Bilberry

Vaccinium myrtillus L.
[Fam. Ericaceae]

**Overview**
Bilberry is the name of a small European blueberry. Dietary supplements made from the standardized extract of bilberry have become popular in the U.S. over the past decade. Sales in the mainstream retail markets ranked 13th of all herbs in 2000. The standardized, concentrated extract of bilberry fruit is used by consumers primarily for ocular, microcirculatory and vascular-related disorders.

**Primary Uses**
- Retinopathy, hypertensive
- Retinopathy, diabetic
- Peripheral vascular disorders, blood purpuras
- Venous insufficiencies, varicose veins, capillary fragility, kidney capillary fragility
- Diarrhea (the bilberry fruits, not the standardized extracts)

**Other Potential Uses**
- Blindness, night and day
- Cataracts
- Macular degeneration
- Retinitis pigmentosa
- Retinopathy, hemorrhagic
- Dysmenorrhea
- Reduction of surgical bleeding

**Pharmacological Actions**
Astringent; antiplatelet aggregation; collagen-stabilizing activity; decreased vascular permeability associated with injury.

**Dosage and Administration**
Ranges from 160–480 mg daily depending on the conditions being treated. Therapeutic benefits appear to take effect in 4–8 weeks.

- **Dried, ripe fruit:** 20–60 g daily (4–8 g with water, several times daily).
- **Infusion/decoction:** 20–60 g daily.
- **Cold macerate:** 20–60 g daily.
- **Gargle:** Mouthwash containing 10% decoction.
- **Fluid extract:** 2–4 ml, 3 times daily [1:1 (g/ml)].

**For diarrhea:** Crude preparations (non-standardized) for no more than 3–4 days.

**Dry Standardized Extract:** (25% anthocyanidins) 80–160 mg, 3 times daily.

**Contraindications**
None known.

**Pregnancy and Lactation:** No known restrictions.

**Adverse Effects**
None known (at therapeutic dosages).

**Drug Interactions**
Pharmacological studies suggest that very high doses (>170 mg anthocyanins per day for 30–60 days) may interact with warfarin or other antiplatelet drugs. Bilberry (form unstated) reportedly may reduce insulin requirements; therefore, conventional antidiabetic therapy would need close monitoring or dosage adjustment.
CLINICAL REVIEW

Fifteen clinical studies on bilberry that included a total of 694 participants were reviewed. All but one of the studies demonstrated positive effects for indications, including various ocular conditions (night/day vision and retinopathy), and vascular conditions, including venous insufficiencies and micro- and macro- peripheral circulation. Two double-blind, placebo-controlled (DB, PC) studies focused on retinopathy and confirmed results of two earlier open studies. One DB, PC study on nighttime vision confirmed preliminary findings of five previous open studies. A recent DB, PC, crossover study failed to find that bilberry extract (25% anthocyanosides) had an effect on night vision or night contrast sensitivity. One DB, PC study conducted on peripheral vascular disorder concluded positive results for Raynaud’s sufferers. Another DB, PC study on chronic dysmenorrhea was positive and further supports pharmacological findings. One single-blind (SB), PC study on venous insufficiencies in 60 participants further supported the findings of four similar studies, including two open studies and two using pregnant subjects. Bleeding was investigated in a SB, PC study finding bilberry reduced intra- and postoperative bleeding and prevented subsequent hemorrhaging. Another study focused on bleeding associated with intrauterine devices.
Bilberry

Vaccinium myrtillus L.
[Fam. Ericaceae]

OVERVIEW
Bilberry is the name of a small, European blueberry. The standardized, concentrated extract of bilberry fruit is used by consumers mainly for disorders of the eyes and circulatory system. Sales in the mainstream retail markets ranked 13th of all herbs in 2000. Some concentrated extracts of the berry are standardized for an exact amount of water-soluble substances called anthocyanidins.

USES
Visual problems such as circulatory disorders of the retina; vein and circulatory disorders, including varicose veins, inadequate vein strength, and fragile capillaries.

DOSAGE
Ranges from 160–480 mg daily depending on the conditions being treated. Therapeutic benefits appear to take effect in 4–8 weeks.
FOR DIARRHEA: Non-standardized preparations for no more than 3–4 days.
DRIED, RIPE FRUIT: 20–60 g daily (4–8 g with water, several times daily).
INFUSION/DECOCTION: 20–60 g daily.
COLD MACERATE: 20–60 g daily.
GARGLE: Mouthwash containing 10% decoction.
FLUID EXTRACT: 2–4 ml, 3 times daily [1:1 (g/ml)].
DRY STANDARDIZED EXTRACT: 80–160 mg, 3 times daily [25% anthocyanidins].

