Clinical Overview

Saw Palmetto

*Serenoa repens* (W. Bartram) Small (syn. *Sabal serrulata* [Michx.] Nutt. ex Schult. & Schult. f.;
*Serenoa serrulata* (Michx.) G. Nichols.)

[Fam. Arecaceae]

**Overview**

Since the mid-1990s, saw palmetto has been one of the 10 top-selling herbs in the U.S. Total sales in mainstream retail stores in 2000 in the U.S. were over $43 million, ranking saw palmetto sixth in total herb sales. In Europe, saw palmetto extract is the most commonly used phytotherapeutic agent for benign prostatic hyperplasia (BPH) and it is one of the most frequently prescribed botanical preparations in Germany. Saw palmetto berry was commonly recommended for various prostatic conditions by healthcare professionals in the early part of the 20th century. It was an official drug, listed in the *United States Pharmacopeia* from 1906 to 1916 and in the *National Formulary* from 1926 to 1950. In the 20th century, the *United States Dispensatory*, 23rd edition, included saw palmetto as a treatment for enlargement of the prostate gland.

**Primary Uses**

- Benign prostatic hyperplasia (BPH), Stages I and II

**Pharmacological Actions**

Anti-estrogenic activity; increases urinary flow rate; decreases residual urine; decreases painful urination; decreases nocturia.

**Dosage and Administration**

Research suggests that 4–6 weeks are needed for therapeutic effect to manifest.

- **Cut Fruit and Other Equivalent Galenical Preparations:**
  1–2 g.
- **Crude Berries:** 10 g, twice daily.
- **Fluid Extract:** 1–2 ml twice daily [1:1 (g/ml)]; 2–4 ml twice daily [1:2 (g/ml)].
- **Soft Native Extract:** 160 mg twice daily or 320 mg once daily [10:1–14:1 (w/w), containing approximately 85–95% fatty acids].
- **Dry Normalized Extract:** 400 mg twice daily [4:1 (w/w) contains ca. 25% fatty acids].
- **Tea:** Not effective because the lipophilic active constituents are insoluble in water.

**Contraindications**

Saw palmetto is contraindicated in advanced BPH with severe urinary retention. It should not be used without first ruling out prostate cancer.

**Pregnancy and Lactation:** Due to potential hormonal activity, saw palmetto is not recommended for pregnant or lactating women, although the herb is seldom used by women.

**Adverse Effects**

Gastrointestinal disturbance occurs rarely. Ingestion of large amounts of saw palmetto berries may cause diarrhea, while ingestion of saw palmetto on an empty stomach may cause nausea. Hypertension was reported in 3.1% of patients taking the saw palmetto extract Permixon® (a proprietary saw palmetto extract from France) although this effect is not usually observed in other trials or case studies on saw palmetto. The general safety profile of saw palmetto is superior to that of finasteride. Sexual dysfunction was less common with saw palmetto and the herb has not been associated with erectile dysfunction, ejaculatory disturbance, or altered libido. Gastrointestinal disturbances, urinary tract infections, ejaculation problems, and impotence were reported in 2% of patients taking saw palmetto in a three-year trial.

**Drug Interactions**

There are no confirmed interactions with saw palmetto. Most clinical trials excluded men taking diuretics, alpha blockers, and anticoagulants; thus, the potential for drug-herb interaction cannot be dismissed. A review of the literature does not reveal evidence of adverse drug interactions between saw palmetto and conventional drugs.

**Clinical Review**

In nineteen studies that included 7,210 participants, all but two demonstrated positive effects for benign prostatic hyperplasia (BPH). Numerous studies revealed that saw palmetto improved symptoms of BPH including one randomized, single-blind, placebo-controlled, parallel group multicenter study (R, SB, PC, PG, MC), two open-label (OL), MC studies, a R,
double-blind (DB), controlled study, a R, comparative study, a prospective MC study, and a R, PC study. Two OL studies found positive results, but another OL study failed to find significant improvement in objective measures of bladder outlet obstruction. Similarly, one DB, C study found no difference between saw palmetto and placebo. Several clinical trials have shown that serum levels of testosterone, dihydrotestosterone (DHT), and PSA are not changed significantly. One PC study looked at hormone levels, found no changes in testosterone, luteinizing hormone (LH), or follicle stimulating hormone (FSH) levels.

It is well accepted that at least 30–50% of BPH patients report an improvement of their symptoms after treatment with placebo. This percentage is about the same after simple monitoring. Two meta-analyses of 18 R, PC studies concluded that saw palmetto treatment for at least 30 days improved urologic symptoms and flow measures. Adverse effects were mild and infrequent. The authors concluded that further research is needed using standardized preparations to determine saw palmetto’s long-term effectiveness and ability to prevent BPH complications. Another meta-analysis focused on 11 R clinical trials and 2 OL trials using saw palmetto extract on men with BPH. The analysis concluded that saw palmetto, compared to placebo, provided a significant improvement in peak urinary flow rate and reduction in nocturia. Some anecdotal reports have stated that saw palmetto can mask prostate cancer by lowering PSA levels. However, several large studies totaling 1,256 patients did not show this effect.

