



Marc Cohen

Rosehip

An evidence based herbal medicine for inflammation and arthritis

Background

Rosehips – which contain a particular type of galactolipid – have a specific anti-inflammatory action. A standardised rosehip powder has been developed to maximise the retention of phytochemicals. This powder has demonstrated anti-oxidant and anti-inflammatory activity as well as clinical benefits in conditions such as osteoarthritis, rheumatoid arthritis and inflammatory bowel disease.

Objective

To examine the evidence suggesting that standardised rosehip powder may be a viable replacement or supplement for conventional therapies used in inflammatory diseases such as arthritis.

Discussion

A meta-analysis of three randomised controlled trials involving 287 patients with a median treatment period of 3 months reported that treatment with standardised rosehip powder consistently reduced pain scores and that patients allocated to rosehip powder were twice as likely to respond to rosehip compared to placebo. In contrast to nonsteroidal anti-inflammatory drugs and aspirin, rosehip has anti-inflammatory actions that do not have ulcerogenic effects and do not inhibit platelets nor influence the coagulation cascade or fibrinolysis.

Keywords

arthritis; osteoarthritis; complementary therapies; rosa

Rosehips are the berry fruits of the dog rose or wild briar rose (*Rosa canina L.*), a scrambling rose species native to Europe, northwest Africa and western Asia.

Rosehip has been used traditionally to treat a range of conditions including diarrhoea, bladder infections and diabetes. In food, rosehips are used in teas, jams, jellies and soups, and as a natural source of vitamin C. The vitamin C content of fresh rosehips is higher than that found in citrus fruits. Rosehip is also high in folate and contains vitamins A, B3, D and E along with flavonoids, carotenoids, beta-sitosterol, fructose, malic acid, tannins, magnesium, zinc, copper and numerous other phytochemicals including recently characterised galactolipids.¹⁻⁴

These nutrients can be depleted or destroyed during processing and the content of phytochemicals has been shown to be sensitive

to the maturity of the fruits as well as drying time, drying air temperature and moisture content.⁵⁻⁸

A team from the Department of Clinical Biochemistry at the University of Copenhagen in Denmark has been involved in researching and testing rosehip for over a decade. This research has focused on a specific rosehip powder produced by Hyben Vital, Denmark.

The production process involves plants grown according to good agricultural practice in standardised fields in Denmark and Sweden. Fruits are harvested when they are fully ripe and optimal fruits are selected using a laser technique.⁹ This patented process preserves the nutrient content and the resultant powder is standardised to contain at least 5 mg/g of vitamin C. The product consists of seeds as well as shells.

The standardised extract has been available for more than a decade in Scandinavia as a herbal remedy.⁹ It is now readily available in Australia and New Zealand under the trade name Rose-Hip Vital™.

Therapeutic activities of rosehip

Antioxidant activity

Rosehip is rich in polyphenolic compounds such as proanthocyanidins and flavonoids such as quercetin and catechin.⁸ The high phenolic and flavonoid content of rosehips has been observed to correlate with antioxidant activity¹⁰ and when rosehip extract containing these phenolics is deprived of vitamin C it still shows considerable antioxidant activity.¹¹ This activity includes protective effects against oxidative stress, enhanced activity of antioxidant enzymes such as superoxide dismutase and catalase, and protective effects on gap junction intercellular communication.¹²

Anti-inflammatory activity

Rosehip has been found to have anti-inflammatory and antinociceptive activities

in several in vivo experimental models with synergistic interactions between compounds.¹³ The anti-inflammatory power of rosehip is reported to be similar to that of indomethacin, although its mode of action is different.¹⁴ The lipophilic constituents have been found to be particularly active with respect to anti-inflammatory properties including actions on arachidonic acid metabolism and inhibition of both cyclooxygenase-1 and 2.¹⁰ Much of the anti-inflammatory action of rosehip has been attributed to high quantities of galactolipids, a class of compounds recently shown to possess antitumour promoting and anti-inflammatory activity, both in vitro and in vivo.⁴ Rosehip and its constituent galactolipids have also been found to inhibit the production of inflammatory mediators and confer chondroprotective effects in vitro.¹⁵