CONTRAINDICATIONS
None known.
PREGNANCY AND LACTATION: None known.

ADVERSE EFFECTS
Bilberry is not known to cause adverse effects in normally recommended therapeutic doses.

DRUG INTERACTIONS
There are no known drug interactions in therapeutic doses. However, very high doses (more than 170 mg anthocyanins daily for 30–60 days) may interact with anticoagulating drugs such as warfarin (Coumadin, Sofarin). Bilberry reportedly may reduce daily insulin requirements. Patients who are simultaneously taking antidiabetic medications and bilberry may need to be monitored or have the dosage of their antidiabetic drugs adjusted.

Comments
When using a dietary supplement, purchase it from a reliable source. For best results, use the same brand of product throughout the period of use. As with all medications and dietary supplements, please inform your healthcare provider of all herbs and medications you are taking. Interactions may occur between medications and herbs or even among different herbs when taken at the same time. Treat your herbal supplement with care by taking it as directed, storing it as advised on the label, and keeping it out of the reach of children and pets. Consult your healthcare provider with any questions.

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Bilberry is the name of a small European blueberry. Dietary supplements made from the standardized extract of bilberry have become popular in the United States over the past decade. Sales in the mainstream retail markets ranked 13th of all herbs in 2000 (Blumenthal, 2001). The standardized, concentrated extract of bilberry is used by consumers to help treat or prevent ocular, microcirculatory, and vascular-related disorders. Bilberry leaf extract (not the fruit that is covered in this monograph) was used as a treatment for diabetes before the availability of insulin. It was found effective in adult onset diabetes as a method of reducing glycosuria and postprandial hyperglycemia (Allen, 1927). For that reason, the leaf extract is contraindicated for diabetes patients taking insulin (Bailey and Day, 1989).

Bilberry preparations consist of the whole, dried, ripe, black or bluish-black fruit of *Vaccinium myrtillus* L. [Fam. Ericaceae]. Some concentrated extracts are standardized to anthocyanosides, calculated as 25% anthocyanidins, but may actually contain about 37% by weight (Pizzorno and Murray, 1999).

**Primary Uses**

**Gastrointestinal**
- Diarrhea: The German Commission E approved crude (i.e. non-concentrated) fruit preparations for acute diarrhea (Blumenthal *et al.*, 1998), particularly in children (Blumenthal *et al.*, 1998; Ofek *et al.*, 1996)

**Ophthalmic**

**Vascular**
- Peripheral vascular disorders and blood purpuras (Allegra *et al.*, 1982)

**Other Potential Uses**
- Blindness, night and day (Jayle *et al.*, 1965; Gloria and Peria, 1966; Sala *et al.*, 1979; Caselli, 1985; Vannini *et al.*, 1986; Zavarise *et al.*, 1987)
- Cataracts (Bravetti *et al.*, 1989)
- Gargle for inflamed oral and pharyngeal mucous membranes (Blumenthal *et al.*, 1998)
- Macular degeneration, retinitis pigmentosa, hemorrhagic retinopathy (Scharrer and Ober, 1981)
- Dysmenorrhea (Colombo and Vescovini, 1985)
- Reduction of intra- and post-operative bleeding (Gentile *et al.*, 1987; Cerutti *et al.*, 1984)

**Dosage**

**Crude Preparations**
- **Dried, ripe fruit:** 20–60 g daily (4–8 g with water, several times daily) (Braun *et al.*, 1993; Meyer-Buchtela, 1999; Wichtl and Bisset, 1994).
- **Infusion/decoction:** 20–60 g daily. The berries are prepared by placing 5–10 g crushed, dried fruit in 150 ml cold water. This mixture is boiled for approximately 10 minutes; then strained while hot. The preparation is drunk cold several times daily until the diarrhea subsides (Braun *et al.*, 1993; Meyer-Buchtela, 1999; Wichtl and Bisset, 1994).
- **Cold macerate:** 20–60 g daily. The berries are prepared by soaking 5–10 g crushed dried fruit in 150 ml cold water for 2 hours, allowing the fruit to swell. The preparation is drunk cold several times daily (Braun *et al.*, 1993; Meyer-Buchtela, 1999; Wichtl and Bisset, 1994).
- **Gargle:** Mouthwash containing 10% decoction (prepared as described above) for local application in the treatment of mild inflammation of oral and pharyngeal mucous membranes (Blumenthal *et al.*, 2000).
- **Fluid extract:** 1:1 (g/ml), 2–4 ml, 3 times daily (Anderhuber, 1991; Cunio, 1993).