A meta-analysis of recent PC trials included 7 clinical studies. All trials lasted 3 months and indicated a decrease in nocturia frequency (0.5 times per night) and an increase in peak urinary flow rate by 1.5 ml/sec over placebo. A 6-month, DB, PC, R study comparing Permixon® and finasteride (Proscar®) included 1,809 patients with BPH, and showed equally improved symptom score in both groups (37% with Permixon® vs. 39% with finasteride), and equally improved peak urinary flow rate. One of the first trials conducted in the U.S. reported symptomatic, but not urodynanic, improvement in 46 men treated for 6 months with a saw palmetto berry extract.

Five studies focused on the use of the combination of saw palmetto and nettles to treat the symptoms of BPH. Originally, it was thought that saw palmetto relieved the symptoms associated with an enlarged prostate without reducing the enlargement. However, one R, DB, PC study on the Nutralite® product examined the use of a saw palmetto, nettles, lemon bioflavonoid extract, and vitamin A combination and found significant improvement in prostate epithelial contraction without adverse effects. Further studies are needed to confirm the finding. Another trial on the same saw palmetto combination product suggested a significant reduction in prostate tissue DHT levels, as determined by needle biopsy. Four well-designed studies on the fixed combination, PRO 160/120®, ranged from 12 weeks to one year, and found good efficacy and tolerance.
Saw Palmetto

*Serenoa repens* (W. Bartram) Small
[Fam. *Arecaceae*]

**OVERVIEW**
Saw palmetto berries were first used by Native Americans as a diuretic and sexual tonic, as well as for stomachache and dysentery. Since the mid-1990s, saw palmetto has been one of the 10 top-selling herbs in the U.S. Total sales in mainstream retail stores in 2000 were over $43 million, ranking saw palmetto sixth in herb sales.

**USES**
Mild to moderate benign prostatic hyperplasia (BPH); enlarged prostate, Stages I and II.

**DOSAGE**
4–6 weeks are needed for effectiveness.

**CRUDE BERRIES:** 10 g, twice daily.
**FLUID EXTRACT:** 1–2 ml, twice daily [1:1 (g/ml)]; 2–4 ml, twice daily [1:2 (g/ml)].
**SOFT NATIVE EXTRACT:** 160 mg, twice daily or 320 mg once daily [10:1–14:1 (w/w)], contains approximately 85–95% fatty acids.
**DRY NORMALIZED EXTRACT:** 400 mg, twice daily [4:1 (w/w) contains ca. 25% fatty acids].

**CONTRAINDICATIONS**
Saw palmetto should not be used by individuals with advanced BPH and severe urinary retention without first consulting with a healthcare provider to rule out prostate cancer.

**PREGNANCY AND LACTATION:** Due to potential hormonal activity, saw palmetto is not recommended for pregnant or breast-feeding women, although the herb is seldom used by women.

**ADVERSE EFFECTS**
Gastrointestinal disturbance occurs rarely. Ingesting large amounts of saw palmetto berries may cause diarrhea while ingesting saw palmetto on an empty stomach may cause nausea. High blood pressure occurred in only 3% of patients who took saw palmetto extract in a large clinical trial of 951 men although this effect is not normally associated with the use of saw palmetto. Compared to finasteride, the leading prescription drug for BPH, saw palmetto extracts have a better general safety profile and produce less frequent sexual complaints. Saw palmetto has not been associated with erectile dysfunction, ejaculatory disturbance, or altered libido, as can occur with some men using prescription medications for BPH.

**DRUG INTERACTIONS**
There are no known interactions between saw palmetto and conventional drugs.

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.
Saw Palmetto


[Fam. Arecaceae]

**OVERVIEW**

Saw palmetto is a small, low-growing, dwarf-palm tree, native to southeastern North America, particularly Florida. The berries were a staple food and medicine of the indigenous Floridians before the Europeans’ arrival (Duke, 1985; Vogel, 1970). Indigenous Americans prepared an aqueous infusion of the berries to treat stomachache and dysentery (Duke, 1985). They also used the fruit as a diuretic and sexual tonic (Duke, 1985). Since the mid-1990s, saw palmetto has been one of the ten top-selling herbs in the U.S. (Blumenthal et al., 1998; Blumenthal, 2001). Total sales in mainstream retail stores in 2000 in the U.S. were over $43 million, ranking saw palmetto sixth in total herb sales (Blumenthal, 2001). In Europe saw palmetto extract is the most commonly used phytotherapeutic agent for benign prostatic hyperplasia (BPH) (Di Silverio et al., 1993), and in Germany it is one of the most frequently prescribed botanical preparations (Blumenthal et al., 1998). Saw palmetto berry was commonly recommended for various prostatic conditions by healthcare professionals in the early part of the 20th century. It was an official drug, listed in the *United States Pharmacopeia* (USP) from 1906 to 1916 and in the *National Formulary* (NF) from 1926 to 1950 (Boyle, 1991) before its use as a therapeutic option for urinary tract disorders by the medical community declined in the U.S. (Tyler, 1994). In the 20th century, the *United States Dispensatory*, 23rd edition, included saw palmetto with an indication for treatment of enlargement of the prostate gland (Wood and Osol, 1943).