A particular galactolipid – GOPO® – has been shown to be the active principle responsible for the observed in vitro inhibition of chemotaxis and chemiluminescence of human peripheral blood leucocytes without any toxicity to the cells.^{16–19} This suggests GOPO® is important for the clinically observed anti-inflammatory properties of standardised rosehip powder, which include reduced serum c-reactive protein (CRP) and creatinine levels in patients with osteoarthritis and healthy subjects,^{18,20} as well as improved pain and joint movement in osteoarthritis patients.^{1,21}

In contrast to nonsteroidal anti-inflammatory drugs (NSAIDs) and aspirin, rosehip has anti-inflammatory actions that do not have ulcerogenic effects and do not inhibit platelets or influence the coagulation cascade or fibrinolysis,²² thereby avoiding potential side effects for patients who may be at increased risk from the gastrointestinal or cardiovascular side effects of NSAIDs.¹⁹

Antidiabetic, lipid lowering and anti-obesogenic activity

Rosehip has been used as a traditional treatment for diabetes and has recently been found to possess hypoglycemic effects in diabetic rats.²³ Similarly, rosehip extract has been reported to significantly reduce blood glucose levels after glucose loading, as well as substantially inhibiting weight gain and/or accumulation of

visceral fat without affecting food intake in mice.²⁴ Rosehip has also been found to produce modest lowering of total cholesterol in humans.¹ While these activities are promising, they await further confirmation in large human clinical trials.²⁵

Clinical research on standardised rosehip powder

Since the patenting of standardised rosehip powder, there has been a number of clinical trials exploring the efficacy of this preparation in conditions such as osteoarthritis, rheumatoid arthritis and inflammatory bowel disease. It should be noted that all clinical research on rosehip has been performed on the standardised, patented extract with the trials being supported by the manufacturer, Hyben Vital. Clinical research into this extract includes open label and randomised controlled trials with a duration of 6 months or less, along with a number of corresponding systematic reviews and meta-analyses. These studies have consistently found rosehip to be extremely safe, with occasional mild allergic reactions or gastrointestinal complaints but no serious adverse effects.²⁶ In January 2011, the evidence for rosehip was reviewed by Arthritis Australia and for the first time rosehip was included in the Arthritis Australia complementary medicine information sheet.²⁷

Randomised controlled trials

Osteoarthritis, rheumatoid arthritis and back pain

The first randomised controlled trial of rosehip involved 100 patients with painful, radiographically verified osteoarthritis of the hip or knee. These patients, some of who were end stage and awaiting joint replacement, were randomised to receive either 2.5 g standardised rosehip powder or placebo twice daily for 4 months. Results showed that in comparison with placebo, rosehip powder significantly reduced pain ($p=0.035$) with 64.6% of patients receiving rosehip reporting at least some reduction of pain. Rosehip-treated patients also experienced improved hip flexion ($p=0.033$) with no significant change observed for internal and

external rotation of the hips or knee flexion.²¹

A second double blind, placebo controlled, crossover study involving 112 patients with osteoarthritis of the hip, knee, hand, shoulder or neck, found that compared to those receiving placebo, patients who received 5 g/day of standardised rosehip powder for 3 months experienced significant reductions in pain ($p<0.0078$) and stiffness ($p<0.0025$), as well as significant improvements in mood, wellbeing and sleep quality. Sixty-six percent of patients receiving active treatment reported improvement in pain compared to only 36% of placebo patients. Reductions in paracetamol consumption and plasma CRP along with a small but significant reduction in total cholesterol were also observed. After the treatment and placebo groups were crossed over for a further 3 months (without a washout period) no difference was seen between the two groups, suggesting that rosehip has a long duration of action with a strong carryover effect.¹