**Standardized Preparations**
- **Dry standardized extract:** (25% anthocyanidins) 80–160 mg, 3 times daily (Pizzorno and Murray, 1999).

Note: Doses may range from 160–480 mg daily depending on the conditions being treated (see the following table, "Clinical
Studies on Bilberry"). Therapeutic benefits appear to take effect in 4–8 weeks.

**DURATION OF ADMINISTRATION**

**Crude Preparations**

DIARRHEA: Not more than 3–4 days.

**Standardized Preparations**

**VASCULAR AND OCULAR-RELATED DISORDERS**: 2–6 months depending on the condition.

**CHEMISTRY**

Dried bilberries contain 5–10% catechins (tannins), ca. 30% invertose (invert sugar) (Schulz et al., 2001), and flavonoids. Bilberry contains a small amount of anthocyanosides (0.1–0.25% in fresh fruit) consisting of 3-O-glycosides of cyanidin, delphinidin, malvidin, peonidin, and petunidin (Baj et al., 1983), and proanthocyanidins B1-B4 (Bruneton, 1999).

**Pharmacological Actions**

**Crude Preparations**

Astringent (Blumenthal et. al., 2000).

**Standardized Preparations**

Human

Anti-platelet aggregation (Pulliero et al., 1989) (ex vivo); collagen-stabilizing activity (Mian et al., 1977); decreased vascular permeability associated with injury (Mian et al., 1977).

**Animal**

Antiplatelet aggregation (Morazzoni and Magistretti, 1990; Zaragoza et al., 1985; Bottecchia et al., 1987); anti-ulcer (Cristoni and Magistretti, 1987); decreased capillary fragility (anti-inflammatory activity) (Detre et al., 1986; Lietti et al., 1976); collagen-stabilizing (Detre et al., 1986); vascular smooth muscle relaxant (Bettini et al., 1984a; Bettini et al., 1984b); vascular permeability regulator (Detre et al., 1986; Lietti and Forni, 1976); increased regeneration of rhodopsin (a light-sensitive pigment found in rods and retina) (Alfieri et al., 1966; Cluzel et al., 1969).

**In vitro**

Antioxidant (Meunier et al., 1989); free radical scavenger (Pieta et al., 1998; Martin-Aragon et al., 1998); inhibits cAMP phosphodiesterases (Ferretti et al., 1988); chemopreventative (Bomser et al., 1996); inhibits lipid peroxidation (Meunier et al., 1989).

**NOTE**: The pharmacological actions — antioxidant, anti-inflammatory, decreases in capillary permeability, and stabilization of collagen — are further supported by research conducted on flavonoids in general (Gabor, 1972; Kuhnau, 1976; Havsteen, 1983; Monboisse et al., 1983).

**Mechanism of Action**

- Inhibits enzymatic cleavage of collagen by enzymes secreted by leukocytes during inflammation (Mian et al., 1977)
- Increases the endothelial barrier effect through stabilizing the membrane phospholipids and increasing the biosynthesis of the acid mucopolysaccharides of the connective ground substance, thus restoring the altered mucopolysaccharide pericapillary sheath (Mian et al., 1977)
- Decreases basement membrane collagen hydrolysis by significantly reducing permeability of the blood-brain barrier (BBB), and increases recovery rate of the BBB caused by permeability-increasing agents (Robert et al., 1977)
- Prevents the liberation of lactate dehydrogenase in heart, plasma, and cardiac isoenzymes (Marcollet et al., 1970)
- May result in retinal protection due to the inhibition of retinal phosphoglucomutase and glucose-6-phosphatase (Cluzel et al., 1969)
- Reduces microvascular impairments due to ischemia reperfusion injury, with preservation of endothelium, attenuation of leukocyte adhesion, and improvement of capillary perfusion (Bertuglia et al., 1995)
- Produces dose-dependent inhibition of platelet aggregation and clot retraction (Bottecchia, 1987)

**Contraindications**

None known.

**Pregnancy and Lactation**: No known restrictions.

**Adverse Effects**

None known (at therapeutic doses).