**PRIMARY USES**

**Prostate**

Benign prostatic hyperplasia (BPH) (Marks et al., 2001, 2000; Ziegler, 1998; Redecker, 1998; Di Silverio et al., 1998; Braeckman et al., 1997; Bach and Ebeling, 1996; Kondás et al., 1996; Carraro et al., 1996; Braeckman, 1994; Casarosa et al., 1988; Champault et al., 1984). The German Commission E approved the use of saw palmetto for mild to moderate BPH stages I and II (Blumenthal et al., 1998).

**DOSAGE**

**Internal**

**Crude Preparations**

**CUT FRUIT AND OTHER EQUIVALENT GALENICAL PREPARATIONS:** 1–2 g (Blumenthal et al., 1998).

**CRUDE BERRIES:** 10 g twice daily (Pizzorno and Murray, 1999).

**FLUID EXTRACT:** 1:1 (g/ml), 1–2 ml twice daily; 1:2 (g/ml) 2–4 ml twice daily (Blumenthal et al., 2000).

**SOFT NATIVE EXTRACT:** 10:1–14:1 (w/w), contains approximately 85–95% fatty acids, 160 mg twice daily (Blumenthal et al., 2000) or 320 mg once daily (Braeckman et al., 1997).

**DRY NORMALIZED EXTRACT:** 4:1 (w/w) contains approximately 25% fatty acids, 400 mg twice daily (Blumenthal et al., 2000).

**TEA:** Not effective because the lipophilic-active constituents are insoluble in water (Bratman and Kroll, 1999).

**NOTE:** Most clinical trials have been conducted with native extract.

**DURATION OF ADMINISTRATION**

Research suggests that, four to six weeks of treatment are needed for a therapeutic effect (Braeckman, 1994; Champault et al., 1984).

**CHEMISTRY**

The main constituents of saw palmetto include carbohydrates (inert sugar, mannitol, high-molecular-weight polysaccharides with galactose, arabinose, and uronic acid), fixed oils (free fatty acids and their glycerides), steroids, flavonoids, resin, pigment, tannin, and volatile oil (Newall et al., 1996). The fruits and seeds are rich in triacylglycerol-containing oil (50% of the fatty acids contain 14 or less carbons) (Bruneton, 1999). The liposterolic fraction is the primary active component. A recent systematic review described the chemistry of saw palmetto fruit and related species at different dates of maturity, dosage forms and commercial products, and fruit samples from other species of palm in order to help control the quality of commercial products (Peng et al., 2002).

**DESCRIPTION**

Saw palmetto preparations consist of the berry (fruit) of *Serenoa repens* (W. Bartram) Small (syn. *Sabal serrulata* [Michx.] [Fam. Arecaceae]) or its extracts.
**Pharmacological Actions**

**Human**
- Anti-estrogenic activity (Di Silverio et al., 1992); increases urinary flow rate (Redecker, 1998; Ziegler and Holscher, 1998; Braeckman et al., 1997); decreases residual urine (Redecker, 1998; Ziegler and Holscher, 1998; Braeckman et al., 1997); decreases painful urination (Champault et al., 1984); decreases nocturia (Boyle et al., 2000; Ziegler and Holscher, 1998; Vahlensieck et al., 1993a, 1993b); anti-inflammatory (Ziegler and Holscher, 1998); anti-exudative (Ziegler and Holscher, 1998).

**Animal**
- Anti-androgenic in rats (Carilla et al., 1984); relaxes smooth muscle in rats (Gutierrez et al., 1996); anti-edem (Stenger et al., 1982).

**In vitro**
- Anti-inflammatory (Breu et al., 1992).

**Mechanism of Action**

**Human**
- Lowers DHT levels in prostate tissue (Marks et al., 2001).

**Animal**
-Suppresses prostatic epithelium through a nonhormonal mechanism (Epstein et al., 1999).
-Reduces dihydrotestosterone (DHT) in prostate tissue, which has been implicated as a causative factor of BPH in vivo (Koch and Biber, 1994).
-Competes with endogenous estrogen for receptor sites (Di Silverio et al., 1992).
-Induces apoptosis and inhibits cell proliferation in prostate epithelium and stroma (Vacherot et al., 2000).

**In vitro**

The following mechanisms are based on results from in vitro studies using supraphysiologic dosages.
- Inhibits action of 5α-reductase, which catalyzes the metabolism of testosterone to DHT (Bayne et al., 2000; Chavez and Chavez, 1998; Marks et al., 2000; Sultan et al., 1984), due to the free fatty acid content of the fruit’s lipophilic extracts (Niederprüm et al., 1994; Weisser et al., 1996).
- Inhibits receptor binding of androgens (Chavez and Chavez, 1998; Sultan et al., 1984).
- Inhibits noncompetitively human α1-adrenoreceptors in vitro (Goepel et al., 1999).
- Inhibits both the cyclooxygenase and lipoxygenase pathways in vitro (Breu et al., 1992).
- Inhibits growth factors in vitro (Plosker and Brogden, 1996).
- Binds selectively to and increases apoptotic index for prostate cells in vitro (Bayne et al., 2000).

