*For the use only of Registered Medical Practitioners or a Hospital or a Laboratory*

**BANOCIDE TABLETS / BANOCIDE FORTE TABLETS**

## 1. GENERIC NAME

Diethylcarbamazine Citrate Tablets I.P. 50 / 100 mg

## 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

*BANOCIDE TABLETS*
Each uncoated tablet contains:
Diethylcarbamazine Citrate I.P. 50 mg

*BANOCIDE FORTE TABLETS*
Each uncoated tablet contains:
Diethylcarbamazine Citrate I.P. 100 mg

***List of Excipients***

*BANOCIDE TABLET*
Lactose, Maize starch, Calcium Silicate, Magnesium Stearate and Purified water.

*BANOCIDE FORTE TABLET*
Lactose, Maize Starch, Calcium Silicate, Magnesium Stearate, Sodium Starch Glycolate and Purified water.

## 3. DOSAGE FORM AND STRENGTH

Tablet
For information on strength(s) refer section *2. Qualitative and Quantitative Composition* above.

## 4. CLINICAL PARTICULARS

### 4.1 Therapeutic Indication

For the treatment of:
- filarial infections due to Wuchereria bancrofti, Loa loa, Brugia malayi and Brugia timori
- tropical eosinophilia
- toxocariasis

For the prophylaxis against:
- loiasis

## 4.2 Posology and Method of Administration

*BANOCIDE TABLETS/BANOCIDE FORTE TABLETS* should be administered after meals.

***Route of Administration***

For oral use.

***Adults***

Allergic manifestations induced by the action of diethylcarbamazine on the parasite are most commonly seen early in treatment. For this reason, the administration of diethylcarbamazine should commence with a low dose which is increased over the next 2 to 3 days and maintained for the remainder of the treatment period.

*Treatment of lymphatic filariasis*

The starting dose is 1 mg/kg on the first day. This dose is gradually increased over 2 to 3 days to 6 mg/kg daily, administered preferably in divided doses, for 12 to 14 days.

The treatment may be repeated, if necessary, after a minimum delay of 10 days.

*Treatment of tropical eosinophilia*

The recommended dosage is 6 mg/kg daily for 14-21 days, repeated as necessary if symptoms reoccur.

*Treatment of toxocariasis*

The starting dose is 1 mg/kg twice daily. This dosage is gradually increased to 6 mg/kg daily, administered in two divided doses, for 21 days.

*Treatment of loiasis*

In the case of severe microfilaraemia, treatment should be initiated under close medical supervision (see section *4.4 Special Warnings and Precautions for Use*).

Treatment should start with very small doses, increasing gradually over 3 days to 6–9 mg/kg daily, administered in three divided doses, for 21 days.

In order to mitigate or prevent the occurrence of side effects, diethylcarbamazine may be combined with corticosteroids.

*Prophylaxis against Loiasis*

The recommended dose is 300 mg once a week.

***Children***

In children, diethylcarbamazine should always be administered under close medical supervision and in divided daily doses.

Diethylcarbamazine citrate may be given orally to children for the treatment of lymphatic filariasis, loiasis and toxocariasis.

*Treatment of lymphatic filariasis*

For the treatment of lymphatic filariasis in children under 10 years of age should be given half the usual adult dose.

*Treatment of loiasis*

For the treatment of loiasis children may be given a dose of 6 - 9 mg/kg daily in 3 divided doses for 12 days. Treatment should start with very small doses, increasing gradually over 3 days.

*Treatment of toxocariasis*

For the treatment of toxocariasis children may be given the same dose as for adults.

***Elderly***

There is no information on the effect of diethylcarbamazine on elderly individuals.

The same pattern of adverse reactions associated with the use of diethylcarbamazine in the treatment of filarial infections should be expected. Therefore, older patients should be treated with careful attention to the normal precautions *(*see section *4.4 Special Warnings and Precautions for Use).*

***Renal Impairment***

In patients with renal insufficiency urinary excretion of diethylcarbamazine is reduced and plasma half-life prolonged according to the degree of renal impairment. Therefore, doses need to be adjusted in these patients.

***Hepatic Impairment***

Dose reduction is not necessary.

**4.3 Contraindications**

This medicinal product is contraindicated in:

- hypersensitivity to diethylcarbamazine citrate or to any of the excipients
- in patients with onchocerciasis due to the occurrence of cutaneous and/or systemic reactions of varying severity (Mazzotti reaction) as well as ocular reactions.

## 4.4 Special Warnings and Precautions for Use

***Initial Treatment***

During the first few days of treatment of filarial infections with diethylcarbamazine, patients should be monitored carefully for adverse reactions (see Section *4.8 Undesirable Effects)*. The intensity and the severity of the adverse reactions that appear after administration of diethylcarbamazine citrate are associated with the level of microfilariae in the blood prior to treatment. In the event of Loa loa infestation, the level of microfilariae present in the blood is often high, which predisposes the treated patients to an increased risk of serious side effects (see Section *4.8 Undesirable Effects*).

