

## ANNEX I

### SUMMARY OF PRODUCT CHARACTERISTICS

#### 1. NAME OF THE MEDICINAL PRODUCT

**BACTOX 125 mg/5 ml, powder for oral suspension in vial.**

#### 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Amoxicillin..... 125.00 mg

As amoxicillin trihydrate.

For one measuring spoon of 5 ml oral suspension reconstituted.

Excipients with known effect: sodium (6.26 mg per measuring spoon), aspartame (8.5 mg per measuring spoon), sodium benzoate (7.1 mg per measuring spoon) and maltodextrin (glucose).

For the full list of excipients, see section 6.1.

#### 3. PHARMACEUTICAL FORM

Powder for oral suspension.

#### 4. CLINICAL PARTICULARS

##### 4.1. Therapeutic indications

BACTOX is indicated for the treatment of the following infections in adults and children (see sections 4.2, 4.4 and 5.1):

- Acute bacterial sinusitis
- Acute otitis media
- Documented angina/pharyngitis with streptococcus
- Acute exacerbation of chronic bronchitis
- Community-acquired pneumonia
- Acute cystitis
- Asymptomatic bacteriuria in pregnancy
- Acute pyelonephritis
- Typhoid and paratyphoid fever
- Dental abscess with cellulitis
- Prosthetic joint infections
- Eradication of *Helicobacter pylori*
- Lyme disease

BACTOX is also indicated in the prophylactic treatment of endocarditis.

Consideration should be given to official guidance on the appropriate use of antibacterial agents.

##### 4.2. Posology and method of administration

###### Posology

The BACTOX dose chosen to treat a particular infection should take into account:

- The suspected pathogens and their probable sensitivity to antibacterial agents (see section 4.4)
- The severity and site of the infection
- Age, weight and renal function of the patient; see below

The duration of treatment will depend on the type of infection and patient response to treatment and should generally be as short as possible. Certain infections require a prolonged treatment (see section 4.4 on prolonged treatment).

**Adults and children  $\geq$  40 kg**

| Indication*   | Dose*  |
|---|--|
| Acute bacterial sinusitis   | 250 mg to 500 mg every 8 hours or 750 mg to 1 g every 12 hours   |
| Asymptomatic bacteriuria in pregnancy   |  |
| Acute pyelonephritis  | For severe infections, 750 mg to 1 g every 8 hours   |
| Dental abscess with cellulitis  | Acute cystitis can be treated with 3 g twice daily for one day   |
| Acute cystitis  |  |
| Acute otitis media  | 500 mg every 8 hours, 750 mg to 1 g every 12 hours   |
| Documented angina/pharyngitis with streptococcus  | For severe infections, 750 mg to 1 g every 8 hours for 10 days   |
| Acute exacerbation of chronic bronchitis  |  |
| Community-acquired pneumonia  | 500 mg to 1 g every 8 hours  |
| Typhoid and paratyphoid fever   | 500 mg to 2 g every 8 hours  |
| Prosthetic joint infections   | 500 mg to 1 g every 8 hours  |
| Prophylactic treatment of endocarditis  | 2 g orally, one single dose 30 to 60 minutes before surgery  |
| Eradication of <i>Helicobacter pylori</i>   | 750 mg to 1 g twice daily in combination with a proton-pump inhibitor (e.g. omeprazole or lansoprazole) and another antibiotic (e.g. clarithromycin or metronidazole) for 7 days   |
| Lyme disease (see section 4.4)  | Early stage: 500 mg to 1 g every 8 hours up to a maximum of 4 g/day in fractionated doses for 14 days (10 to 21 days)<br><br>Late stage (systemic complications): 500 mg to 2 g every 8 hours up to a maximum of 6 g/day in fractionated doses for 10 to 30 days |
| *Consideration should be given to the official therapeutic recommendations for each indication. |  |

**Children < 40 kg**

Children can be treated with BACTOX in the form of capsules or suspensions.