**Contraindications**

Saw palmetto is not indicated for advanced BPH with severe urinary retention. It should not be used without first ruling out prostate cancer (Bratman and Kroll, 1999). For this reason, the German Commission E clarifies that saw palmetto relieves only the symptoms associated with BPH and recommends consulting a healthcare provider at regular intervals (Blumenthal et al., 1998).

**Pregnancy and Lactation:** No known restrictions (Blumenthal et al., 2000), although saw palmetto is seldom used by women. Due to potential hormonal activity, saw palmetto is not recommended for pregnant or lactating women, though this has not been confirmed by scientific studies (Blumenthal and Riggins, 1997; Newall et al., 1996; Elghamry and Hansel, 1969).

**Adverse Effects**

Rare cases of gastrointestinal disturbance have been reported (Blumenthal et al., 1998). Ingestion on an empty stomach may cause nausea (Bruneton, 1999). Hypertension was reported in 3.1% of patients taking the saw palmetto extract Permixon® (a proprietary form of saw palmetto) (Carraro et al., 1996), although hypertension is not a generally reported effect associated with the use of saw palmetto, either from clinical trials or case reports. The general safety profile of saw palmetto extracts has been shown to be better than finasteride (Wilt et al., 1998). Sexual dysfunction was less common with saw palmetto (p<0.001), and the herb has not been associated with erectile dysfunction, ejaculatory disturbance, or altered libido (Wilt et al., 1998). Gastrointestinal disturbances, urinary tract infections, ejaculation problems, and impotence were reported in 2% of patients taking saw palmetto in a clinical trial on 315 men with BPH stage II or III over three years (Brach and Ebeling, 1996). Other trials have noted mild GI upset in a small percentage (1.3%) of patients (Wilt et al., 1998).

**Drug Interactions**

There are no known interactions associated with saw palmetto (Brinker, 2001). Most clinical trials excluded men taking diuretics, alpha blockers, and anticoagulants; thus, the potential for drug-herb interactions cannot be dismissed, though none have been reported by patients or healthcare providers. A review of the literature does not reveal evidence of adverse drug interactions between saw palmetto and conventional drugs. In vitro, saw palmetto potentially inhibits the binding of α1-adrenoreceptor antagonists (e.g., tamsulosin and prazosin) and calcium mobilization; the clinical relevance has not been confirmed (Brinker, 2001).

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

**Class 1:** Herbs that can be safely consumed when used appropriately. The editors note that rare cases of stomach problems have been recorded and that the German Commission E suggests regular consultation with a healthcare provider when using saw palmetto for treatment of enlarged prostate, based on the assumption that it treats only the symptoms without eliminating hypertrophic concern (McGuffin et al., 1997).

**Regulatory Status**

**Canada:** Approved active ingredient in over 45 licensed products including some Traditional Herbal Medicines (THMs). Natural Health Products (NHPs) and homeopathic medicines (Health Canada, 2002).

**France:** Authorized as a prescription drug reimbursable by the national health insurance (Chauvarie, 2001).

**Germany:** Dried fruit and other galenical preparations or lipophilic extracts are approved by the Commission E as non-prescription drugs (Blumenthal et al., 1998). Fresh ripe fruit for preparation of mother tincture and liquid dilutions are official in German Homeopathic Pharmacopoeia (GHP, 1993).
BELGIUM: Approved as a prescription adjuvant in BPH treatment.  
ITALY: Authorized as a registered drug only (Ris, 2001).  
SWEDEN: Classified as Natural Remedy for self-medication requiring premarketing authorization. Two combination products, Curbicin® with pumpkin seed (Cucurbita pepo) and Prostakan® with nettle root (Urtica dioica), are registered in the Medical Products Agency (MPA) “Authorised Natural Remedies” with the approval indication: “Traditionally used in case of micturition problems caused by benign prostatic hyperplasia, e.g. frequent need to urinate and nocturia. Prior to treatment other serious conditions should have been ruled out by doctor” (MPA, 2001). A product monograph for Curbicin® and a document discussing the risk for an anticoagulation effect are included (MPA, 2000, 1999).

SWITZERLAND: Herbal medicine with positive classification (List D) by the Interkantonale Konzertstelle für Heilmittel (IKS) and corresponding sales Category D with sale limited to pharmacies and drugstores, without prescription (Morant and Rupanner, 2001; Ruppanner and Schaefer, 2000). Three saw palmetto monopreparation phytomedicines, six polypreparations (i.e., multi-ingredient products), and 12 saw palmetto homeopathic preparations are listed in the Swiss Codex 2000/01 (Ruppanner and Schaefer, 2000).