**Drug Interactions**

None known. It has been inferred, based on pharmacological studies, that very high doses (>170 mg anthocyanins per day) may interact with warfarin or other antiplatelet drugs (Bone and Morgan, 1997). Leaf only. There have also been claims that bilberry leaf, as mentioned in the overview, may reduce insulin requirements. Therefore, conventional antiabetic therapy would require close monitoring or adjustment (De Smet et al., 1993; Bailey and Day, 1989).

**American Herbal Products Association (AHPA) Safety Rating**

CLASS 1: Can be safely consumed when used appropriately (McGuffin et al., 1997).

**Regulatory Status**

**Austria**: Dried fruit official in the 1990 Austrian Pharmacopoeia, 1991 Addendum II (Meyer-Buchtela, 1999; ÖAB, 1991; Wichtl and Bisset, 1994).

**Canada**: Multiple-ingredient Traditional Herbal Medicines (THMs) containing bilberry, in tea infusion form, and homeopathic mono-preparations of bilberry are scheduled OTC drugs requiring premarket registration and assignment of a drug identification number (DIN) (Health Canada, 2001).

**France**: Fresh or dried fruits are permitted for oral or topical use (Bruneton, 1999).

**Germany**: Dried fruit, for tea infusions and other equivalent galenical dosage forms, is an approved nonprescription drug of the German Commission E monographs (Blumenthal et al., 1998). Dried fruit is official in the German Drug Codex supplement to the German Pharmacopoeia (DAC, 1998). Bilberry dried-fruit tea is an approved nonprescription drug listed in the German Standard License (St. Zul.) monographs (Braun et al., 1993). The fresh, ripe fruit for preparation of hydro-alcoholic mother tincture and liquid dilutions is an official drug of the German Homoeopathic Pharmacopoeia (GHP, 1993).

**Italy**: Dried hydro-alcoholic extract is listed in the Italian Pharmacopoeia (Morazzoni and Bombardelli, 1996).

**Sweden**: Classified as foodstuff (De Smet et al., 1993). As of January 2001, no bilberry products are listed in the Medical Products Agency (MPA) “Authorised Natural Remedies” (MPA, 2001).
SWITZERLAND: Dried fruit is official in the *Swiss Pharmacopoeia* (Meyer-Buchtel, 1999; Ph.Helv.VII, 1987–1997; Wichtl and Bisset, 1994). A semipurified extract (Myrtaven®), standardized to 58 mg anthocyanosides per capsule, is a Category C nonprescription drug with sale limited to pharmacies (Morant and Ruppanner, 2001).


**CLINICAL REVIEW**

Fifteen studies are outlined in the following table, “Clinical Studies on Bilberry,” including a total of 694 participants. All but one of the studies (Muth et al., 2000) demonstrate positive effects for indications, including various ocular conditions (night/day vision and retinopathy), and vascular conditions, including venous insufficiencies and micro- and macroperipheral circulation. Two double-blind, placebo-controlled (DB, PC) studies (Perossini et al., 1987; Repossi et al., 1987) focused on retinopathy and confirmed results of two earlier open studies (Orsucci et al., 1983; Scharrer and Ober, 1981). One DB, PC study (Vannini et al., 1986) on nighttime vision confirmed preliminary findings of five previous open studies (Jaye and Auber, 1964; Jaye et al., 1965; Gloria and Peria, 1966; Sala et al., 1979; Terrasse et al., 1966). A recent DB, PC, crossover study (Muth et al., 2000) failed to find an effect of a bilberry extract (25% anthocyanosides) on night vision or night contrast sensitivity. One DB, PC study conducted on peripheral vascular disorder (Allegra et al., 1982) concluded positive results for Raynaud’s sufferers. Another DB, PC study (Colombo and Vescovini, 1985) on chronic dysmenorrhea was positive and further supports pharmacological findings (Bettini et al., 1984a, Bettini et al., 1984b).

One single-blind, PC study on venous insufficiencies in 60 participants (Gatta et al., 1988) further supported the findings of four similar studies, including two open studies (Ghiringhelli et al., 1977; Mian et al., 1977), and two using pregnant subjects (Teglio et al., 1987; Grismondi et al., 1980). Bleeding was investigated in a SB, PC study (Gentile et al., 1987), finding bilberry reduced intra- and postoperative bleeding and prevented subsequent hemorrhaging. Another study (Cerutti et al., 1984) focused on bleeding associated with intrauterine devices. The most comprehensive review of research and clinical information on bilberry was compiled by Morazzoni and Bombardelli (1996).

