



Effect of Integrative Korean Medicine Treatment for Tear of Supraspinatus Tendon: A Case Report

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극상근건 파열에 대한 복합 한방치료의 효과 : 증례보고

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A 53-year-old woman with right shoulder pain after falling down presented at our outpatient department after conventional treatment that had little effect. She was treated with integrative Korean Medicine treatment as an outpatient from February 2, 2022 to July 4, 2022. Based on Magnetic Resonance Imaging (MRI) findings, the patient was diagnosed with a right rotator cuff tear. With 39 treatment sessions, Numeric Rating Scale (NRS) score decreased and showed improvement in assessment. On May 6, MRI was retaken to show restoration of the supraspinatus tendon tear. The patient felt almost no pain on July 4, declaring the end of treatment. This successful case suggests that integrative Korean Medicine treatment might be an attractive alternative for severe rotator cuff tears.

Key words : rotator cuff tear, supraspinatus tendon tear, acupuncture, Korean medicine

Introduction

A rotator cuff is a group of muscles and tendons surrounding the shoulder joint that comprises subscapularis, supraspinatus, infraspinatus, and teres minor muscles. A rotator cuff provides dynamic stabilization of the glenohumeral joint, as well as contributes to shoulder movement¹⁾. Rotator cuff disorders are the most common cause of disability related to the shoulder²⁾. Rotator cuff disorders span a spectrum of pathology, beginning with tendon impingement

in the subacromial space to partial tears and full-thickness tears that may range from small to massive. Among them, a tear of the supraspinatus tendon is the most prevalent, comprising over 95% of total rotator cuff injuries, as its attachment site is exposed to frequent forces³⁾.

Treatment options for rotator cuff disorders range from physical therapy to surgical repair. Despite various research on the management of rotator cuff tears, surgical standards are dubious and are not uniform⁴⁾. American Guidelines consort on recommendation for the repair of a full-thickness

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rotator cuff tear was weak as compared to conservative treatment⁵). Even after surgery, pain can last, and functional disability can become a chronic problem, thus lowering quality of life. As conservative treatment is the first-line treatment for rotator cuff tear, with its own risks and limits, existing available evidence suggests that acupuncture is effective in lowering pain and restoring shoulder function^{6,7}. Add to this, with visible image proof, this study strongly supports that Korean medicine may be a powerful alternative treatment option.

Case

On July 15, 2021, a 56-year-old female, a housewife experienced pain in the right shoulder that developed after falling down, placing her right hand over the water gauge. Right after, she went to local orthopedics and took an X-ray, to be diagnosed with 'stretching of ligament.' She then received physiotherapy and oral medication. She intermittently went to the local orthopedics and a local Korean medicine clinic to take physiotherapy and acupuncture when her pain got worse. Without certain improvement, on February 4, 2022, she visited Daejeon Jaseng Hospital of Korean Medicine as an outpatient. The patient's treatment period was from February 4, 2022 to July 2, 2022 (total 39 treatment sessions). The patient's past medical history were:

Acute cataract operation (July, 30, 2021); breast cancer operation (July 2010). HBV carrier from maternal infection. Last follow-up in June, 2019, and inactive.

1. Radiology

The results of MRI imaging made on February 4 and May 6, 2022 are shown in Fig. 1, 2.

2. Treatment methods

1) Acupuncture/pharmacopuncture treatment: Shinbaro3 pharmacopuncture (Jaseng Wono Tangjunwon, Namyangju, Korea) was applied to the right side at LI15 and near the insertion of the supraspinatus tendon every session. Shinbaro3 pharmacopuncture was applied to the right side at LI16 and near subacromial bursa on alternate session. 2 cc per session was injected by applying 26 gauge×38 mm needle with a disposable 3 ml/cc syringe (Sungshim Medical, Bucheon, Korea). The depth was approximately 3 cm to 3.5 cm.

Acupuncture was performed after sterilizing the skin with ethanol around the needling points. A total of 6-8 standard, disposable sterile acupuncture needles [0.25×30 mm (Dong-bang Acupuncture, Seongnam, Korea)] were used per session. The acupoints included SI12, SI13, TE14, TE15 and LI11. The depth was approximately 1 cm to 2.5 cm. Electro-acupuncture (1~25 Hz) was applied at 2 acupoints using a low-frequency machine (STN-330 Stratek, Anyang, Korea) and retained for 10 minutes (Table 1).