The dosage should be increased gradually in individuals showing no or mild reactions and should be slower in individuals showing more severe reactions. In the large majority of cases, reactions resolve during treatment.

***Serious central nervous system complications in patients with Loa loa infestation***

Serious central nervous system problems such as encephalopathy and coma have been reported, in particular in patients with Loa loa infestation that have been treated with diethylcarbamazine. Although rare, fatalities have been reported.

These reactions can be mitigated or prevented by the introduction of a progressive dosage and the addition of corticosteroids.

***Alkaline urine***

Diets that promote the alkalisation of the urine may increase the elimination half-life of diethylcarbamazine. Dose reductions may be needed.

***Hypersensitivity Reactions***

In the event of a severe hypersensitivity reaction, administration of a corticosteroid, such as betamethasone, is recommended.

***Seizure threshold***

Diethylcarbamazine must be used with care in patients who have a history of convulsions or factors that predispose them to convulsions.

***Concomitant disorders***

In the event of an acute concomitant disorder, the patient should be allowed to recover before taking diethylcarbamazine.

*BANOCIDE* and *BANOCIDE FORTE TABLETS* contain lactose. Patients with galactose intolerance, total lactase deficiency, or glucose and galactose malabsorption syndrome (rare inherited diseases) should not take these medicines.

## 4.5 Drug Interactions

There are no relevant data available.

## 4.6 Use in Special Populations

### Pregnancy and Lactation

***Fertility***

There are no relevant data available.

***Pregnancy***

Diethylcarbamazine should not be used during pregnancy. In view of the severe reactions which may follow diethylcarbamazine administration, it is advisable to postpone treatment of pregnant women until after parturition.

***Lactation***

The use of diethylcarbamazine is not recommended during breast-feeding. No data are available on the excretion of diethylcarbamazine citrate or its metabolites in human breast milk.

## 4.7 Effects on Ability to Drive and Use Machines

Patients should be informed of the risk of drowsiness associated with the use of diethylcarbamazine which may impact on the ability to drive and use machines (see section *4.8 Undesirable Effects*).

## 4.8 Undesirable Effects

***Clinical Trial Data and Post Marketing Data***

*Adverse drug reactions (ADRs) are listed below by MedDRA system organ class and by frequency.*

*Frequencies are defined as:*

Very common ≥1/10

Common ≥1/100 to <1/10

Uncommon ≥1/1000 to <1/100

Rare ≥1/10000 to <1/1000

Very rare <1/10000

Not known (cannot be estimated from the available data).

In the absence of a filarial infection the only side effects of diethylcarbamazine, when given at the recommended dosage, are nausea and vomiting.

Adverse reactions to treatment with diethylcarbamazine vary with the infecting filarial species. Treatment of bancroftian filariasis with diethylcarbamazine results in the development of fewer and milder reactions than those seen following therapy of infection with Brugia spp or Loa loa.

Reactions associated with the microfilaricidal action of diethylcarbamazine resolve during treatment.

*Blood and lymphatic system disorders*
Common: lymphangitis[1,2]
Not known: lymphadenitis[1,2], lymphoedema[1,2]

*Immune system disorders*
Not known: reactions resembling the Mazzotti reaction, allergic reactions *(see Skin and subcutaneous tissue disorders*)

*Metabolism and nutrition disorders*
Not known: anorexia

*Nervous system disorders*
Very common: headache
Common: dizziness, faintness
Not known: seizures (in patients with history of epilepsy), meningoencephalitis[3] *(*see section *4.4 Special Warnings and Precautions for Use)*

*Vascular disorders*
Very common: vasculitis[1,2]

*Respiratory, thoracic and mediastinal disorders*
Not known: asthmatic attack

*Gastrointestinal disorders*
Common: vomiting
Not known: nausea

*Skin and subcutaneous tissue disorders*
Not known: urticaria, pruritus[3], rash[3]

*Musculoskeletal and connective tissue disorders*
Not known: myalgia[1], arthralgia[1,3]

*Renal and urinary disorders*
Common: proteinuria
Not known: haematuria

*General disorders and administration site conditions*
Very common: fever, nodules[1,2] (palpable subcutaneously and along spermatic cord, formed by recently killed worms)
Common: localised oedema[1,2]
Not known: rigors, malaise, chills[1,2], oedema[3],

[1] – in patients with Brugia malayi or Brugia timori infection
[2] – in patients with Wuchereria bancrofti infection
[3] – in patients with Loa loa infection

### 4.9 Overdose

***Symptoms and signs***

Symptoms are likely to consist of nausea, vomiting, headache, dizziness, drowsiness and, in serious cases, convulsions.

***Treatment***

Adequate fluids should be given to ensure optimal diuresis. Acidification of urine should enhance the excretion of diethylcarbamazine. Routine supportive measures should be given when necessary.

Further management should be as clinically indicated or as recommended by the national poisons centre, where available.

## 5. PHARMACOLOGICAL PROPERTIES

Pharmacotherapeutic group: Antinematodal agents; ATC Code: P02CB02.

