Chamomile has also been used to treat colic, croup and fevers in children [27–29]. It has been used as an emmenagogue and a uterine tonic in women. It is also effective in arthritis, back pain, brain tonic, bedsores and stomach cramps [30–35].

Conclusions

Chamomile has been used as an herbal medication since aged. There is a need for protract h spotlight on pre-clinical studies with Chamomile linking animal and human models on different diseases. This may then be as a result validated in clinical trials that will help in developing Chamomile as a promising therapeutic agent. Without such confirmation, it will remain unclear that these can be medical treatments are truly beneficial. Chamomile preparations could be safe and provide therapeutic benefits. We can clearly that leaves are richer than flower and due to presence of all these nutrients and phytochemicals Chamomile cures many diseases.

Authors' contributions

Aishwarya Jaya contributed to the conceptualization of the topic, intellectual content, data acquisition, design and literature study. Dr Ekta Singh Chauhan contributed to the manuscript editing.

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Author details

¹Department of Food Science and Nutrition, Banasthali University,, Associate Professor, Rajasthan, India.. ²Food Science and Nutrition Department Banasthali University, Research scholar, Rajasthan, India.

References

- [1] Carter CW, Boyd M, Nelson M. Drug Interactions with Dietary Supplements. *Pharm Damerica's Pharmacist*. 2012;37-52.
- [2] McKay DL, Blumberg JB. A review of the bioactivity and potential health benefits of Chamomile tea (*Matricaria recutita* L.). *Phytotherapy Research*.2006;20(7):519-530.
- [3] Repca`k M, Smajda B, Kovacik J, Eliasova A. Circa- dian rhythm of Z- and E-2-beta-D:- glucopyranosyloxy-4- methoxy cinnamic acids and herniarin in leaves of Matri- caria chamomilla. *Plant Cell Reports*.2009;28(7):1137-1143.
- [4] Jakubcova Z, Zeman L, Horiky P, Mrkvicova E, Mares P, Mrazkova E, Stastnik O. The influence of the addition of Chamomile extract to the diet of chickens. *Mendel Net Conference*. 2014;147-150.
- [5] Ramadan M, Goeters S, Watzer B, Krause E, Lohmann K, Bauer R, Hempel B, Imming P. Chamazulene carboxylic acid and matricin: a natural profen and its natural prodrug, identified through similarity to synthetic drug substances. *Journal of Natural Product*.2006;69(7):1041-1045.
- [6] Yaguchi A, Yoshinari T, Tsuyuki R, Takahashi H, Nakajima T, Sugita-Konishi Y, Nagasawa H, Sakuda S. Isolation and identifica- tion of precocenes and piperitone from essential oils as specific inhibitors of trichothecene production by *Fusar- ium graminearum*. *Journal of Agricultural and Food Chemistry*.2009;57(3):846-851.
- [7] Svehlikova V, Bennett RN, Mellon FA, Needs PW, Piacente S, Kroon PA, Bao Y. Isolation, identification and sta- bility of acylated derivatives of apigenin 7-O- glucoside from Chamomile (*Chamomilla recutita* [L.] Rauschert). *Phytochemistry*.2004;65(16):2323-2332.
- [8] Avallone R, Zanolli P, Puia G, Kleinschnitz M, Schreier P, Baraldi M. Pharmacological profile of apigenin, a flavonoid isolated from *Matricaria chamomilla*. *Biochem Pharmacol*.2000;59:1387-1394.
- [9] Gupta V, Mittal P, Bansal P, Khokra SL, Kaushik D. Phar- macological potential of *Matricaria recutita*-a review. In- ternational Journal of Pharmaceutical Sciences and Drug Research.2010;2(1):12–16.
- [10] Shoara R, Hashempur MH, Ashraf A, Salehi A, Dehshahri S, Habibagahi Z. Efficacy and safety of topical *Matricaria chamomilla* LL. (*Chamomile*) oil for knee osteoarthritis: A randomized controlled clinical trial. *Complementary Therapies in Clinical Practice*. 2015;21(3):181-187.
- [11] Bahmani M, Abdi F, Adineh A, Hassanzadazar H, Eghbali B, Gholami-Ahangaran M, Rafieian-Kopaei M. The anti-leech ef- fect of ethanolic extract of *Achillea millefolium* L. compared to levamisole and niclosamide on *limnatis nilot- ica*. *Studia Universitatis "Vasile Goldis,". Life Sciences Series*.2014;24(3):293-297.
- [12] Hajjaj G, Bounihi A, Tajani M, Chebraoui L, Bouabdellah M, Cherradi N, Lamiaa R, Cherrah Y, Zellou A. Acute and sub-chronic oral toxicity of standardized water extract of *Matricaria chamomilla* LL. in Morocco. *International Journal of Universal Pharmacy and Bio Sciences*. 2015; 4(1): 1-14.