U.K.: Herbal Medicine on the General Sale List, Table A (internal or external use), Schedule 1 (requires full Product License) (MCA, 2002).

U.S.: Dietary supplement (USC, 1994). In view of the levels of evidence in clinical trials of “moderate scientific quality” indicating that commercial extracts of saw palmetto are more effective than placebo to treat symptoms of BPH, the United States Pharmacopoeia (USP) moved saw palmetto preparations from National Formulary (NF) status to inclusion into the USP. This is the first time this has been done for an herb formerly classed only as a dietary supplement. This USP status is designated only for articles that are either approved by the Food and Drug Administration and/or have a USP-accepted use (USP, 2002). The mother tincture 1:10 (v/w), 65% alcohol (v/v), of ripe fruit, is an OTC Class C drug official in Homeopathic Pharmacopoeia of the United States (HPUS, 1992).

CLINICAL REVIEW

Nineteen studies are outlined in the following table, “Clinical Studies on Saw Palmetto,” including 7,210 participants. All but two (Gerber et al., 1998; Champault et al., 1984), demonstrated positive effects for BPH. Numerous studies concluded that saw palmetto improves symptoms of BPH including one randomized, single-blind, placebo controlled, parallel group multi-center study (R, SB, PC, PG, MC) (Braeckman et al., 1997), two open-label (OL), MC studies, (Braeckman, 1994; Ziegler and Holcsh, 1998), an R, DB, controlled study (Carraro et al., 1996), a R, comparative study (Di Silverio et al., 1998), a prospective MC study (Bach and Ebeling, 1996), a R, PC study (Carrault et al., 1984), and two observational studies (Vahlesiek et al., 1993a and 1993b). Two OL studies found positive results (Kondas et al., 1996; Redecker, 1998), but another OL study failed to find significant improvement in objective measures of bladder outlet obstruction (Gerber et al., 1998). Similarly, one DB, C study found no difference between saw palmetto and placebo (Reece et al., 1986). Several clinical trials (Carraro et al., 1996; Rhodes et al, 1993; Strauch et al., 1994) have shown that serum levels of testosterone, dihydrotestosterone, and prostate-specific-antigen (PSA) are not changed significantly. One PC study looked at hormone levels, finding no changes in testosterone, luteinizing hormone (LH), or follicle stimulating hormone (FSH) levels (Casarosa et al., 1988).

It is well-accepted that at least 30–50% of BPH patients report an improvement in their symptoms after treatment with placebo (Bruneton, 1999). This percentage is about the same after simple monitoring (Chapple, 1993). Two meta-analyses of 18 R, PC trials concluded that saw palmetto treatment for at least 30 days improves urologic symptoms and flow measures (Wilt et al., 1998, 2000). Adverse effects were mild and infrequent. The authors concluded that further research is needed using standardized preparations to determine saw palmetto’s long-term effectiveness and ability to prevent BPH complications. Another meta-analysis (Boyle et al., 2000) focused on 11 R clinical trials and two OL trials using saw palmetto extract on men with BPH. The analysis concluded that saw palmetto compared to placebo provided significant improvement in the peak urinary flow rate and a reduction in nocturia.

Some anecdotal reports state that saw palmetto can mask prostate cancer by lowering PSA levels. However, several large studies including a total of 1,256 patients did not show this effect (Carraro et al., 1996; Braeckman, 1994). Originally, it was thought that saw palmetto relieves the symptoms associated with an enlarged prostate without reducing the enlargement (Blumenthal et al., 1998). However, a recent study has detected shrinkage of the epithelial tissue in the transition zone of the gland (Marks et al., 2000; Marks and Tyler, 1999). Further studies are needed to confirm the finding.

A meta-analysis of recent PC trials included seven clinical studies (Boyle et al., 2000). All trials lasted three months, and indicated a decrease in nocturia frequency (0.5 times per night) and an increase in the peak rate of urinary flow rate by 1.5 ml/second over placebo. A six-month, R, DB, PC study (Carraro et al., 1996) comparing Permixon® and finasteride (Proscar®) included 951 patients with BPH, and showed an equally improved symptom score in both groups (37% with Permixon® vs. 39% with finasteride), and equally improved peak urinary flow rates. One of the first U.S. trials (Gerber et al., 1998) reported symptomatic, but not urodynamic, improvement in 46 men treated for six months with a saw palmetto berry extract.

Five studies focused on a saw palmetto and nettle combination for BPH symptoms. One R, DB, PC study on the Nutralite® product examined use of a saw palmetto, nettles, lemon bioflavonoid extract, and vitamin A combination, and found significant improvement in prostate epithelial contraction with adverse effects (Marks et al., 2000). The same combination produced a 32% reduction in dihydrotestosterone levels compared to baseline in six months in prostate tissue extracted via needle biopsy (Marks et al., 2001). Four well-designed studies on the fixed combination, PRO 160/120®, ranging from 12 weeks to one year, found good efficacy and tolerance (Sökeland, 2000; Sökeland and Albrecht, 1997; Metzger et al., 1996; Schneider et al., 1995).