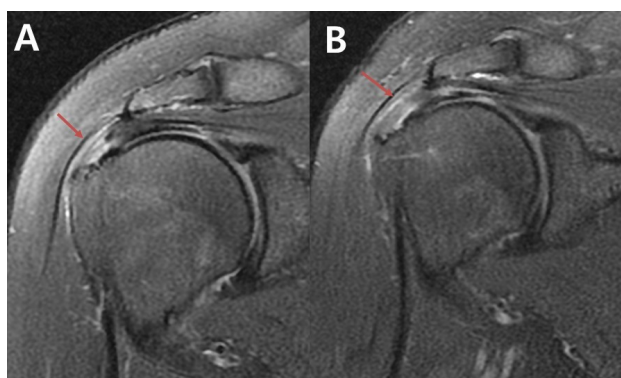


Fig. 1. MRI imaging, coronal view.
Red arrow points supraspinatus tendon. (A) February 4, 2022. (B) May 6, 2022.

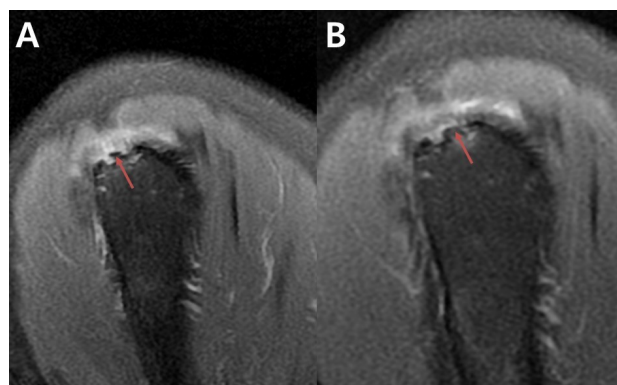


Fig. 2. MRI imaging, sagittal view.
Red arrow points supraspinatus tendon. (A) February 4, 2022. (B) May 6, 2022.

Table 1. Details of interventions using the STRICTA 2010 checklist

Item	Details
Acupuncture rationale	1a) Acupoints were selected based on traditional Korean medicine meridian theory in treating right shoulder pain. 1b) Acupuncture treatment was administered for its anti-inflammatory, pain-relieving and promoting local vascularity effects. 1c) Needles were removed when the patient complained of too much pain in the area.
Details of acupuncture	2a) 6~8 needles were used per session. 2b) SI12, SI13, TE14, TE15, LI11 2c) The depth of inserted needles was between 1 cm and 2.5 cm. 2d) Any manipulations to induce de-qi sensation were not adopted. 2e) Electrical stimulation was applied using a low-frequency device (STN-330 Stratek, Anyang, Korea). 2f) Needles were retained for 10 minutes. 2g) 0.25×30 mm disposable stainless steel needles were used (Dong-bang Acupuncture, Seongnam, Korea).
Treatment regimen	3a) The patient received 39 sessions of acupuncture treatment. 3b) Acupuncture was administered once a day during outpatient session (about 1.83 sessions per week, 7.6 sessions per month). Each session took 20 to 30 minutes.
Other components of treatment	4a) Pharmacopuncture treatment based on the meridian theory was performed every session. Herbal treatment was taken 2 times a day for 60 days. 4b) The patient was informed about their diagnosis and treatments.
Practitioner background	5) 1 Korean medicine doctor with 25 years of clinical experience conducted treatment in the treatment room.
Control or comparator intervention	6a) This study was not relevant because there was no control group. 6b) This study was not relevant because there was no control group.

Table 2. The composition of herbal medicine

Herbal medicine	Herbal components (g)
Gyunbiyanggeun-hwan	Poria Sclerotium 0.306, Ginseng Radix 0.153, Achyranthis Radix 0.026, Asini Corii Colla 0.013, Rehmanniae Radix 0.613, Cervi Parvum Cornu&Cervi Cornu 0.064, Mel 0.306, Cinnamomi Ramulus 0.013, Arisaematis Rhizoma 0.006

Table 3. Range of motion of shoulder before (session 1) and after treatment (session 39)

	Flexion (°)	Extension (°)	Abduction (°)	Adduction (°)	Internal rotation (°)	External rotation (°)
Session 1	70/180	20/60	60/180	60/75	40/80	45/90
Session 39	170/180	50/60	160/180	75/75	80/80	80/90

2) Cupping: Fumigated 37 mm diameter disposable cupping was used to prevent infection (Korea, Boryung, Eastern acupuncture equipment manufacturer). Dry and wet cupping was performed on the right side at TE15 and SI11 once a session for 10 minutes.