For children weighing 40 kg or more, the adult dosage should be prescribed.

Recommended doses:

| Indication*                                      | Dose*                                 |
|--|---------------------------------------|
| Acute bacterial sinusitis                        | 20 to 90 mg/kg/day in several doses * |
| Acute otitis media                               |                                       |
| Community-acquired pneumonia                     |                                       |
| Acute cystitis                                   |                                       |
| Acute pyelonephritis                             |                                       |
| Dental abscess with cellulitis                   |                                       |
| Documented angina/pharyngitis with streptococcus | 40 to 90 mg/kg/day in several doses * |
| Typhoid and paratyphoid fever                    | 100 mg/kg/day in 3 doses              |

|   |   |
|---|---|
| Prophylactic treatment of endocarditis  | 50 mg/kg orally, one single dose 30 to 60 minutes before surgery  |
| Lyme disease (see section 4.4)  | Early stage: 25 to 50 mg/kg/day in three doses for 10 to 21 days<br><br>Late stage (systemic complications): 100 mg/kg/day in three doses for 10 to 30 days |
| + Consideration should be given to the official therapeutic recommendations for each indication.<br>*The dosage regimen in two daily doses should only be considered for the highest doses. |   |

### **Elderly patients**

No dosage adjustment is necessary.

### **Patients with renal impairment**

| GFR (ml/min)  | Adults and children $\geq$ 40 kg | Children < 40 kg <sup>#</sup>                      |
|---|----------------------------------|--|
| <b>greater than 30</b>  | No dosage adjustment necessary   | No dosage adjustment necessary                     |
| <b>10 to 30</b>   | maximum 500 mg twice daily       | 15 mg/kg twice daily (maximum 500 mg twice daily)  |
| <b>less than 10</b>   | maximum 500 mg/day               | 15 mg/kg in one single dose daily (maximum 500 mg) |
| <sup>#</sup> In the majority of cases, parenteral treatment is preferable |                                  |  |

### **Patients on haemodialysis**

Amoxicillin can be eliminated from blood circulation by haemodialysis.

|  | <b>Haemodialysis</b>  |
|--|---|
| <b>Adults and children weighing over 40 kg</b> | 500 mg every 24 hours.<br><br>Before haemodialysis, an additional dose of 500 mg should be administered. In order to re-establish concentrations of the medicinal product into circulation, another dose of 500 mg should be administered after haemodialysis.                                      |
| <b>Children weighing less than 40 kg</b>       | 15 mg/kg/day in one single dose daily (500 mg maximum).<br><br>Before haemodialysis, an additional dose of 15 mg/kg should be administered. In order to re-establish concentrations of the medicinal product into circulation, another dose of 15 mg/kg should be administered after haemodialysis. |

### **Patients on peritoneal dialysis**

500 mg/day of amoxicillin maximum.

### **Patients with hepatic impairment**

Use with caution and monitor hepatic function regularly (see sections 4.4 and 4.8).

### **Method of administration**

BACTOX is intended for oral use.

Dietary intake has no effect on the absorption of BACTOX.

Treatment can be started by parenteral route, according to the dosage recommendations of the intravenous formulation, and be continued with a formulation for oral administration.

Use the measuring spoon provided with the vial.

See section 6.6 regarding instructions for reconstitution of the medicinal product before administration.

### **4.3. Contraindications**

Hypersensitivity to the active substance, penicillins or to any of the excipients listed in section 6.1.

History of immediate severe hypersensitivity reaction (e.g. anaphylaxis) to another beta-lactam (e.g. cephalosporin, carbapenem or monobactam).

In case of phenylketonuria, due to the presence of aspartame.

### **4.4. Special warnings and precautions for use**

#### Hypersensitivity reactions

Before starting treatment with amoxicillin, an in-depth interview is required in order to determine the patient's history of hypersensitivity reactions to penicillins, cephalosporins or other beta-lactams (see sections 4.3 and 4.8).