BRANDED PRODUCTS*

IDS 89: Strathmann AG & Co. / Sellhpsweg 1 / 22459 / Hamburg / Germany / Tel: +49-40-55-9050 / Fax: +49-40-55-9051-00 / www.strathmann.de / Email: info@strathmann.de.

LG 166/S: Laboratori Guidotti S.p.A, Via Trieste 40 56126 Pisa, Italy / Tel: +39-05-05-0251-1 / Fax: +39-05-04-0250 / Email: a.viti@giofil.it / www.giofil.it. 160 mg liposterolic extract.

Permixon®: Pierre Fabre Médicament / 45, Place Abel-Gance / 92654 Boulogne / France / Tel: +33-01-49-10-8000 / Fax: +33-01-49-10-9712 / www.dermaweb.com. Liposteric hexane extract of saw palmetto berries, comprised of free (90%) and esterified (7%) fatty acids, sterols, polyphenic compounds, and flavonoids.

PRO 160/120®: Dr. Willmar Schwabe Pharmaceuticals / International Division / Willmar Schwabe Str. 4 / D-76227, Karlsruhe / Germany / Tel: +49-721-4005 ext. 294 / www.schwabepharma.com / Email: melville-eaves@schwabe.de. Fixed combination of 160 mg of saw palmetto extract (WS 1473), 10–14.3:1, and 120 mg of stinging nettle root (Urtica dioica) dry extract (WS 1031), 8.3–12.5:1.

Prostagram® (a.k.a. WS 1473): Dr. Wilmar Schwabe Pharmaceuticals. Liposterolic extract made from alcohol extraction.

Strogen® forte: Dr. Willmar Schwabe Pharmaceuticals. Fixed combination of 160 mg of saw palmetto extract (WS 1473), 10–14.3:1, and 120 mg of stinging nettle root (Urtica dioica) dry extract (WS 1031), 8.3–12.5:1.

Strogen forte®: Strathmann AG & Co. The liposterolic extract is produced through carbon dioxide extraction. Sabal extract IDS 89 is a constituent of Strogen® forte.

Strogen®: Strathmann AG & Co. Sabal extract IDS 89 is a constituent of Strogen® S.

Talso®: Sanofi Synthelabo GmbH / 174 avenue de France / 75013 Paris / France / Tel: +33 53 77 4000 / www.schwabepharma.com. Liposterolic hexane extract of saw palmetto berries, comprised of free (90%) and esterified (7%) fatty acids, sterols, polyphenic compounds, and flavonoids.


GHP See: German Homeopathic Pharmacopoeia.


Gutierrez M, Garcia de Boto M, Cantabrana B, Hidalgo A. Mechanisms involved in the spasmylocin effect of extracts from Sabal serrata fruit on smooth muscle. Gen...


MCA. *See: Medicines Control Agency*.


Clinical Studies on Saw Palmetto (*Serenoa repens* [W. Bartram] Small)

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Subject</th>
<th>Design</th>
<th>Dosage</th>
<th>Preparation</th>
<th>Results/Conclusion</th>
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<tr>
<td>Ziegler and Holscher, 1998</td>
<td>BPH</td>
<td>O, MC</td>
<td>160 mg; 2x/day</td>
<td>Prostagutt® (WS 1473)</td>
<td>Saw palmetto caused a significant improvement in subjective assessment. Therapy was well-tolerated. Significant improvement in mean flow rate (p=0.0001), micturition time (p=0.0001), and time to peak flow rate (p=0.0001) with intent-to-treat analysis. No significant change in micturition volume. Significant decrease in residual volume (p&lt;0.0001), significant decline in daytime micturition (p&lt;0.0001) and in nocturia (p&lt;0.0001).</td>
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<td>Braeckman, 1997</td>
<td>BPH</td>
<td>R, S, PC, P MC</td>
<td>160 mg; 2x/day</td>
<td>Prostaserene®</td>
<td>Compared to control, those receiving saw palmetto had a significant reduction in prostatic DHT (p=0.0001) and epidermal growth factor (EGF) (p&lt;0.01). They had a significant increase in testosterone levels (p&lt;0.001). Highest values were in peri-urethral area.</td>
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<td>Bach and Ebeling, 1996</td>
<td>BPH</td>
<td>P, MC</td>
<td>160 mg; 2x/day</td>
<td>Prostagen® S (IDS 89)</td>
<td>For 80% of patients, clinical status and quality of life improved markedly. 50% of patients had an improvement in residual urine, flow time, and flow rate. Adverse side effects (e.g., gastrointestinal disturbances, urinary tract infections, ejaculation problems, impotence) were experienced by 2% of patients.</td>
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<td>Kondás et al., 1996</td>
<td>BPH</td>
<td>O, MC</td>
<td>320 mg/day</td>
<td>Prostagen forte® (IDS 89)</td>
<td>Of patients participating, 74% had an improvement on International Prostate Symptom Score. Greatest improvement rates were noted for sensation of residue, interruption of micturition, and force of urinary stream. Subjective reports of improvement did not depend on size of hyperplastic prostate. Significant increase in average peak flow rate (p&lt;0.001). Decrease in residual volume (p&lt;0.001). Decrease in average volume of prostate (p&lt;0.02). No adverse reactions.</td>
</tr>
<tr>
<td>Carraro, 1996</td>
<td>BPH</td>
<td>R, DB, C</td>
<td>160 mg, 2x/day</td>
<td>Permixon® or finasteride</td>
<td>Both treatments equally decreased symptoms of BPH. Saw palmetto had minimal effect on prostate volume and no effect on PSA concentration. Saw palmetto was more effective than finasteride in reducing lower urinary tract symptoms in men with smaller prostate size. Significant results in favor of finasteride for urinary flow rate and prostate volume. Significant decrease in PSA levels with finasteride. Significantly more subjects withdrew from study with finasteride.</td>
</tr>
<tr>
<td>Braeckman, 1994</td>
<td>BPH</td>
<td>O, MC</td>
<td>160 mg; 2x/day</td>
<td>Prostaserene®</td>
<td>After 45 days of treatment there was significant improvement (p&lt;0.0001) in International Prostate Symptom Score, quality of life, urinary flow rate, residual urinary volume, and prostate size. Serum PSA concentration was not modified by saw palmetto extract, decreasing the risk of possible development of prostate cancer during treatment. Only 3% of patients reported side effects.</td>
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</table>