3) Herbal medicine: Patient intake herbal medicine (Table 2) orally twice a day from February 4 to April 5.

4) Ethical statement: This study was conducted under the Institutional Review Board of the Daejeon Jaseng Korean Medicine Hospital (IRB File no.: 2022-10-020) to protect the patient’s personal information.

3. Assessments

1) Numeric rating scale: The Numeric Rating Scale (NRS) is an 11-point scale used to quantify pain⁸⁾. NRS scores were taken every treatment session to record the amount of pain relief and the effect of the treatment.

2) Range of motion: Range of motion (ROM) is a basic part of the shoulder physical exam. The normal ROM of the shoulder⁹⁾ is shown in Table 3. ROM was checked to compare the patient’s shoulder function.

3) European Quality of life-5 Dimensions: EQ-5D-5L is a widely used instrument that evaluates the generic quality of life which measures five dimensions: mobility, self-care,

usual activities, pain/discomfort, and anxiety/depression¹⁰. EQ-5D-5L was taken to compare the patient's health status before and after treatment.

4) Shoulder pain and disability index: The Shoulder Pain and Disability Index (SPADI) was established to measure shoulder pain and disability. The SPADI contains 13 items that assess two domains: pain and disability¹¹. SPADI was taken to check shoulder pain and disability before and after the treatment.

4. Progress note

On the 1st day of outpatient treatment session (February 4, 2022), the pain in right shoulder was NRS 6 score, while the EQ-5D-5L and SPADI scores were 0.498 and 83.85, respectively (86 for pain, 82.5 for disability). The patient felt pain in almost all ROM of the shoulder, extreme pain when she continued to resist abduction (see Table 3). She showed a positive sign in empty can and full can test, painful arc sign and muscle weakness. On February 26, the pain was slightly more reduced to the NRS score of 5. On March 26, the pain

was greatly reduced with the NRS score of 4. On April 15, her pain much reduced by daytime, with a little remaining night pain, with the NRS score of 3. On April 23, her pain was much reduced, with the NRS score of 2. On May 27, her NRS score was 1, with a complete restoration of internal rotation. On June 28, she said she had little pain, with the NRS score of nearly 0. On July 2, she felt no pain at all and completed treatment. The ROM recovered to the normal level. The EQ-5D-5L and SPADI scores were 0.841 and 6.92, respectively (12 for pain, 3.75 for disability) (Fig. 3, 4).

Discussion

Patients with the rotator cuff tendon tear feel severe pain mostly on the anterior part of the shoulder, which aggravates when using their arms, and nocturnal pain which can lead to sleep deprivation¹². In physical examination, there is a limit of active ROM, especially in resisted abduction motion, and can be specified by special tests like the Neer test, drop