Serious and occasionally fatal hypersensitivity reactions (including anaphylactoid and severe cutaneous adverse reactions) have been reported in patients on penicillin therapy. The onset of such reactions is more likely in patients with a history of hypersensitivity to penicillin and in persons with atopia. The onset of any allergic manifestation requires the discontinuation of treatment with amoxicillin and implementation of another appropriate treatment.

#### Non-susceptible microorganisms

Amoxicillin is not suitable in the treatment of certain types of infections unless the pathogen is already documented and known as being responsive to amoxicillin, or if there is a very high probability that the pathogen is sensitive to it (see section 5.1). In particular, this involves the treatment of patients with urinary infections and severe infections of the ear, nose and throat.

#### Seizures

Seizures may appear in patients with renal impairment or receiving high doses or in patients presenting predisposing factors (e.g. history of seizures, treated epilepsy, meningeal disorders (see section 4.8)).

#### Renal impairment

In patients with renal impairment, the dose should be adjusted according to the degree of renal impairment (see section 4.2).

#### Skin reactions

At the beginning of treatment, the onset of a generalised febrile erythema, associated with pustules, can be the symptom of an acute generalised exanthematous pustulosis (AGEP) (see section 4.8). This reaction requires discontinuation of amoxicillin and contraindicates any subsequent administration this medicinal product.

Amoxicillin should be avoided if infectious mononucleosis is suspected, because the onset of a morbilliform skin rash has been associated with this pathology after using amoxicillin.

#### Jarisch-Herxheimer reaction

Jarisch-Herxheimer reactions have been observed after treatment of Lyme disease with amoxicillin (see section 4.8). This is a direct consequence of the bactericidal activity of amoxicillin on the bacteria responsible for Lyme disease, spirochaete *Borrelia burgdorferi*. Patients should be reassured by the fact that this is a common consequence and generally resolved spontaneously through antibiotic treatment of Lyme disease.

#### Proliferation of non-susceptible microorganisms

Prolonged use may occasionally result in the proliferation of non-susceptible organisms.

Antibiotic-associated colitis has been reported with nearly all antibacterial agents: with severity varying from mild to life-threatening (see section 4.8). Therefore, it is important to consider this diagnosis in patients with diarrhoea occurring during or after administration of any antibiotic. In case of colitis associated with antibiotics, amoxicillin should be immediately discontinued; a doctor should be consulted

and appropriate treatment should be implemented. Medicines that inhibit peristalsis are contraindicated in these circumstances.

#### Prolonged treatment

In case of prolonged treatment, regular monitoring of organ functions is recommended, particularly renal, hepatic and haematopoietic functions. Elevated liver enzymes and changes in blood count have been reported (see section 4.8).

#### Anticoagulants

Rare cases of prolongation of Quick's time have been reported in patients receiving amoxicillin. Appropriate monitoring should be introduced when anticoagulants are prescribed simultaneously. Dose adjustments for oral anticoagulants may be necessary to maintain the desired level of blood coagulation (see sections 4.5 and 4.8).

#### Crystalluria

Very rare cases of crystalluria have been observed in patients with a low urinary output, particularly during parenteral administration. When administering high doses of amoxicillin, it is recommended to maintain fluid intake and adequate urination to reduce the risk of amoxicillin crystalluria. In patients with bladder catheters, the permeability of the catheter should be monitored regularly (see sections 4.8 and 4.9).

#### Interference with diagnostic tests

High levels of amoxicillin in serum and urine are likely to affect certain laboratory tests. Due to high concentrations of amoxicillin in urine, false positive results are common with chemical methods.

Whilst searching for the presence of glucose in the urine during treatment with amoxicillin, the enzymatic method with glucose oxidase should be used.

The presence of amoxicillin can distort the results for oestriol assays in pregnant women.

#### Important information on excipients

This medicinal product contains maltodextrin (glucose). Its use is not recommended in patients with glucose-galactose malabsorption syndrome.