### Clinical Studies on Saw Palmetto (*Serenoa repens* [W. Bartram] Small) (cont.)

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<tr>
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<tr>
<td>Vahlensieck et al., 1993a</td>
<td>BPH</td>
<td>OB n=578 (BPH Stages II and III)</td>
<td>8 months; 12 weeks of treatment</td>
<td>160 mg, 2x/day</td>
<td>Talso®</td>
<td>Clear clinical improvements were seen in symptoms, including urine flow, urine retention, nocturia, and daytime micturition. The residue urine volume was reduced by approximately half after 12 weeks, with 30% reduction after 4 weeks. The physicians evaluated efficacy as good or very good in over 80% of the subjects with over 95% of the subjects demonstrating good or very good tolerability.</td>
</tr>
<tr>
<td>Vahlensieck et al., 1993b</td>
<td>BPH</td>
<td>OB n=1,334</td>
<td>8 months</td>
<td>160 mg, 2x/day</td>
<td>Talso®</td>
<td>The study was based on symptom treatment and patient evaluations. During the treatment period, polakiuria was reduced by 37%, nocturia by 54%, and the volume of residual urine was reduced by 50%. The number of patients with dysuria was reduced from 75% to 37%. 80% of the patients rated good or very good efficacy at 80% and good or very good tolerability at 95%.</td>
</tr>
<tr>
<td>Casarosa, 1988</td>
<td>BPH</td>
<td>PC n=20 men with BPH and normal levels of testosterone, LH, and FSH, (50–70 years)</td>
<td>30 days</td>
<td>160 mg, 2x/day or placebo</td>
<td>LG 166/5</td>
<td>One month of treatment with saw palmetto extract did not alter testosterone, LH, or FSH levels. These findings are in contrast to those of Tenaglia and DiSilverio (1986) who found increases in the hormone levels. The authors have no explanation for the discrepancy.</td>
</tr>
<tr>
<td>Champault, 1984</td>
<td>BPH</td>
<td>R, PC n=110 men (ages 47–92), with BPH, not needing surgery</td>
<td>28 days</td>
<td>160 mg, 2x/day or placebo</td>
<td>Saw palmetto extract (PA 109)</td>
<td>Patients taking saw palmetto had significant decrease in nocturnal micturitions (p&lt;0.001), dysuria (painful urination), and rate of micturition as compared to placebo. No adverse effects reported. Significant increase in urinary flow with saw palmetto extract (p&lt;0.001).</td>
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### Combination Preparations