A third placebo controlled, double blind crossover trial involving 94 patients aged over 35 years with osteoarthritis of the hip or knee, randomised patients to either placebo or 5 g/day of rosehip for a period of 3 months. Compared to placebo, treatment with rosehip resulted in a significant reduction in WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) pain (+/–) and consumption of ‘rescue medication’ after 3 weeks and significant reduction in WOMAC disability, stiffness and global assessment of severity of the disease after 3 months of treatment.²⁸

In addition to offering benefits for patients with osteoarthritis, rosehip may offer benefits in other conditions such as back pain and rheumatoid arthritis. A 1 year surveillance of 152 patients found that rosehip provided significant pain relief for patients with acute exacerbations of chronic back pain.²⁹ More recently, a 6 month, double blind placebo controlled trial also found modest benefits for patients with rheumatoid arthritis indicated by significantly improved scores on the Health Assessment Questionnaire Disability Index (HAQ-DI) along with various other patient and physician reported scales. The authors concluded that while the results were promising, the study was not well powered and larger studies were needed.³⁰

A slow onset of action, modest effect size and lack of statistical power may account for the results of a more recent and much smaller open case control study of 20 female patients with rheumatoid arthritis and 10 female controls, which found no significant effects on clinical symptoms, level of CRP or laboratory measures of antioxidant enzyme activity after 4 weeks of treatment with 10.5 g/day of rosehip powder.³¹

Meta-analyses and systematic reviews

A meta-analysis of the three randomised controlled trials of osteoarthritis patients included 287 patients with a median treatment period of 3 months. This meta-analysis reported that treatment with patented rosehip powder consistently reduced pain scores and that patients were twice as likely to respond to rosehip (as indicated by a reduction in WOMAC pain) compared to placebo (effect size of 0.37, 95% CI: 0.13–0.60). The authors therefore concluded that rosehip powder does reduce pain and that its efficacy and safety need evaluation and independent replication in future large scale, long term trials.³²

A more recent meta-analysis provides an indirect comparison of the pain reducing effect of glucosamine hydrochloride and standardised rosehip powder for osteoarthritis. This analysis, which was based on three studies on glucosamine hydrochloride involving a total of 933 patients and the three studies described above involving 287 patients, concluded that rosehip is more efficacious than glucosamine hydrochloride in reducing pain in osteoarthritis patients.³³

As well as being the subject of meta-analyses, the clinical trials of rosehip have been systematically reviewed. One systematic review of two relatively small (n=100 and 112) double blind, randomised placebo controlled studies, both of which were considered to be of high quality with a Jadad score of 5 out of 5, concluded that rosehip powder had a moderate effect in patients with osteoarthritis.³⁴ This same conclusion was also made by another systematic review that included four trials (two of which were identified as subgroup analyses).³⁵

Summary

The growing evidence base for rosehip suggests that this traditional herbal remedy has a high safety profile. While further research is required to establish its clinical role, existing research (both in vitro and in vivo) suggests that standardised rosehip powder may offer an effective first line therapy and is a viable replacement or supplement for conventional drug therapies such as NSAIDs in osteoarthritis and possibly other inflammatory diseases.

