

ANNEX B

Laminarin

B.1 Identity

B.1.1 Identity of the active substance (Annex IIA 1)

B.1.1.1 Name and address of applicant(s) for inclusion of the active substance in Annex I (Annex IIA 1.1)

Applicant : Laboratoires GOËMAR S.A.
Z.A.C. La Madeleine
Avenue du Général Patton
35400 Saint-Malo
FRANCE

Contact person : Dr. Jean-Claude YVIN
Phone : +33 (0) 2 99 21 53 70
Fax : +33 (0) 2 99 82 56 17

B.1.1.2 Manufacturer(s) of the active substance (Annex IIA 1.2)

The active substance is a natural compound extracted from a sea brown alga, named *Laminaria digitata*, by :

Laboratoires GOËMAR S.A.
Z.A.C. La Madeleine
Avenue du Général Patton
35400 Saint-Malo
FRANCE

Location of plant : idem

Contact person : Dr. Jean-Claude YVIN
Phone : +33 (0) 2 99 21 53 70
Fax : +33 (0) 2 99 82 56 17

B.1.1.3 ISO common name and synonyms (Annex IIA 1.3)

Proposed name : LAMINARIN (< original dossier)
Until now, this proposal has not yet been submitted to ISO. In fact, notifier now intends to propose another name (probably SOLAMIN) and to submit this new proposal to ISO

Synonym : LAMINARAN (Ref : Merck Index)

B.1.1.4 Chemical name (Annex IIA 1.4)

IUPAC nomenclature : (1→3)-β-D-glucan
(according to IUPAC-IUB Joint Commission on Biochemical Nomenclature)

CA nomenclature : -
(notifier has submitted a description of the structure to CAS, in order to confirm that the CAS-number [9008-22-4] is acceptable for the structure of the Laminaran extracted from *Laminaria digitata* and to obtain a CA name)

B.1.1.5 Manufacturer's development code number(s) (Annex IIA 1.5)

Active substance : LAMINARIN
Code number : H11

Code name for the active substance	Code and batch numbers for the active substance	Date of production	System of production
PHYCARINE®	96S51	December 1996	Industrial
LAMINARIN	H 11-99S10	March 1999	Industrial
LAMINARIN	H 11-99S21	May 1999	Industrial
LAMINARIN	H 11-99S24	June 1999	Industrial
LAMINARIN	H 11-S012000	January 2000	Industrial
LAMINARIN	H 11-S232000	May 2000	Industrial

Batch 96S51 was used for toxicological tests : acute toxicity studies (oral, subcutaneous and by inhalation), primary irritation (cutaneous and ocular), cutaneous sensitisation.

Batch 99S10 was used for *Daphnia magna* study and for a toxicological test (micronucleus study).

Batch 99S21 was used for toxicological tests (*in vitro* mutagenicity) and for study on algal growth.

Batch 99S24 was used for toxicological tests (90-day and teratogenicity).

Batch S012000 was used for the determination of physical and chemical properties on the technical material and for ecotoxicological tests (biodegradability, bees, cold- and warm-water fish).

Batches 99S10, 99S21, 99S24, S012000 and S232000 were the 5 batches used for the five-batch analysis study.

Batch S210300 (purity = 98 %), obtained by purification of batch 99S21, was used for the determination of physical and chemical properties on the pure active substance.

Formulation : PHYLIQ
no code number specified

Code name for the formulation	Batch n° for the formulation	Date of production	System of production	Laminarin batch n°
PHYLIQ	980305	05 March 1998	semi-industrial	S47-1(97)
PHYLIQ	990301	01 March 1999	semi-industrial	S47-1(97)
PHYLIQ	9912812	15 December 1999	laboratory	99S21
PHYLIQ	000211	03 February 2000	semi-industrial	S012000
PHYLIQ	L000713	17 July 2000	laboratory	S012000
PHYLIQ	L001204	04 December 2000	laboratory	S012000

Batches 980305, 990301 and 000211 produced in semi-industrial systems were used for efficacy tests.

Laboratory Batch 9912812 was used for acute toxicological tests.