Due to the presence of sodium benzoate (E211), this medicinal product may cause irritation of the skin, eyes and mucous membranes and can increase the risk of jaundice in neonates.

This medicinal product contains 6.26 mg of sodium per measuring spoon. This should be taken into account when administering to patients on a strict low-sodium diet.

### **4.5. Interaction with other medicinal products and other forms of interaction**

#### Probenecid

Concomitant use of probenecid is not recommended. Probenecid decreases renal tubular secretion of amoxicillin. Concomitant use of probenecid may result in a prolonged increase of blood levels of amoxicillin.

#### Allopurinol

Concomitant administration of allopurinol during treatment with amoxicillin may increase the probability of allergic skin reactions.

#### Tetracyclines

Tetracyclines and other bacteriostatics can interfere with the bactericidal effects of amoxicillin.

#### Oral anticoagulants

Oral anticoagulants are often administered concomitantly with antibiotics of the penicillin family and no interaction has been reported. However, cases of increased INR have been reported in the literature in patients on acenocoumarol or warfarin when administering amoxicillin. If co-administration is required, Quick's time or INR should be closely monitored when adding or removing amoxicillin. A dosage adjustment of oral anticoagulants may also be necessary (see sections 4.4 and 4.8).

#### Methotrexate

Penicillins can reduce the excretion of methotrexate and thus increase its toxicity.

#### 4.6. Fertility, pregnancy and lactation

##### **Pregnancy**

Studies in animals have shown no evidence of direct or indirect harmful effects on reproduction. Limited data on the use of amoxicillin in pregnant women does not indicate increased risk of congenital deformities. Amoxicillin can be administered in pregnant women if the potential benefits outweigh the potential risks associated with treatment.

##### **Breast-feeding**

Amoxicillin is excreted in human breast milk in small quantities with a possible risk of sensitivity. Therefore, diarrhoea and fungal infection of mucous membranes are possible in breast-fed infants and may require discontinuation of breast-feeding. Amoxicillin may only be used when breast-feeding after assessment of the benefit/risk ratio by the treating physician.

##### **Fertility**

There is no data concerning the effects of amoxicillin on human fertility. Animal reproduction studies have not shown any effects on fertility.

#### 4.7. Effects on ability to drive and use machines

No studies have been conducted on the ability to drive and use machines. However, the onset of undesirable effects (e.g. allergic reactions, dizziness, seizures) may have an effect on the ability to drive and use machines (see section 4.8).

#### 4.8. Undesirable effects

The most common undesirable effects are diarrhoea, nausea and skin rashes.

The undesirable effects identified in clinical studies and post-marketing for amoxicillin are listed below according to the MedDRA System Organ Class.

The following terminology is used to classify undesirable effects according to their frequency:

- Very common:  $\geq 1/10$
- Common:  $\geq 1/100$ ;  $< 1/10$
- Uncommon:  $\geq 1/1000$ ;  $< 1/100$
- Rare:  $\geq 1/10000$ ;  $< 1/1000$
- Very rare:  $< 1/10000$
- Frequency not known: cannot be estimated from the available data

| <b><u>Infections and infestations</u></b>          |   |
|--|---|
| Very rare  | Mucocutaneous candidiasis   |
| Frequency not known                                | Aseptic meningitis  |
| <b><u>Blood and lymphatic system disorders</u></b> |   |
| Very rare  | Reversible leucopenia (including agranulocytosis or severe neutropenia), reversible haemolytic anaemia and thrombocytopenia. Prolonged bleeding time and Quick's time (see section 4.4) |
| <b><u>Immune system disorders</u></b>              |   |
| Very rare  | Severe allergic reactions, including Quincke's oedema, anaphylaxis, serum disorders and hypersensitivity vasculitis (see section 4.4)   |
| Frequency not known                                | Jarisch-Herxheimer reaction (see section 4.4), Kounis syndrome  |