**BRANDED PRODUCTS**

Difarel™: Laboratoires Chibret / c/o Societe Anonyme Clermont-Ferrand / Puy-de-Dôme / France. No product information available; no longer manufactured.

Myrtocyan®: Indena S.p.A. / Viale Ortles 12 / 20139 Milano / Italy / Tel.: +39-02-57-4961 / Fax: +39-02-57-4046-20 / Email: indenain@tin.it. Extract standardized to 25% anthocyanidins containing 36% anthocyanosides.

Tegens™: Synthelabo-Pharma SA of France / 11 Rue de Veyrot, 1217 Meyrin / France / Tel.: +33-02-29-89-0147 / Fax: +33-02-29-89-0188. The product is standardized to 25% anthocyanidins containing 36% anthocyanosides by the extract Myrtocyan®, American equivalents, if any, are found in the Product Table beginning on page 398.

**REFERENCES**


Allegra C, Pollari G, Criscuolo A, Bonifacio M. Antocianosidi e sistema microvascular-


USC. See: United States Congress.


### Clinical Studies on Bilberry *(Vaccinium myrtillus)*

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Subject</th>
<th>Design</th>
<th>Duration</th>
<th>Dosage</th>
<th>Preparation</th>
<th>Results/Conclusion</th>
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</thead>
<tbody>
<tr>
<td>Muth et al., 2000</td>
<td>Night vision and contrast sensitivity</td>
<td>DB, PC n=15 males, all except 2 with good vision (ages 25–47 years)</td>
<td>90 days</td>
<td>160 mg, 3x/day (25% anthocyanosides)</td>
<td>Not specified</td>
<td>Study failed to find an effect of bilberry on night visual acuity (VA) (p&gt;0.15) or night contrast sensitivity (CS) (p&gt;0.35) for a high dose of bilberry taken for a significant duration. Hence, this study casts doubt on the proposition that bilberry supplementation, in forms currently available and in doses recommended, improves night VA or night CS.</td>
</tr>
<tr>
<td>Perossini et al., 1987</td>
<td>Retinopathy (patients with diabetic retinopathy, n=35; hypertensive vascular retinopathy n=5) (stage IV excluded)</td>
<td>DB, PC n=40</td>
<td>30 days</td>
<td>160 mg 2x/day</td>
<td>Tegens™ 160 mg capsule</td>
<td>Improved ophthalmoscopic and angiographic patterns were demonstrated in ~90% of the patients. Concluded to be an effective and safe treatment of diabetic and hypertensive retinopathy. (No statistics reported.)</td>
</tr>
<tr>
<td>Repossi et al., 1987</td>
<td>Early diabetic or hypertensive retinopathy</td>
<td>DB, PC n=40</td>
<td>1 year</td>
<td>160 mg 2x/day</td>
<td>Tegens™ 160 mg capsule</td>
<td>Improvements were observed in 50% (vs. 20% in control group). Patients with exudate deposits improved in 15% of the cases (vs. 10% control group). A lower percentage of patients (10% vs. 15%) with hard exudates worsened.</td>
</tr>
<tr>
<td>Vannini et al., 1986</td>
<td>Nighttime vision in healthy subjects</td>
<td>DB, PC n=40 (mean age 25.5 years)</td>
<td>2 hours</td>
<td>240 mg/single dose</td>
<td>Myrtocyan®</td>
<td>Improved pupillary photomotor response, most evident 2 hours after administration; decreased total pupillary contraction time (p&lt;0.05); increased pupillary contraction (p&lt;0.05).</td>
</tr>
<tr>
<td>Orsucci et al., 1983</td>
<td>Diabetic retinopathy in Type II diabetes mellitus</td>
<td>O n=10</td>
<td>6 months</td>
<td>80 mg 3x/day</td>
<td>Tegens™ 80 mg capsule</td>
<td>Improvement in retinal picture; reduction or disappearance of hemorrhages.</td>
</tr>
<tr>
<td>Scharrer and Ober, 1981</td>
<td>Diabetic retinopathy</td>
<td>O n=31: 2 with hemorrhages due to anticoagulants, 4 with arteriosclerosis with hemorrhages of the retina, 20 with diabetic retinopathy (Keith-Wagner Stages II and III)</td>
<td>4 weeks</td>
<td>Two, 80 mg capsules 3x/day</td>
<td>Difrarel 100™ capsule</td>
<td>Reduced vascular permeability during treatment; Mitigated changes of retinal vessels and prevented alterations in the visual field. (No statistics reported.)</td>
</tr>
</tbody>
</table>