Author

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References

1. Rein E, Kharazmi A, Winther K. A herbal remedy, Hyben Vital (stand. powder of a subspecies of *Rosa canina* fruits), reduces pain and improves general wellbeing in patients with osteoarthritis: a double-blind, placebo-controlled, randomised trial. *Phytomedicine* 2004;11:383–91.
2. Böhm V, K, Fröhlich K, Bitsch R. Rosehip: a "new" source of lycopene? *Mol Aspects Med* 2003;24:385–9.
3. Machmudah S, Kondo M, Sasaki M, et al. Process optimization and extraction rate analysis of carotenoids extraction from rosehip fruit using supercritical CO₂. *J Supercrit Fluids* 2008;44:308–14.
4. Christensen LP. Galactolipids as potential health promoting compounds in vegetable foods. *Recent Pat Food Nutr Agric* 2009;1:50–8.
5. Erenturk S, Gulaboglu MS, Gultekin S. The effects of cutting and drying medium on the vitamin C content of rosehip during drying. *J Food Eng* 2005;68:513–8.
6. Pirone BN, Ochoa MR, Kesseler AG, De Michelis A. Chemical characterization and evolution of ascorbic acid concentration during dehydration of rosehip (*Rosa eglantheria*) fruits. *American Journal of Food Technology* 2007;2:377–87.
7. Strålsjö L, Alkint C, Olsson ME, Sjöholm I. Total folate content and retention in rosehips (*Rosa ssp.*) after drying. *J Agric Food Chem* 2003;51:4291–5.
8. Türben C, Uylaser V, Incedayi B, Celikkol I. Effects of different maturity periods and processes on nutritional components of rosehip (*Rosa canina* L.). *Journal of Food, Agriculture and Environment* 2010;8:26–30.
9. Winther K. A standardized powder made from

- rosehips (*Rosa canina* L.) improves function and reduces pain and the consumption of rescue medication in osteoarthritis. *Osteoarthritis Cartilage* 2008;16(Suppl 1):S8–9.
10. Wenzig EM, Widowitz U, Kunert O, et al. Phytochemical composition and in vitro pharmacological activity of two rosehip (*Rosa canina* L.) preparations. *Phytomedicine* 2008;15:826–35.
 11. Daels-Rakotoarison DA, Gressier B, Trotin F, et al. Effects of *Rosa canina* fruit extract on neutrophil respiratory burst. *Phytother Res* 2002;16:157–61.
 12. Yoo KM, Lee CH, Lee H, Moon BK, Lee CY. Relative antioxidant and cytoprotective activities of common herbs. *Food Chemistry* 2008;106:929–36.
 13. Deliorman Orhan D, Harteviogui A, Kupeli E, Yesilada E. In vivo anti-inflammatory and antinociceptive activity of the crude extract and fractions from *Rosa canina* L. fruits. *J Ethnopharmacol* 2007;112:394–400.
 14. Lattanzio F, Greco E, Carretta D, Cervellati R, Govoni P, Speroni E. In vivo anti-inflammatory effect of *Rosa canina* L. extract. *J Ethnopharmacol* 2011;137:880–5.
 15. Schwager J, Hoeller U, Wolfram S, Richard N. Rosehip and its constituent galactolipids confer cartilage protection by modulating cytokine, and chemokine expression. *BMC Complement Altern Med* 2011;11:105.
 16. Larsen E, Kharazmi A, Christensen LP, Christensen SB. An antiinflammatory galactolipid from rosehip (*Rosa canina*) that inhibits chemotaxis of human peripheral blood neutrophils in vitro. *J Nat Prod* 2003;66:994–5.
 17. Winther K, Rein E, Kharazmi A. The anti-inflammatory properties of rose-hip. *Inflammopharmacology* 1999;7:63–8.
 18. Kharazmi A, Winther K. Rosehip inhibits chemotaxis and chemiluminescence of human peripheral blood neutrophils in vitro and reduces certain inflammatory parameters in vivo. *Inflammopharmacology* 1999;7:377–86.
 19. Kharazmi A. Laboratory and preclinical studies on the anti-inflammatory and anti-oxidant properties of rosehip powder - Identification and characterization of the active component GPO®. *Osteoarthritis Cartilage* 2008;16(Suppl 1):S5-7.
 20. Rosnagel K, Willich SN. Importance of complementary medicine exemplified by the use of rose-hip. *Bedeutung der komplementärmedizin am beispiel der hegebutte* 2001;63:412–6.
 21. Warholm O, Skaar S, Hedman E, Mølmen HM, Eik L. The effects of a standardized herbal remedy made from a subtype of *Rosa canina* in patients with osteoarthritis: a double-blind, randomized, placebo-controlled clinical trial. *Curr Ther Res Clin Exp* 2003;64:21–31.
 22. Winther K. Rose-hip in the form of HybenVital, has no impact on coagulation, platelet function and fibrinolysis in Third International Exhibition and Conference on Nutraceuticals and Food for Vitality. 2000: Palexpo Exhibition and Conference Centre, Geneva, Switzerland.
 23. Orhan N, Aslan M, Hosbas S, Deliorman OD. Antidiabetic effect and antioxidant potential of