|   |   |
|---|---|
| <b><u>Nervous system disorders</u></b>  |   |
| Very rare   | Hyperkinesia, dizziness and seizures (see section 4.4)  |
| <b><u>Gastrointestinal disorders</u></b>  |   |
| Clinical study data   |   |
| *Common   | Diarrhoea and nausea  |
| *Uncommon   | Vomiting  |
| Post-marketing data   |   |
| Very rare   | Antibiotic-associated colitis (including pseudomembranous colitis and haemorrhagic colitis, see section 4.4)<br><br>Black hairy tongue<br><br>Superficial discolouration of the teeth <sup>#</sup>  |
| <b><u>Hepatobiliary disorders</u></b>   |   |
| Very rare   | Hepatitis and cholestatic jaundice<br><br>Moderate increase in AST and/or ALT   |
| <b><u>Skin and subcutaneous tissue disorders</u></b>  |   |
| Clinical study data   |   |
| *Common   | Skin rash   |
| *Uncommon   | Urticaria and pruritis  |
| Post-marketing data   |   |
| Very rare   | Skin reactions such as erythema multiforme, Stevens-Johnson syndrome, toxic epidermal necrolysis, bullous and exfoliative dermatitis, and acute generalized exanthematous pustulosis (AGEP) (see section 4.4) and drug reaction with eosinophilia and systemic symptoms (DRESS) |
| <b><u>Renal and urinary disorders</u></b>   |   |
| Very rare   | Interstitial nephritis<br><br>Crystalluria (see sections 4.4 and 4.9)   |
| <p>* The frequency of these undesirable effects was determined according to clinical study data on a total of approximately 6000 adult and paediatric patients treated with amoxicillin.</p> <p><sup>#</sup> Superficial discolouration of the teeth has been reported in children. Good oral hygiene may help to prevent dental discolouration, usually reversible after brushing the teeth.</p> |   |

### **Reporting of suspected adverse reactions**

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system: Agence nationale de sécurité du médicament et des produits de santé (ANSM) and the network of Regional Pharmacovigilance Centres - Website: [www.signalement-sante.gouv.fr](http://www.signalement-sante.gouv.fr).

## 4.9. Overdose

### Signs and symptoms of overdose

Gastrointestinal symptoms (such as nausea, vomiting and diarrhoea) and electrolyte balance disorders are possible. Cases of amoxicillin crystalluria, leading to some cases of renal impairment have been observed. Seizures may occur in patients with renal impairment or those receiving high doses (see sections 4.4 and 4.8).

### Intoxication treatment

The treatment of gastrointestinal signs is symptomatic and requires special monitoring of the electrolyte balance.

Amoxicillin can be eliminated from blood circulation by haemodialysis.

## 5. PHARMACOLOGICAL PROPERTIES

### 5.1. Pharmacodynamic properties

**Pharmacotherapeutic group: broad-spectrum penicillins, ATC code: J01CA04.**

#### Mechanism of action

Amoxicillin is a semi-synthetic penicillin (antibiotic of the beta-lactam family), which inhibits one or several enzymes (often referred to as penicillin-binding proteins or PBPs) of the biosynthetic pathway of bacterial peptidoglycans, structural components of the bacterial cellular wall. The inhibition of peptidoglycan synthesis leads to weakening of the cell wall, often followed by lysis and cell death.

Being subject to degradation by beta-lactams produced by resistant bacteria, the activity spectrum of amoxicillin when it is administered alone does not include organisms that produce these enzymes.

#### Pharmacokinetic/pharmacodynamic relationship

Time above minimum inhibitory concentration ( $T > MIC$ ) is considered as the major efficacy parameter for amoxicillin.

#### Resistance mechanisms

The two main mechanisms of resistance to amoxicillin are:

- Inactivation by bacterial beta-lactams
- Modification of PBPs, which reduces the affinity of the antibacterial agent for the target

The impermeability of bacteria or efflux pump mechanisms may cause or promote bacterial resistance, particularly in Gram-negative bacteria.