Laboratory batch L000713 was used for the physical and chemical properties of the formulation.

Laboratory Batch L001204 was used for testing on non-target arthropods.

B.1.1.6 CAS, EEC and CIPAC numbers (Annex IIA 1.6)

CAS number : 9008-22-4
EINECS number : 232-712-4
CIPAC number : 671

B.1.1.7 Molecular formula, molecular mass and structural formula (Annex IIA 1.7)

Laminarans are a class of low-molecular weight β -glucans which appear “to be the food reserve of all brown algae” (Painter, 1983). Among the different species, they differ by the number of units (20 to 30 in general), the proportion of branching points (determining the level of water solubility), the position of linkage (1, 3, 6), and the presence and proportion of terminal mannitol residues. The different types of laminarans have been extensively reviewed in the literature (see for instance Percival and Mc Dowell, 1985).

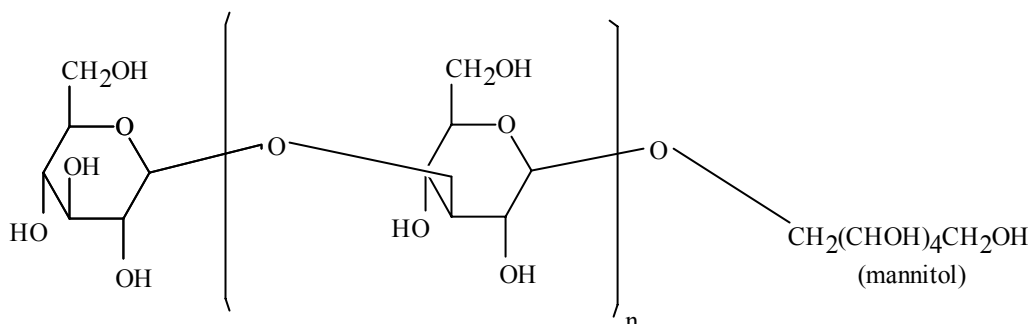
In the case of Laminarin (= laminaran from *Laminaria digitata*), the size heterogeneity and branching structure have been particularly studied by ElectroSpray-Ionisation-Mass-Spectrometry, ESIMS (Read et al., 1996).

It appears to be a β -(1 \rightarrow 3)-linked D-glucan with occasional β -(1 \rightarrow 6)-linked branches, composed of a major M-series containing 20-30 glucosyl residues linked to a mannitol terminal residue, and a minor G-series containing 22-28 glucosyl residues. Both series have a mean degree of polymerisation of 25 glucosyl residues and an approximately 3:1 molar ratio of M-series to G-series molecules is maintained across the range of molecular sizes. M-series molecules contain 0 to 4 branches, with an average of 1.3 branches per molecule ; branched G-series molecules are also detected. This study also showed that 75 % of branches are single glucosyl residues.

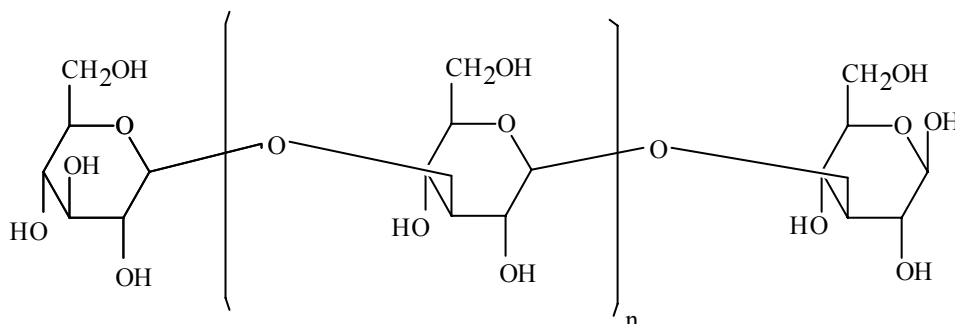
Molecular formula : $(C_6H_{12}O_6)_n$ $n = 25$ to 30

Molecular mass : $4500 - 5000$ g/mol

Structural formula :