- Rosa canina fruits. *Pharmacognosy Magazine* 2009;5:309–15.
24. Ninomiya K, Matsuda H, Kubo M, Morikawa T, Nishida N, Yoshikawa M. Potent anti-obese principle from *Rosa canina*: a structural requirements and mode of action of trans-tiliroside. *Bioorg Med Chem Lett* 2007;17:3059–64.
 25. Chrubasik C, Roufogalis BD, Müller-Ladner U, et al. A systematic review on the *Rosa canina* effect and efficacy profiles. *Phytother Res* 2008;22:725–33.
 26. Chrubasik S, Chrubasik C, Neumann E, Müller-Ladner U. The anti-inflammatory efficacy of powdered rosehip – a review. Zur antiinflammatorischen Wirksamkeit von pulver aus der Hagebutte 2009;30:227–31.
 27. Arthritis Australia. Arthritis information sheet: Complementary therapies 2011. Available at www.arthritisaustralia.com.au/images/stories/documents/info_sheets/2011/2011_updates/Complementary_therapies/Complementary_Therapies.pdf.
 28. Winther KA, Apel K, Thamsborg G. A powder made from seeds and shells of a rose-hip subspecies (*Rosa canina*) reduces symptoms of knee and hip osteoarthritis: a randomized, double-blind, placebo-controlled clinical trial. *Scand J Rheumatol* 2005;34:302–8.
 29. Chrubasik C, Wiesner L, Black A, Müller-Ladner, Chrubasik S. A one-year survey on the use of a powder from *Rosa canina* lito in acute exacerbations of chronic pain. *Phytother Res* 2008;22:1141–8.
 30. Chrubasik S, Willich SN. Patients with rheumatoid arthritis may benefit from a standardised powder of *Rosa canina* (rosehip). Focus on Alternative and Complementary Therapies 2010;15:114–5.
 31. Kirkeskov B, Christensen R, Bügel S, et al. The effects of rosehip (*Rosa canina*) on plasma antioxidative activity and C-reactive protein in patients with rheumatoid arthritis and normal controls: a prospective cohort study. *Phytomedicine* 2011;18:953–8.
 32. Christensen R, Bartels EM, Altman RD, Astrup A, Bliddal H. Does the hip powder of *Rosa canina* (rosehip) reduce pain in osteoarthritis patients? A meta-analysis of randomized controlled trials. *Osteoarthritis Cartilage* 2008;16:965–72.
 33. Christensen R, Bartels EM, Bliddal H. Efficacy of glucosamine hydrochloride or specialised Rosehip powder in osteoarthritis patients: an indirect comparison meta-analysis. In OARSI. Montreal, Canada: OsteoArthritis Research Society International, 2009.
 34. Rossnagel K, Roll S, Willich SN. The clinical effectiveness of rosehip powder in patients with osteoarthritis. A systematic review. *Klinische Wirksamkeit von Hagebuttenpulver bei Patienten mit Arthrose. Eine systematische Übersicht* 2007;149(27–28 Suppl):51–6.
 35. Chrubasik C, Duke RK, Chrubasik S. The evidence for clinical efficacy of rosehip and seed: a systematic review. *Phytother Res* 2006;20:1–3.