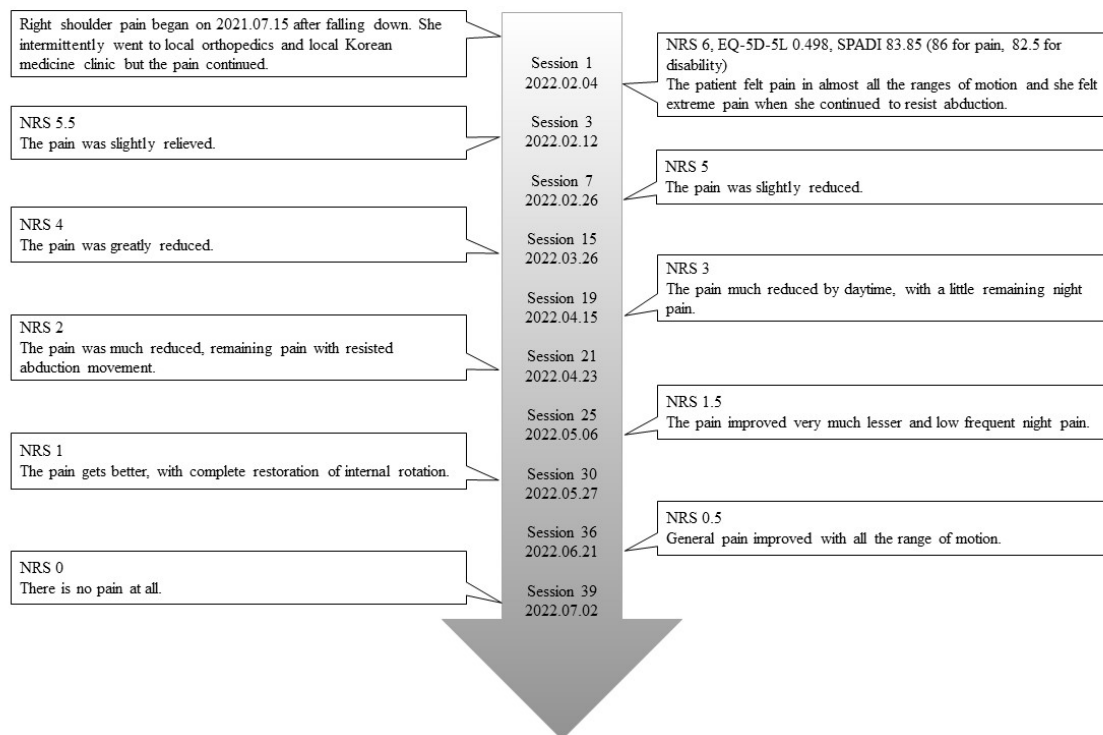


Fig. 3. Timeline of patient history and clinical symptoms.

NRS, Numeric Rating Scale; EQ-5D, European Quality of Life-5 Dimensions; SPADI, Shoulder Pain and Disability Index.

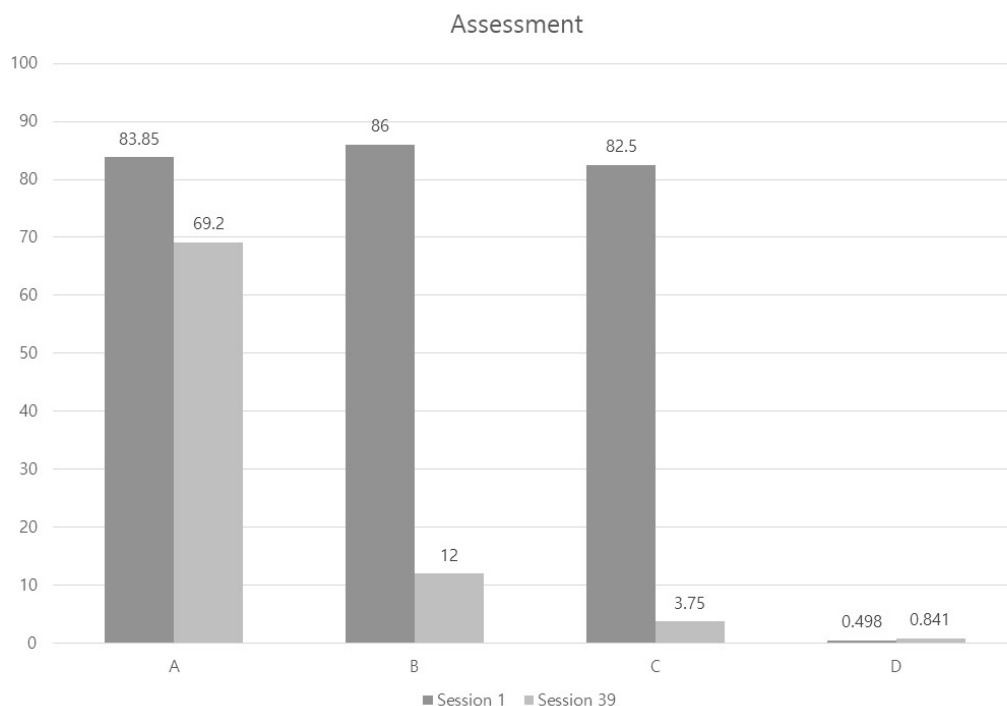


Fig. 4. Changes in SPADI and EQ5D scores.