#### Critical concentrations

Critical concentrations for amoxicillin established by EUCAST (European Committee on Antimicrobial Susceptibility Testing) version 5.0.

| Organism                              | Critical value of MIC sensitivity (mg/L) |                   |
|---------------------------------------|--|-------------------|
|                                       | Susceptible $\leq$                       | Resistant $>$     |
| Enterobacteria                        | 8 <sup>1</sup>                           | 8                 |
| <i>Staphylococcus spp.</i>            | Note <sup>2</sup>                        | Note <sup>2</sup> |
| <i>Enterococcus spp.</i> <sup>3</sup> | 4  | 8                 |
| Streptococcus A, B, C and G groups    | Note <sup>4</sup>                        | Note <sup>4</sup> |
| <i>Streptococcus pneumoniae</i>       | Note <sup>5</sup>                        | Note <sup>5</sup> |
| <i>Viridans</i> group streptococci    | 0.5                                      | 2                 |
| <i>Haemophilus influenzae</i>         | 2 <sup>6</sup>                           | 2 <sup>6</sup>    |
| <i>Moraxella catarrhalis</i>          | Note <sup>7</sup>                        | Note <sup>7</sup> |



|   |                    |                    |
|---|--------------------|--------------------|
| <i>Neisseria meningitidis</i>   | 0.125              | 1                  |
| Gram-positive anaerobic bacteria except <i>Clostridium difficile</i> <sup>8</sup> | 4                  | 8                  |
| Gram-negative anaerobic bacteria <sup>8</sup>                                     | 0.5                | 2                  |
| <i>Helicobacter pylori</i>  | 0.125 <sup>9</sup> | 0.125 <sup>9</sup> |
| <i>Pasteurella multocida</i>  | 1                  | 1                  |
| Non-species-related critical concentrations <sup>10</sup>                         | 2                  | 8                  |

<sup>1</sup> Wild strains of Enterobacteria are classified as susceptible to aminopenicillins. Certain countries prefer to classify isolated wild strains of *E. coli* and *P. mirabilis* in the intermediate category. In this case, the critical value of MIC  $S \leq 0.5$  mg/L should be used.

<sup>2</sup> Most staphylococci are penicillinase producers, and are resistant to amoxicillin. Methicillin-resistant isolates are, with some exceptions, resistant to all antibiotics of the beta-lactam family.

<sup>3</sup> Susceptibility to amoxicillin can be deduced from that of ampicillin.

<sup>4</sup> The susceptibility of Streptococcus A, B, C and G groups to penicillins is deduced from the susceptibility to benzylpenicillin.

<sup>5</sup> The critical values only involve non-meningeal isolates. For isolates classified as ampicillin-intermediate, oral treatment with amoxicillin must be avoided. Susceptibility is deduced from the MIC value of ampicillin.

<sup>6</sup> The critical values are based on intravenous administration. Beta-lactamase-positive isolates should be reported as resistant.

<sup>7</sup> Beta-lactam producers should be reported as resistant.

<sup>8</sup> Sensitivity to amoxicillin is deduced by sensitivity to benzylpenicillin.

<sup>9</sup> The critical values are based on epidemiological threshold values (ECOFF), which distinguish between wild strain isolates and isolates with decreased susceptibility.

<sup>10</sup> Non-species-related critical values are based on doses of at least 0.5 g administered 3 to 4 times per day (1.5 to 2 g/day).

The prevalence of resistance may vary as a function of geography and time for some species. It is therefore advisable to have information available on the prevalence of local resistance, especially for the treatment of severe infections. If necessary, it is desirable to obtain expert advice when the interest of using the medicinal product in certain infections may be questionable due to local resistance prevalence.