### 5.1 Mechanism of Action and Pharmacodynamic Properties

The mode of action is uncertain. At least 2 types of effects of diethylcarbamazine on microfilariae have been reported. The drug has been shown to induce immobilization of the worm by decreasing muscle activity; this may be related to hyperpolarization effects caused by the piperazine moiety. Alteration of the surface membrane of microfilariae also appears to occur, facilitating enhanced destruction by the host's immune system. Recent evidence suggests that diethylcarbamazine may enhance adhesion of granulocytes to microfilariae via antibody-dependent and independent mechanisms. Platelets may also play a role in mediating effects against microfilariae. Interference of microfilarial intracellular processing and transport of specific macromolecules by diethylcarbamazine, or other effects of the drug on immune and/or inflammatory responses of the host have also been suggested to explain filaricidal actions.

Diethylcarbamazine is microfilaricidal for all species for which it is indicated. In addition, diethylcarbamazine leads to almost complete destruction of adult Loa loa; however it has variable macrofilaricidal activity against other filarial species.

### 5.2 Pharmacokinetic Properties

***Absorption***

Diethylcarbamazine is rapidly absorbed from the gastrointestinal tract. After a single dose, peak plasma levels are reached within 1 to 2 hours. The plasma half life is approximately 9 hours. Increasing doses, given over several days, result in a proportional rise in plasma levels. When a daily maintenance dosage of 900 mg is given, the mean plasma level remains constant, showing no accumulation on prolonged dosing.

***Distribution***

Diethylcarbamazine is widely distributed in tissues. In animals, diethylcarbamazine distributes in similar amounts to most tissues, except adipose tissue. High drug concentrations have been found in the pituitary gland, lymph nodes, adrenal medulla, and salivary glands. Diethylcarbamazine crosses the blood-brain barrier.

***Metabolism***

Diethylcarbamazine is eliminated largely as unchanged drug, with relatively small amounts being excreted as the N-oxide metabolite.

***Elimination***

Diethylcarbamazine and its metabolites are excreted in the urine. Urinary excretion and hence plasma half-life is dependent on urinary pH. About 5% of a dose is eliminated in the faeces.

***Special patient populations***

*Renal Impairment*

The plasma half life of diethylcarbamazine is increased in patients with renal insufficiency, whereas acidification of urine significantly increases the excretion rate of diethylcarbamazine, thereby markedly reducing the plasma half life.

*Vegetarians*

In certain regions, the diet is predominantly vegetarian, which promotes alkaline urine (pH 7.5 to 8). When an alkaline urinary pH is maintained, the elimination half-life of diethylcarbamazine is increased, whereas acidification of urine significantly increases the excretion rate of diethylcarbamazine.

## 6. NONCLINICAL PROPERTIES

### 6.1 Animal Toxicology or Pharmacology

*Carcinogenesis, mutagenesis*

There are no data as to whether diethylcarbamazine has mutagenic or carcinogenic potential.

*Teratogenicity*

Diethylcarbamazine is not teratogenic at high doses in rats and rabbits.

## 7. DESCRIPTION

Tablet

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Each uncoated tablet contains:
Diethylcarbamazine Citrate I.P. 50 mg

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Each uncoated tablet contains:
Diethylcarbamazine Citrate I.P. 100 mg

***List of Excipients***

*BANOCIDE TABLET*
Lactose, Maize starch, Calcium Silicate, Magnesium Stearate and Purified water.

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Lactose, Maize Starch, Calcium Silicate, Magnesium Stearate, Sodium Starch Glycolate and Purified water.

## 8. PHARMACEUTICAL PARTICULARS

### 8.1 Incompatibilities

There are no relevant data available.

### 8.2 Shelf Life

The expiry date is indicated on the label and packaging.

### 8.3 Packaging Information

Strips of tablets in a carton.

### 8.4 Storage and Handling Instructions

Store at temperature not exceeding 30$^{o}$C, protected from moisture.

Keep out of reach of children.

## 9. PATIENT COUNSELLING INFORMATION

Registered Medical Practitioners may counsel their patients (and/or patients' caregiver as applicable) about the special warnings and precautions for use, drug interactions, undesirable effects, and any relevant contraindications of *BANOCIDE TABLETS* or *BANOCIDE FORTE TABLETS*. Patients (and/or patients' caregiver) may also be informed about posology, method of administration and storage/handling information as applicable.

## 10. DETAILS OF MANUFACTURER

The Manufacturing Site details are mentioned on the label and packaging.

**For further information please contact:**
GlaxoSmithKline Pharmaceuticals Limited.
**Registered Office**
Dr. Annie Besant Road, Worli
Mumbai - 400 030

## 11. DETAILS OF PERMISSION OR LICENCE NUMBER WITH DATE

Manufacturing License number is indicated on the label and packaging.

## 12. DATE OF REVISION

**29-JAN-2025**

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*Version: BAN/PI/IN/2025/01*

*Adapted from:*

- *Notezine (Diethylcarbamazine citrate), Sanofi Winthrop industry, 10 April 2024, ANSM France, Link: Autorisation - Minigraphie (sante.fr)*
- *Diethylcarbamazine citrate NCDS v04 dated 16 March 2021 (obsolete).*