(A) SPADI (Session 1 vs. Session 39), (B) Pain (Session 1 vs. Session 39), (C) Disability (Session 1 vs. Session 39), (D) EQ-5D-5L (Session 1 vs. Session 39). EQ-5D, European Quality of Life-5 Dimensions; SPADI, Shoulder Pain and Disability Index.

arm sign and painful arc sign¹³. If the tear progresses further, muscle weakness could be seen during abduction movement. Progression is more severe when the initial thickness exceeds 50%, showing the majority of tear progression¹⁴.

With the development of imaging, rotator cuff tear can be more accurately diagnosed. MRI is the most sensitive, in-depth and non-invasive imaging that can more specifically diagnose tear of tendon¹⁵. In this case report, we diagnosed the patient with supraspinatus tendon tear with subacromial bursitis. With a complex Korean medicine treatment, the pain was reduced from NRS 6 to 0, ROM was restored to normal level, and EQ-5D-5L and SPADI were considerably restored. The distinctive finding of this research is that the patient actually showed restoration of tear in MRI--full-thickness and almost full-width tear to partial tear-- about 3 months (92 days) after the first treatment session, in about 10 months (296 days) after the onset of the symptoms.

We used acupuncture and pharmacopuncture at acupoints that are close to the lesion and are widely used for shoulder pain in traditional literature. The known mechanism of

acupuncture is the provision of analgesic and anti-inflammatory effects, which occurs by releasing chemical compounds that relieve pain, overriding pain signals in the nerves, and lowering swelling. Another mechanism is to increase local vascular flow that can temporarily normalize relative hypoxia and low pH which is a feature of pathological muscle tissue¹⁶. Sustaining blood flow is crucial for spontaneous tendon healing¹⁷. For pharmacopuncture, injection of herbal extracts into acupoints, we used Shinbaro 3. The main component of Shinbaro 3 is a formulation derived from the hydrolyzed roots of *Harpagophytum procumbens* var. *sublobatum* (Engl.) Stapf., which has been reported in phytochemical studies as a potential anti-inflammatory and antioxidant agent, as well as a pain reliever¹⁸.

Herbal medicine is a compound of multiple herbal components. *Gyunbiyanggeun-Hwan* (*Jianbiyangjin-wan*) is supposed to remove hemostasis¹⁹ and reduce inflammation²⁰ by pharmacological properties of its component, however efficacy of this pill remains unknown.

There are already several research that demonstrates

Korean medicine treatment is effective for rotator cuff injuries. However, this case is meaningful for 2 aspects: before and after treatment MRI comparison shows actual restoration of tendon (full-width to partial tear) in 3 months; and this is the first rotator cuff injury case using Shinbaro3 pharmacopuncture. Since this report is based on only one case and no control group, it is difficult to generalize the findings and assess the effect of the individual types of treatment. Further research should be conducted with a well-designed control group study to fully evaluate the efficacy and mechanism of the proposed treatment.

Conclusion

We suggest that integrative Korean Medicine treatment is an effective treatment option for supraspinatus tendon tear as it reduces shoulder pain and disability, restores tendon tear and range of motion and thereby elevates patients' quality of life.

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Data availability

The authors can provide upon reasonable request.

Conflicts of interest

The authors have declared that no conflicts of interest

exists.