|  |
|--|
| <b>In vitro sensitivity to amoxicillin microorganisms</b>  |
| <b><u>Normally susceptible species</u></b>   |
| <u>Gram-positive aerobic bacteria</u><br><i>Enterococcus faecalis</i><br>Beta-haemolytic streptococcus (A, B, C and G groups)<br><i>Listeria monocytogenes</i> |
| <b><u>Variably susceptible species</u></b><br>(acquired resistance > 10%)  |
| <u>Gram-negative aerobic bacteria</u><br><i>Escherichia coli</i>   |

|  |
|--|
| <i>Haemophilus influenzae</i><br><i>Helicobacter pylori</i><br><i>Proteus mirabilis</i><br><i>Salmonella typhi</i><br><i>Salmonella paratyphi</i><br><i>Pasteurella multocida</i>  |
| <u>Gram-positive aerobic bacteria:</u><br>Coagulase-negative staphylococci<br><i>Staphylococcus aureus</i> <sup>£</sup><br><i>Streptococcus pneumoniae</i><br>Viridans group streptococci  |
| <u>Gram-positive anaerobic bacteria:</u><br><i>Clostridium</i> spp.  |
| <u>Gram-negative anaerobic bacteria:</u><br><i>Fusobacterium</i> spp.  |
| <u>Other:</u><br><i>Borrelia burgdorferi</i>   |
| <b><u>Naturally resistant species<sup>†</sup></u></b>  |
| <u>Gram-positive aerobic bacteria:</u><br><i>Enterococcus faecium</i> <sup>†</sup>   |
| <u>Gram-negative aerobic bacteria:</u><br><i>Acinetobacter</i> spp.<br><i>Enterobacter</i> spp.<br><i>Klebsiella</i> spp.<br><i>Pseudomonas</i> spp.   |
| <u>Gram-negative anaerobic bacteria:</u><br>Bacteroides spp. (many strains of <i>Bacteroides fragilis</i> are resistant).  |
| <u>Others:</u><br><i>Chlamydia</i> spp.<br><i>Mycoplasma</i> spp.<br><i>Legionella</i> spp.  |
| <sup>†</sup> Natural intermediate susceptibility due to the lack of required resistance mechanisms<br><sup>£</sup> Nearly all <i>S. aureus</i> are resistant to amoxicillin due to their production of penicillinase. In addition, all methicillin-resistant strains are resistant to amoxicillin. |

## 5.2. Pharmacokinetic properties

### **Absorption**

Amoxicillin totally dissociated in aqueous solution at physiological pH. It is quickly and thoroughly absorbed after oral administration. After oral administration, amoxicillin presents a bioavailability of approximately 70%. The time required to reach the peak plasma concentration ( $T_{max}$ ) is about one hour.

The pharmacokinetic results of one study in which the dose of 250 mg amoxicillin three times per day was administered to groups of healthy volunteers in the fasting state are presented below.

| C <sub>max</sub>   | T <sub>max</sub> * | AUC (0-24h) | T <sub>½</sub> |
|--------------------|--------------------|-------------|----------------|
| (µg/ml)            | (h)                | (µg.h/ml)   | (h)            |
| 3.3 ± 1.12         | 1.5 (1.0-2.0)      | 26.7 ± 4.56 | 1.36 ± 0.56    |
| *Median (interval) |                    |             |                |

In the dose range between 250 and 3 000 mg, the bioavailability was proportional to the dose administered (measured by C<sub>max</sub> and AUC). Absorption was not affected by simultaneous food intake.

Haemodialysis can be used to eliminate amoxicillin.

### **Distribution**

Approximately 18% of total plasma amoxicillin are bound to proteins and the apparent volume of distribution is approximately 0.3 to 0.4 l/kg.

After intravenous administration, amoxicillin was detected in the gallbladder, abdominal tissue, skin, fat, muscle tissues, synovial and peritoneal fluids, bile and pus. Amoxicillin does not adequately disperse in cerebrospinal fluid.

Animal studies have not shown significant tissue accumulation from the drug-derived substance. Amoxicillin, like the majority of penicillins, can be detected in human breast milk (see section 4.6).

It has been shown that amoxicillin crosses the placental barrier (see section 4.6).