M-series molecules



G-series molecules

B.1.1.8 Method or methods of manufacture (Annex IIA 1.8)

Confidential information, see Annex C

B.1.1.9 Specification of purity of the active substance (Annex IIA 1.9)

Minimum purity : 860 g/kg on dry matter

Nominal purity : 930 g/kg on dry matter

B.1.1.10 Identity of inactive isomers, impurities and additives (Annex IIA 1.10)

Confidential information, see Annex C

B.1.1.11 Analytical profile of batches (Annex IIA 1.11)

Confidential information, see Annex C

B.1.2 Identity of the plant protection product (Annex IIA 3.1; Annex IIIA 1)

B.1.2.1 Current, former and proposed trade names and development code numbers (Annex IIIA 1.3)

Trade name : not yet determined

Development code : PHYLIQ

B.1.2.2 Manufacturer or manufacturers of the plant protection product (Annex IIIA 1.2)

Manufacturer of the preparation : Laboratoires GOËMAR S.A.
Z.A.C. La Madeleine
Avenue du Général Patton
35400 Saint-Malo
FRANCE

Location of plant : idem

Manufacturer of the active substance : idem

Contact person : Dr. Jean-Claude YVIN
Phone : +33 (0) 2 99 21 53 70
Fax : +33 (0) 2 99 82 56 17

B.1.2.3 Type of the preparation and code (Annex IIIA 1.5)

Soluble concentrate (SL)

B.1.2.4 Function (Annex IIIA 1.6)

Elicitor of the crop's self-defence mechanism

B.1.2.5 Composition of the preparation (Annex IIIA 1.4)

Table B.1.2.5-1 : Composition of PHYLIQ

Component	Content (g/L)	Function
Laminarin - pure a.s. - technical a.s. (nominal purity : 93% on dry matter)	37 39.8	Active substance
Other components	Confidential information, see Annex C	

B.1.3 References relied on**Identity of the active substance**

Annex Point / Reference number	Author(s)	Year	Title Testing facility, Report n°, GLP or GEP Status published or not	Data Protection Claimed Y/N	Owner
IIA 1.2/01	BLACK W.A.P., DEWAR E.T.	1954	Laminaran J.Sci. Food Agric., 5, 137-145 Non-GLP, published	N	-
IIA 1.4/01	Anonymous	1982	IUPAC-IUB Joint Commission on Biochemical Nomenclature (JCBN) - Polysaccharide Nomenclature - Recommendations 1980 European Journal of Biochemistry, 126, 439-441 Non-GLP, published	N	-
IIA 1.7/01	PAINTER T.J.	1983	<i>Algal Polysaccharides.</i> <i>in</i> The Polysaccharides – Eds G.O.Aspinall - Academic Press 197-285 Non-GLP, published	N	-
IIA 1.7/02	PERCIVAL E., MC DOWELL R.H.	1985	<i>Algal polysaccharides.</i> <i>in</i> Biochemistry of storage carbohydrates in green plants, 305-347- Eds P.M.Dey and R.A.Dixon- Academic Press Non-GLP, published	N	-
IIA 1.7/03	READ S.M., CURRIE G., BACIC A.	1996	Analysis of the structural heterogeneity of Laminarin by electrospray-ionisation-mass spectrometry. Carbohydrate Research, 281, 187-201 Non-GLP, published	N	-
IIA 1.10/01	Confidential information : <i>Please refer to Document J.</i>			N	-
IIA 1.10/02	Confidential information : <i>Please refer to Document J.</i>			N	-
IIA 1.10/03	Confidential information : <i>Please refer to Document J.</i>			N	-
IIA 1.11/01	TREBERT R.	2001	Confidential information : <i>Please refer to Document J.</i> SGS Laboratoire Crépin – Study N° BPL 200007/0395 GLP, unpublished	Y	GOË
IIA 1.11/02	TREBERT R. COUSIN C.	2002	Confidential information : <i>Please refer to Document J.</i> SGS Laboratoire Crépin – Study N° BPL 200111/0388 GLP, unpublished	Y	GOË