References

1. Dang A, Davies M. Rotator cuff disease: treatment options and considerations. *Sports Med Arthrosc Rev.* 2018 ; 26(3) : 129-33. <https://doi.org/10.1097/JSA.0000000000000207>
2. Mahon HS, Christensen JE, Brockmeier SF. Shoulder rotator cuff pathology: common problems and solutions. *Clin Sports Med.* 2018 ; 37(2) : 179-96. <https://doi.org/10.1016/j.csm.2017.12.013>
3. The Korean Orthopaedic Association. *Orthopedics.* 7th ed. Seoul : ChoiSin Medical Publishing Co. 2013 : 629-34.
4. Tashjian RZ. Epidemiology, natural history, and indications for treatment of rotator cuff tears. *Clin Sports Med.* 2012 ; 31(4) : 589-604. <https://doi.org/10.1016/j.csm.2012.07.001>
5. Murray J, Gross L. Optimizing the management of full-thickness rotator cuff tears. *J Am Acad Orthop Surg.* 2013 ; 21(12) : 767-71. <https://doi.org/10.5435/JAAOS-21-12-767>
6. Lee GE, Kim YI, Jo KS, Han SH, Kim MK, Min BK, et al. Forty-one cases of rotator cuff injuries treated by complex Korean medicine treatment: a retrospective review. *JKMR.* 2018 ; 28(4) : 81-7. <https://doi.org/10.18325/jkmr.2018.28.4.81>
7. Lim SJ, Jun JY, Lee CW, Kim HS, Kim HS, Bae YH, et al. Clinical characteristics and treatment effects of shoulder pain patients admitted to a Korean medicine hospital based on MRI findings. *J Acupunct Res.* 2014 ; 31(4) : 109-19. <https://doi.org/10.13045/acupunct.2014058>
8. Dietrich TJ, Moor BK, Puskas GJ, Pfirrmann CW, Hodler J, Peterson CK. Is the lateral extension of the acromion related to the outcome of shoulder injections? *Eur Radiol.* 2015 ; 25(1) : 267-73. <https://doi.org/10.1007/s00330-014-3403-7>
9. Bakhsh W, Nicandri G. Anatomy and physical examination of the shoulder. *Sports Med Arthrosc Rev.* 2018 ; 26(3) : e10-e22. <https://doi.org/10.1097/JSA.0000000000000202>
10. Rabin R, de Charro F. EQ-5D: a measure of health status from the EuroQol Group. *Ann Med.* 2001 ; 33(5) : 337-43. <https://doi.org/10.3109/07853890109002087>
11. Breckenridge JD, McAuley JH. Shoulder Pain and Disability Index (SPADI). *J Physiother.* 2011 ; 57(3) : 197. <https://doi.org/>

- 10.1016/S1836-9553(11)70045-5
12. Terabayashi N, Watanabe T, Matsumoto K, Takigami I, Ito Y, Fukuta M, et al. Increased blood flow in the anterior humeral circumflex artery correlates with night pain in patients with rotator cuff tear. *J Orthop Sci.* 2014 ; 19(5) : 744-9. <https://doi.org/10.1007/s00776-014-0604-5>
 13. Lee JH, Ko MK, Yoon KS, Lee CW, Kim YI, Kim JH. Case report of acute traumatic rotator cuff tear treatment in traditional Korean medicine. *J Pharmacopuncture.* 2011 ; 14(4) : 53-8. <https://doi.org/10.3831/KPI.2011.14.4.053>
 14. Lo IK, Denkers MR, More KD, Nelson AA, Thornton GM, Boorman RS. Partial-thickness rotator cuff tears: clinical and imaging outcomes and prognostic factors of successful non-operative treatment. *Open Access J Sports Med.* 2018 ; 9 : 191-7. <https://doi.org/10.2147/OAJSM.S153236>
 15. Lim JY, Choi JE, Kim MJ, Kim SH, Kim YJ, Do HK, et al. Comparative effectiveness research of conservative treatment and rotator cuff repair for the patient with rotator cuff tears. 1st ed. Seoul : NECA. 2015 : 1-135.
 16. Filshie J, White A, Cummings M. *Medical acupuncture—a western scientific approach.* 2nd ed. Seoul : Hanmi Medical Publishing. 2019 : 19-54, 93-118, 575-86.
 17. Longo UG, Berton A, Khan WS, Maffulli N, Denaro V. Histopathology of rotator cuff tears. *Sports Med Arthrosc Rev.* 2011 ; 19(3) : 227-36. <https://doi.org/10.1097/JSA.0b013e318213bccb>
 18. Gxaba N, Manganyi MC. The fight against infection and pain: Devil's claw (*harpagophytum procumbens*) a rich source of anti-inflammatory activity: 2011-2022. *Molecules.* 2022 ; 27(11) : 3637. <https://doi.org/10.3390/molecules27113637>
 19. Zhang RX, Li MX, Jia ZP. *Rehmannia glutinosa*: review of botany, chemistry and pharmacology. *J Ethnopharmacol.* 2008 ; 117(2) : 199-214. <https://doi.org/10.1016/j.jep.2008.02.018>
 20. Ríos JL. Chemical constituents and pharmacological properties of *Poria cocos*. *Planta Med.* 2011 ; 77(7) : 681-91. <https://doi.org/10.1055/s-0030-1270823>