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<tr>
<td>Marks et al., 2001</td>
<td>BPH</td>
<td>R, PC, Cm n=40 (saw palmetto vs. placebo), n=22 (finasteride vs. control), measuring prostate tissue androgen levels using needle biopsies</td>
<td>6 months</td>
<td>318 mg saw palmetto extract/day; 1 tablet, 3x/day with meals, or placebo</td>
<td>Nutrilite® Saw Palmetto with Nettle Root (containing saw palmetto extract 106 mg, nettle root extract 80 mg, lemon bioflavonoid extract 33 mg, and vitamin A, 190 IU)</td>
<td>In the saw palmetto group, tissue DHT levels were reduced by 32% from 6.49 ng/g to 4.40 ng/g (p&lt;0.005). The effect of chronic finasteride therapy was statistically significant (p&lt;0.01) in lowering prostate tissue DHT levels (80%) compared to levels of testosterone. No significant change in tissue DHT levels was observed with the placebo.</td>
</tr>
<tr>
<td>Marks et al., 2000</td>
<td>BPH</td>
<td>R, DB, PC n=41 men with symptomatic BPH, OL extension after 6 months</td>
<td>6 months</td>
<td>318 mg saw palmetto extract/day; 1 tablet, 3x/day with meals, or placebo</td>
<td>Nutrilite® Saw Palmetto with Nettle Root (containing saw palmetto extract 106 mg, nettle root extract 80 mg, lemon bioflavonoid extract 33 mg, and vitamin A, 190 IU)</td>
<td>Saw palmetto blend group had non-statistically significant improvement vs. placebo in clinical parameters (e.g., International Prostate Symptom Score, uroflowmetry, residual urine volume, prostate volume). After 6 months, saw palmetto blend was associated with prostate epithelial contraction, notably in transition zone (p&lt;0.01), suggesting possible mechanism for clinical significance found by other studies. No serious adverse effects were associated with saw palmetto blend.</td>
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### Clinical Studies on Saw Palmetto (Serenoa repens [W. Bartram] Small) (cont.)

#### Lower Urinary Tract Symptoms

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<tr>
<td>Sökeland, 2000</td>
<td>BPH</td>
<td>R, MC, DB</td>
<td>48 weeks</td>
<td>2 capsules PRO 160/120®/day vs. finasteride (5 mg/day) vs. placebo</td>
<td>PRO 160/120® (Prostagutt forte™, fixed combination of 160 mg of saw palmetto extract [WS 1473] and 120 mg of stinging nettle dry extract [WS 1031]) or finasteride</td>
<td>The efficacy of both PRO 160/120® and finasteride were shown to be equivalent in the International Prostate Symptom Score with tolerability significantly better with PRO 160/120®. 96 adverse events were recorded in 54 patients using finasteride compared with 74 in 52 patients taking PRO 160/120®.</td>
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<tr>
<td>Metzker et al., 1996</td>
<td>BPH (Stages I and II)</td>
<td>DB, PC</td>
<td>350 days</td>
<td>2 capsules PRO 160/120®/day vs. finasteride (5 mg/day) vs. placebo</td>
<td>Prostagutt forte™, fixed combination of 160 mg of saw palmetto extract [WS 1473] and 120 mg of stinging nettle dry extract [WS 1031]]</td>
<td>The study concluded good efficacy and tolerance in the administration of PRO 160/120® for approximately one year of therapy. After 24 weeks, maximum urine volume per second by 3.3 ml/s had occurred with the combination compared to only a slight improvement of 0.35 ml/s with placebo. Subjective reports corresponding to the I-PSS found a highly significant (p&lt;0.001) advantage with the combination vs. placebo.</td>
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<td>Schneider et al., 1995</td>
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<td>S</td>
<td>12 weeks</td>
<td>2 capsules PRO 160/120®/day vs. finasteride (5 mg/day) vs. placebo</td>
<td>Prostagutt forte™, fixed combination of 160 mg of saw palmetto extract [WS 1473] and 120 mg of stinging nettle dry extract [WS 1031]]</td>
<td>Treatment with the combination was found to be an effective method to avoid surgery or not to make it necessary as soon. Physician and patient assessment confirmed the efficacy and tolerance of PRO 160/120®.</td>
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#### Benign Prostatic Hyperplasia (BPH)

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<tr>
<td>Sökeland and Albrecht, 1997</td>
<td>BPH (Stages I and II)</td>
<td>R, RC, MC, DB</td>
<td>48 weeks</td>
<td>2 capsules PRO 160/120®/day vs. finasteride (5 mg/day) vs. placebo or one capsule of 5 mg of finasteride per day</td>
<td>PRO 160/120® (Prostagutt forte™, fixed combination of 160 mg of saw palmetto extract [WS 1473] and 120 mg of stinging nettle dry extract [WS 1031]) or finasteride</td>
<td>International-Prostate-Symptom-Score (I-PSS) value improved by a total of 4.8 points with the PRO 160/120®. The study found equivalent efficacy between the two groups. Less adverse events, including diminished ejaculation volume, erectile dysfunction and headache, were reported in the PRO 160/120® group. The study recommended that patients should receive finasteride only after the use of the combination for at least 3 months was unsuccessful.</td>
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<td>BPH (Stages I and II)</td>
<td>DB, PC</td>
<td>350 days</td>
<td>2 capsules PRO 160/120®/day vs. finasteride (5 mg/day) vs. placebo</td>
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### Lower Urinary Tract Symptoms

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<tr>
<td>Gerber et al., 1998</td>
<td>Lower urinary tract symptoms</td>
<td>O</td>
<td>6 months</td>
<td>160 mg, 2x/day</td>
<td>Solaray® Saw Palmetto</td>
<td>The International Prostate Symptom Score significantly improved (p=0.001) after 2 months of treatment. No significant change in peak urinary flow rate, post void residual urine volume, or detrusor pressure at peak flow. No significant improvement in objective measures of bladder outlet obstruction. Saw palmetto was well-tolerated.</td>
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