- [13] Mazokopakis EE, Vrentzos GE, Papadakis JA, Babalis DE, Ganotakis ES. Wild Chamomile (*Matricaria recutita* L.) mouthwashes. in methotrexate-induced oral mucositi *Phytomedicine*. 2005; 12(1-2): 25-27.
- [14] Singh O, Khanam Z, Misra N, Srivastava MK. Chamomile (*Matricaria chamomilla* LL.): an overview. *Pharmacognosy Reviews*. 2011; 5(9): 82-95.
- [15] National Institute of Nutrition, Indian council of medical research, A manual of laboratory techniques. Hyderabad, A.P., India: Silver Prints. 2003.
- [16] Sadasivam S, Manickam A. *Biochemical Methods*. New Age International Publisher. 1996.
- [17] Sharma S. *Experimental and Techniques in Biochemistry*. 1st edition. New Delhi, India: Galgotia Publication (Pvt) Ltd.2007.
- [18] George W, Latimer JR. *Official Methods of Analysis of AOAC International*. 20th edition. USA: AOAC International Publication. 2016.
- [19] Ayoola GA, Coker HAB, Adesegun SA, Adepoju-Bello AA, Obaweya K, Ezennia EC, Atangbayila TO. Phytochemical screening and antioxidant activities of some selected medicinal plants used for malaria therapy in Southwestern Nigeria. *Tropical Journal of Pharmaceutical Research*. 2008;7(3): 1019-1024.
- [20] Tiwari P, Kumar B, Kaur M, Kaur G, Kaur H. Phytochemical screening and extraction: a review. *Internationale Pharmaceutica Scientia*. 2011; 1(1): 98-106.
- [21] Zohra SF, Meriem B, Samira S, Muneer AMS. Phytochemical Screening and identification of some compounds from Mallow. *Journal of Natural Product and Plant Resources*. 2012; 2(4): 512-516.
- [22] Brindha P, Sasikala B, Purushothaman KK. Pharmacognostic studies on Merugan kizhangu. *Bulletin of Medico-Ethno-Botanical Research*. 1981; 3: 84-96.
- [23] Kassi E, Papoutsi Z, Fokialakis N, Messari I, Mitakou S, Moutsatsou P. Greek plant extracts exhibit selective estrogen receptor modulator (SERM)-like properties. *Journal of Agricultural and Food Chemistry*. 2004; 52(23): 6956-61.
- [24] Awang -Dennis VC. Taylor and Francis group. New York: CRC Press. *The herbs of Choice: The therapeutic use of Phytomedicinals*. 2006; 292.
- [25] Martens D. Chamomile: the herb and the remedy. *The Journal of the Chiropractic Academy of Homeopathy*. 1995; 6: 15-18.
- [26] Newall CA, Anderson LA, Phillipson JD. *Herbal medicine: A guide for health care professionals*. London: Pharmaceutical Press. 1996; 296: 996.
- [27] Crotteau CA, Wright ST, Eglash A. Clinical inquiries; what is the best treatment for infants with colic? *The Journal of Family Practice*. 2006; 55: 634-636.
- [28] Sakai H, Misawa M. Effect of sodium azulene sulfonate on capsaicin-induced pharyngitis in rats. *Basic & Clinical Pharmacology Toxicology*. 2005; 96: 545-5.
- [29] Peña D, Montes de Oca N, Rojas S. Anti-inflammatory and anti-diarrheic activity of *Isocarph cubana* Blake. *Pharmacologyonline*. 2006; 3: 744-749.
- [30] Wang Y, Tang H, Nicholson JK, Hylands PJ, Sampson J, Whitcombe I, Stewart CG, Caiger S, Oru I, Holmes E. Metabolomic strategy for the classification and quality control of phytomedicines: A case study of Chamomile flower (*Matricaria recutita* L.). *Planta Medica*. 2004; 70: 250-255.
- [31] Mohammad SM. Study on Cammomile (*Matricaria chamomilla* LL.) Usage and Farming. *Advances in Environmental Biology*. 2011; 5(7): 1446-1453.
- [32] Garcia-Pinto AB, Santos-Filho SD, Carvalho JJ, Pereira MJ, Fonseca AS, Bernardo-Filho M. In vitro and in vivo studies of an aqueous extract of *Matricaria recutita* (German Chamomile) on the radiolabeling of blood constituents, on the morphology of red blood cells and on the biodistribution of the radiopharmaceutical sodium pertechnetate. *Pharmacognosy Magazine*. 2013; 9(36): 49-56.
- [33] Blumenthal M, Goldberg A, Brinckman J. *Herbal Medicine: Expanded Commission E Monographs*. Newton, MA: Lippincott Williams & Wilkins. 2000:57-61.
- [34] Lee SH, Heo Y, Kim YC. Effect of German Chamomile oil application on alleviating atopic dermatitis-like immune alterations in mice. *Journal Veterinary Science*. 2010; 11(1): 35-41.
- [35] Chauhan ES, Jaya A. Chamomile An Ancient Aromatic Plant - A Review. *Journal of Ayurveda Medical Sciences*. 2017; 2(4): 251-5.