Table I.

Reactant	Temp. (°C)	Position of introduced CN	mp (°C)	Yield (%)
Quinoline 1-oxide	75	2a)	171	85
Isoquinoline 2-oxide	75	1a)	207	85
1,6-Naphthyridine 1,6-dioxide2)	25	2,5 (dicyano)b)	248 (decomp.)	20
		2b)	260 (decomp.)	10
		5b)	257 (decomp.)	10
1,6-Naphthyridine 1-oxide2)	25	2b)	236 (decomp.)	80
1,6-Phenanthroline 6-oxide3)	25	5b)	220	82
Phenanthridine 5-oxide	50	6a)	217	58

a) The structures were determined by admixture with authentic samples.
b) The structures were determined by elemental analyses and IR and NMR spectra.

A more quantitative consideration will be made using molecular orbital theory in a full paper.

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The Isolation of Neojusticin from *Justicia procumbens* Linn.

Justicidin A (I) and B (II), fish-killing components have been reported from *Justicia Hayatai* var. *decumbens*.1) We now report the isolation of a new lignan named neojusticin from *J. procumbens* Linn. var. *leucantha* Honda (Japanese name, Kitsunenomago).

The ether extract of dried plant on chromatography afforded justicidin A and B as major components. Two of minor components were diphyllin (III)2) and a new compound, neojusticin. Neojusticin, mp 273—275°, $C_{21}H_{14}O_7$ (M^+ calcd. 378.074, found 378.074) possesses one methoxy group (δ in $CDCl_3$ 4.31 (3H, s)), two methylenedioxy groups (6.06 (4H, s)), a γ-lactone methylene (5.10 (2H, s)), and five aromatic hydrogen atoms (7.70 (1H, s), 6.99 (1H, s), 6.95 (1H, d, $J=7$ cps), 6.78 (1H, s), and 6.72 (1H, d, $J=7$ cps)). UV $\lambda_{max}^{CHCl_3}$ mμ (log ε): 263.5 (4.69), 298 (4.01), 319 (4.03), and 355 (3.47). IR ν_{max}^{KBr} cm^{-1}: 1760 (γ-lactone carbonyl), 1605 (aromatic), 933 (methylenedioxy group).

The nuclear magnetic resonance (NMR) signals of aromatic hydrogens and ultraviolet (UV) spectrum of neojusticin resemble those of justicidin A (I), which means the both compounds should have the same substitution pattern. However, the NMR signal of γ-lactone methylene group (5.10) suggested system A rather than system B for neojusticin because Horii and his co-workers3) pointed out that the methylene group in system A appears between 5.08

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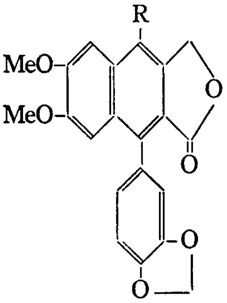
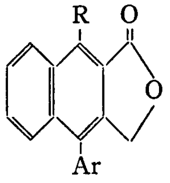
1) K. Munakata, S. Marumo, K. Ohta and Y.-L. Chen, *Tetrahedron Letters*, **1965**, 4167; **1967**, 3821; *idem*, *Agr. Biol. Chem.*, 33, 610 (1969).
2) T. Murakami and A. Matsushima, *Yakugaku Zasshi*, **81**, 1596 (1961); Z. Horii, K. Ohkawa, S. Kim and T. Momose, *Chem. Commun.*, **1968**, 653.
3) Z. Horii, M. Tsujiuchi and T. Momose, *Tetrahedron Letters*, **1969**, 1079.

and 5.23 ppm whereas 5.32—5.52 in system B. Moreover, the methoxy signal (4.31) comes out in much lower field than justicidin A (3.80, 4.03, and 4.09), which also supports system A for neojusticin. These evidences lead structure (IV) for neojusticin.

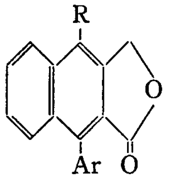
Neojusticin would be the sole example of naturally occurring 1-oxygenated-2,3-naphthalide lignan (system A) since the structure of taiwanin E4) is represented by VI3) not by V. Neojusticin has fish-killing activity as well as pentachlorophenol.



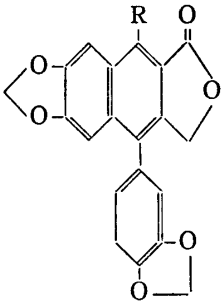
I : R=OMe
Ⅱ : R=H
Ⅲ : R=OH



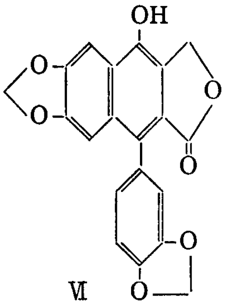
A



B



Ⅳ : R=OMe
Ⅴ : R=OH



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4) Y.-T. Lin, T.-B. Lo, K.-T. Wang and B. Weinstein, *Tetrahedron Letters*, **1967**, 849.