### **Biotransformation**

Amoxicillin is partially excreted in the urine as inactive penicilloic acid, in a proportion up to 10 to 25% of the initial dose.

### **Elimination**

The primary route of elimination for amoxicillin is renal.

Amoxicillin has an mean elimination half-life of approximately one hour and an average total clearance of approximately 25 l/hour in healthy subjects. About 60 to 70% of amoxicillin is excreted unchanged in urine during the 6 hours after administration of a single dose of 250 mg or 500 mg of amoxicillin. Various studies have shown that urinary excretion is between 50 to 85% over a 24-hour period.

Concomitant use of probenecid delays excretion of amoxicillin (see section 4.5).

### **Age**

The elimination half-life of amoxicillin in young children aged 3 months to 2 years is similar to that of older children and adults. In very young children (including preterm neonates), during the first week of life, administration should be limited to twice per day due to the immaturity of the renal elimination route. Due to an increased likelihood of renal function deterioration in elderly patients, the dose should be selected with caution and it may be useful to monitor the renal function.

### **Gender**

After oral administration of amoxicillin in healthy men and women, the sex of patients did not have a significant effect on the pharmacokinetic characteristics of amoxicillin.

### **Renal impairment**

The total serum clearance of amoxicillin decreases proportionally to the decrease in renal function (see sections 4.2 and 4.4).

### **Hepatic impairment**

Amoxicillin should be used with caution in patients with hepatic impairment and hepatic function should be monitored regularly.

### **5.3. Preclinical safety data**

Non-clinical data reveal no special hazard for humans based on conventional studies of safety pharmacology, repeated dose toxicity, genotoxicity, carcinogenic potential, toxicity to reproduction and development.

Carcinogenic studies have not been conducted with amoxicillin.

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1. List of excipients**

Anhydrous citric acid, trisodium citrate (anhydrous), sodium benzoate, talc, guar (galactomannan of), orange flavouring, lemon flavouring, peach-apricot flavouring, aspartame, silicon dioxide.

### **6.2. Incompatibilities**

Not applicable.

### **6.3. Shelf life**

Before reconstitution: 3 years.

After reconstitution, the suspension may be stored in a refrigerator for 14 days (between 2°C and 8°C).

### **6.4. Special precautions for storage**

Store at a temperature not exceeding 25°C.

For storage conditions after reconstitution of the medicinal product, see section 6.3

### **6.5. Nature and contents of container**

5.1 g of powder (equivalent to 12 measuring spoons of 5 ml of reconstituted suspension) in a 60-ml vial (amber glass), with a graduated measuring spoon (polypropylene) at 2.5 ml and 5 ml. Box of 1.

### **6.6. Special precautions for disposal and other handling**

Check that the cap seal is intact before use.

To open, press then turn the cap.

Flip and shake the vial to loosen the powder.

Fill the vial with still water up to the circular level of the vial.

Shake until a homogeneous liquid is obtained. If necessary, refill the water up to the level and shake.

Shake the vial well before each use.

Use the measuring spoon provided with the vial to measure the prescribed dose. Wash the measuring spoon after each use.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

## **7. MARKETING AUTHORISATION HOLDER**

**LABORATOIRE INNOTECH INTERNATIONAL**  
22 AVENUE ARISTIDE BRIAND  
94110 ARCUEIL

## **8. MARKETING AUTHORISATION NUMBER(S)**

- 34009 333 588 2 2: 5.1 g of powder (equivalent to 12 measuring spoons of 5 ml) in a 60-ml vial (amber glass) with a measuring spoon (polypropylene). Box of 1.

## **9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION**

Date of first authorisation: 05 March 1991

Date of latest renewal: 05 March 2011

## **10. DATE OF REVISION OF THE TEXT**

28 December 2018

## **11. DOSIMETRY**

Not applicable.

## **12. INSTRUCTIONS FOR PREPARATION OF RADIOPHARMACEUTICALS**

Not applicable.

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## **GENERAL CLASSIFICATION FOR SUPPLY**

List I