## Vascular (micro and peripheral circulation, venous disorders/insufficiencies, etc.)

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Subject</th>
<th>Design</th>
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<th>Dosage</th>
<th>Preparation</th>
<th>Results/Conclusion</th>
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<tbody>
<tr>
<td><strong>Clinical Studies on Bilberry</strong> <em>(Vaccinium myrtillus)</em> <em>(cont.)</em></td>
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<tr>
<td>Gatta et al., 1988</td>
<td>Venous insufficiency (various causes)</td>
<td>SB, PC</td>
<td>30 days</td>
<td>160 mg 3x/day</td>
<td>Tegens™ 160</td>
<td>Decreased severity of edema, sensations of pressure, paresthesia, and cramp-like pain were observed in the bilberry group (p&lt;0.01 for all outcomes).</td>
</tr>
<tr>
<td>Gentile et al., 1987</td>
<td>Preventive bleeding due to ototrinolaryngeal surgery</td>
<td>SB, PC</td>
<td>10 days prior to surgery</td>
<td>160–320 mg/day</td>
<td>Myrtocyan®</td>
<td>Reduced intra- and postoperative bleeding and prevented subsequent hemorrhaging when treated with bilberry before surgery. (No statistics reported.)</td>
</tr>
<tr>
<td>Teglio, 1987</td>
<td>Venous insufficiency symptoms in pregnant women</td>
<td>n=51 (mean period of pregnancy 27 weeks)</td>
<td>3 months</td>
<td>160, 240, 360 mg/day</td>
<td>Tegens™</td>
<td>Reduction in symptoms of pruritus (94.6%), paresthesia (87.5%), cramps (80.1%), pain (78.5%), exhaustion and heaviness (60%), and hemorrhoidal symptoms (75.5–83%).</td>
</tr>
<tr>
<td>Allegra et al., 1982</td>
<td>Peripheral vascular disorder</td>
<td>DB, PC</td>
<td>30 days</td>
<td>480 mg/day</td>
<td>Myrtocyan®</td>
<td>Decreased edema, paresthesia, and pain while increasing joint mobility in patients with Raynaud’s disease.</td>
</tr>
<tr>
<td>Grismondi et al., 1981</td>
<td>Phlebopathies induced by pregnancy</td>
<td>n=54 (ages 24–37 years)</td>
<td>60–90 days</td>
<td>320 mg/day</td>
<td>Myrtocyan®</td>
<td>Improvements in burning and itching (p&lt;0.001), heaviness (p&lt;0.001), and a reduction in edema and in capillary fragility (p&lt;0.001).</td>
</tr>
<tr>
<td>Ghiringhelli et al., 1977</td>
<td>Varicose veins of lower limbs</td>
<td>O n=47 (mean age 45 years)</td>
<td>30 days</td>
<td>480 mg/day</td>
<td>Myrtocyan®</td>
<td>Bilberry significantly improved symptoms such as limb edema and dyshormic skin phenomena as well as heaviness, paresthesia, and pain.</td>
</tr>
<tr>
<td>Mian et al., 1977</td>
<td>Ulcerative dermatitis due to post thrombo-phlebitis</td>
<td>O n=15</td>
<td>10 days</td>
<td>240 mg/day</td>
<td>Myrtocyan®</td>
<td>Bilberry reduced the protein content of the exudate produced by venous occlusion and stasis, a symptom of post-thrombotic and varicose veins stasis. (No statistics reported.)</td>
</tr>
<tr>
<td>Cerutti et al., 1984</td>
<td>Side effects of copper IUD’s</td>
<td>n=48</td>
<td>6 months</td>
<td>Two, 160 mg capsules 2x/day</td>
<td>Myrtocyan®</td>
<td>Decreased incidents of spotting and hyperpoly-menorrhhea were observed in bilberry users.</td>
</tr>
</tbody>
</table>

**Other**

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Subject</th>
<th>Design</th>
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<th>Dosage</th>
<th>Preparation</th>
<th>Results/Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombo, 1985</td>
<td>Chronic dysmenorrhea</td>
<td>DB, PC</td>
<td>3 days prior to and during the cycle</td>
<td>320 mg/day</td>
<td>Myrtocyan® capsule</td>
<td>Bilberry significantly reduced dysmenorrhea symptoms including headache, heaviness of lower limbs, mammary tension, sickness and emesis, and pelvic and lumbosacral pain by the second month.</td>
</tr>
</tbody>
</table>